

KEEPING IN RESERVE:
RETHINKING EARTH CRISES THROUGH ACTS AND
ARCHITECTURES OF RESERVATION

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DECLARATION OF AUTHORSHIP

I, Joana Trigueiros Rafael Sampaio Rodrigues declare that this thesis and the work presented in it is entirely my own. Wherever contributions of others are involved, every effort is made to indicate this clearly.

Signed:

Date: 04 December 2017

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DEDICATION

To *Danny Wolfers*,
who has released circa 28 EPs and 7 LPs under 10 different aliases,
while I wrote this text

ABSTRACT

This thesis concerns architecture and engages with redefining architecture in terms of its relation to acts and structures of reservation, both posited as causes of, and as solutions to Earth crises – i.e. crises related to human-induced threats to, or arising from, the planetary environment. Here, what is meant by “reservation” is the production of (and the) arrangements to secure and keep apart – i.e. *in reserve/s* – things perceived as threatening to humanity or vital to its survival. In addition, the term here refers to another aspect of reservation - the expression of doubt regarding the efficacy of such arrangements.

This thesis contends that, despite being intended to act as architectural solutions, agents or safeguards for the future and safety of (human) life on the planet, by failing to respect the inescapably interconnected nature of the environment and the reciprocity of its processes - their extensive, cumulative and temporal qualities – reserve arrangements exacerbate rather than lessen the problems they set out to address. These assimilate the very structure and pattern of crises they attempt to resolve, and keep morphologically reproducing the ill effects of threats - thus, not only exposing architecture and the reserve fragile *limits* but, ultimately, cementing them as fictions.

This argument is made in relation to attempts to guard and defend against three categories of threat from Earth crises: destruction and danger; depletion of natural and artificial resources; contamination and pollution. These are read through ‘voiced reservations’ from the fields of Arts, critical theory, Earth (and social) sciences, radical ecology, speculative philosophy, cultural studies, architectural theory and even science fiction, which offer theoretical means to reflect on general laws of acting upon the planet and in relation to the future. Problematizing the construction of the planet through the logic of the reserve, this thesis calls for new methodological engagements.

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INTRODUCTION

This thesis aims to contribute to knowledge in the field of architecture by approaching and thus redefining architecture in terms of its relation to acts and structures of reservation, both posited as causes of, and as solutions *to*, Earth crises – i.e., crises related to culturally (or socially) induced threats to, or arising from the planetary environment. The term ‘reservation’ as I am using it here has a number of meanings. First, it refers to the production of spatial/architectural entities designed either to secure and keep apart – i.e. in reserve/s – things perceived as threatening to humanity or vital to its survival. Secondly, it refers to the reservation arrangements whereby such things are secured and isolated; arrangements which act as architectural agents in support of attempted solutions to Earth crises intended to safeguard the future and safety of (human) life on the planet. Thirdly, the term ‘reservation’ has to do here with the expression of doubt, within this thesis, regarding the efficacy of such arrangements, that is, the *voicing of reservations* about the incompleteness – indeed, the *uncompleteness* – of such intentionally-designed reserves, in the sense that these *keep in reserve* also the emergence of unplanned, unanticipated and often unwanted consequences, as I will argue here. As a major focus of this thesis, this argument is made here in relation to a number of attempts to guard and defend against threats from Earth crises, and perceived dangerous effect these produce.

This thesis thus examines and ‘voices reservations’ about the presentation of architectural acts and structures of reservation as supposedly effective means of dealing with Earth crises and the issues arising from them, but which they are, in actuality, prolonging and/or adding to, not solving.

Amongst the key findings of this thesis is that the threat, or threats of Earth crises are part and parcel of the way we have organized, and continue to insist on, organizing our world. The emergence and integration of these threats owe much to the organizing potential of architecture and its designs, through which we have accomplished the development and urbanization of the planet. These are often designs that attempt to provoke change through the realisation of supposedly isolated systems, in relation to which a vision of the future may often be employed (as validating) and

validated, and simultaneously dismissed as just one possible vision. Such designs reflect the modern sociological (and anthropological) ideology and the philosophy that have dictated the current state of affairs, and that continue to be invested in addressing issues of Earth crises. Through this continued focus and emphasis, the ‘solutions’ that issue from this thinking and practice both assimilate the structure and pattern of crises, and end up *keeping in reserve/s* – i.e., thrusting aside, instead of relieving – such threats *and* their causes. Such ‘solutions’ rely on acts and structures that may be seen to have been, and to continue to be causal of them, by, in their *keeping in reserve/s*, their keeping in reserve *also* of the threat which is the foundation of each crisis, and thus that of the reserve, and, this thesis will argue, ultimately that of architecture itself. Hence, these reserves are architectural solutions that demonstrate an inadequate engagement with the posited and actual threats of Earth crises, and the issues and scales these introduce – including those integral to architecture’s own origins.

The acts and structures specifically addressed in this thesis relate to three different categories of threats from Earth crises. These are:

- 1) threats of (mass) destruction and incoming danger;
- 2) threats issuing from the depletion or erosion of natural and/or artificial resources;
- 3) threats issuing from the proliferation of the harmful by-production of human (civil and military) activities, such as (invisible) contaminants and pollutants.

All three may be further characterised as types of threat which:

- a) are inherently related with ecology;
- b) have (had) a strong impact upon culture and the planet;
- c) compel and have compelled the establishment of major reservation arrangements.

Reservation arrangements of the kind with which this thesis is concerned, include reserves of vital ecosystem *goods*, carbon and (renewable) energy sources; seed, blood and data banks designed to mitigate problems related to rates of extinction, habitat destruction, energy exhaustion, medical emergencies and other threats to biodiversity; and the various kinds of protective architecture that are built to reduce the probability and/or contain the aftermath of disasters that range from the cosmic to the chemical, biological and radiological (i.e. nuclear), and are intended to prevent,

ameliorate or remove the introduction and/or presence of harmful substances or products in and/or into environments.

These include architectures intended to deal with the fall of meteorites to Earth, the consumption of natural and artificial resources, and the large and massively expanding amounts of radioactive waste on Earth. As such, these are architectures within which, and which are proper to the types of arrangements *wherein*, the issues of, and discourses pertaining to the above-mentioned threats are inscribed. Despite the numerous attempts to legitimate these arrangements as effective means by which to address the urgency that has come to characterise the threat of Earth crises, where architecture is concerned, their implications have not been adequately or even specifically addressed in architectural history, theory and practice.

Any thorough examination of the roles that architectural solutions – i.e. structures and acts of reservation – play in relation to Earth crises has thus far been lacking. These structures have, thus far, been almost exclusively identified as manageable, aesthetically potent and/or productive (scientific) spaces, aimed at solving environmental and ecological problems¹ and/or decreasing rates of deterioration. The fact that critical attention has, thus far, largely focused on these features and observed (and perpetuated) this view of them has resulted in a degree of disjuncture between the production of spatial/architectural entities designed and advertised to mitigate the problems at stake, and their real feasibility. This thesis aims to address this gap, and so too this disjuncture in existing architectural theory by focusing on the threats retained in architectures aimed at containing them.

The discursive introduction of reservation itself as a specific field of inquiry within architectural history and critical theory, and within it of these acts and structures, is the original contribution to knowledge in the field of architecture that this thesis aims to provide. As this necessity implies, the use of reservation as a concept has been practically dismissed. The use in architecture of the term and concept of reservation is largely restricted to its attachment to statements and claims relating to activities undertaken to protect special landscapes and species (i.e. those regarded as important), and most reductively, to refer to spaces engaged in the service of functional architectures and their possible outcomes – such as repositories, warehouses, storage units and/or facilities, tanks, banks, treasuries, archives and other related spaces of

¹ As we will see in Chapters I and II, this relates to efforts to conserve dwindling natural resources and prevent further deterioration of the environment that has impacted on environmental policy and practices.

‘consignation’ (as defined by the French philosopher Jacques Derrida in his seminal take on archives, *Archive Fever*² (1995)). Outside of architecture, any good encyclopedia provides a number of separate entries detailing wherein and how the concept is instrumentalised; therein, one may find a number of spaces and activities consonant with this grasp of the concept.

For the purposes of this thesis, however the concept of reservation has proved far more capable than one might infer from the spaces and activities detailed above. Here, reservation shall be seen as operating through, at the basis of, and in a synchronous manner with architecture, as medium, design strategy and procedure. As such, reservation will be used as a framework for critically interpreting what architecture *is*, and/or has come to represent, and its inherent abstraction; what architecture postulates, and what it relates to, in its traditional formulations; in its actual and contingent behaviours; and above all in its relationship with threats of Earth crises.

Saving Demands

Scholars and authors leading concerns and debates of issues of Earth crises – whether as individuals (such as Al Gore and many other contemporary environmentalists, eco-critical theorists and practitioners³), or those gathered together into scientific societies and governmental organizations (such as the Intergovernmental Panel on Climate Change (IPCC), the United Nations Environmental Programme), environmental non-governmental organizations and the Anthropocene Working Group⁴ – are now in agreement that ‘we’, i.e. humans, have completely transformed the planet and degraded the environment at all spatial scales, from the local to global, thus directly and indirectly threatening the functional continuity of the Earth’s systems, with dramatic consequences for life on the planet. The resulting challenge – as reports on the implementation of agreements, from the Earth Summit (1992) to Climate Action (2014) announce – is global. The complexity of phenomena associated with threats of Earth crises demands us to devise and implement changes to our ways of acting and living, in and in relation to the (human) environment. What we now require are *robust* answers:

² See the RESERVE glossary entry, in Appendices.

³ These are theorists and practitioners involved in the interdisciplinary study of culture and cultural products connected with humanity’s relationship to the ‘natural’ world and the environmental destruction we have wrought, such as Glen Love, Timothy Morton and others ahead.

⁴ The Working Group on the Anthropocene includes the earth scientists Paul Crutzen, Eugene Stoermer and geologist Jan Zalasiewicz, amongst many other scientist, geologists and geographers. The term ‘Anthropocene’ denotes the present time interval, or geological era, as one in which many geologically significant conditions and processes are and have been profoundly altered by human activities. Chapters I and II include more detail on this thesis and debate.

modes by which to address these problems and enact the kind of progress that can safeguard the ecosystems *goods* and energy sources that have supported and can support the wellbeing of a large part of humanity, and achieve a sustainably healthy planet. The survival of our societies, cultures and civilizations – as well as of our species – depends on a stable climate and planet. Without such modes of response, it is now widely acknowledged that humanity is doomed.

The current conception of the structure and functioning of the Earth's systems is that these are now and have been profoundly influenced by human activity. Architecture itself, as constitutive and constituent part of our human environment (and thus also of the destruction and degradation of the planet), is inevitably implicated; doubly so, in fact, as the preferred tool and main agent in strategic 'solutions' set to address the challenge, and so implicated also as the agent of those consequences of these 'solutions' which (have) come to be perceived as dangerous. The thinking and questioning of what is to be done to control our impact on the planet, change the course of our development and save the planetary environment, and of and *how* is it to be done, is as innately architectural and constructive as it is ideological. This thus justifies the rationale for the recourse to architecture – its basic tools, modes of thinking and of ordering, and as an *art of building* – by those who have agency, and also the endeavour of this thesis to redefine architecture in terms of its relation to the causes of, and to projected solutions to, Earth crises.

All too often, both architecture and those engaged in its practice as a means of seeking the solutions that they (we) need to meet the crises – as exemplified, for example, in the recent series of 'sustainable' and 'ecological' designs, advertised as solutions fit to safeguard habitats from destruction and other environmental impacts through their low-impact construction and operation – only end up worsening the crises.

Despite being driven by a humanitarian ethics of salvation, fuelled by a fear of loss when regarding the risk of real ecological collapse, such design solutions often appear at once to be moved by the facilitation of economic growth and market speculation. Those undertaking them seem to perceive it possible to address the risk posed by Earth crises via a profit-oriented, economic and ecological perspective, and to find these aims compatible. As I hope to show in the following chapters, controversy has swirled around the question of whether or not the future achievement of a sustainable and healthy planet in the future should continue to be conceived of, or is

even possible should we continue to conceive of it as dependent on our ability to control, dominate and engineer our now-degraded physical environments to be ‘better’.

One of the major concerns dominating this debate relates to the logistical programme necessary to incorporate such solutions, which would appear to support a chain of attitudes and activities bringing yet more issues of destruction and danger upon us – those associated with the goods and services necessary to build and maintain them – than they aim to contain.

To illustrate this argument, it might be useful to refer here to the energy efficiency requirements in policies for domestic (and new) buildings, promoted by the Organisation for Economic Co-operation and Development and the International Energy Agency since at least 2008. Although these requirements are not within the remit of this thesis, they can help shed light on the underlying logic conditioning current responses to threats of Earth crises. On the whole, these requirements demand major building renovations and the replacement of, amongst other things, insulation materials as well as home appliances to realise feasible energy-saving potentials, introduce renewable sources of energy, and lower impact on ecosystems. The overriding intention is thus to introduce ‘sustainable’ and ‘ecological’ design into buildings for human habitation to lower the world’s energy consumption, a need which currently is largely met by fossil fuels, which are the major cause of environmental destruction and degradation. Yet, regardless of how you look at these demands, to rearrange things in this fashion implies the destruction of many of the extant materials and appliances in and of the house to make room for new ones. This approach also introduces preoccupations with the depletion of various natural and artificial resources, such as rare earth materials and the ruin of social and environmental contexts related with them. Similarly this has led to the proliferation of harmful by-products of human activities, and increased household exposure to mixtures of chemicals and toxins (released from these materials and appliances into the house), due to the problem of how to ventilate houses without wasting energy, as is routinely noted by the Scientific Committee on Health and Environmental Risks, one of the scientific committees that advises the European Community on health and environmental risks related to pollutants.

Consequently, requirements for domestic buildings to meet certain ‘eco’ standards can ultimately have negative implications for the environment and (indoor) human safety, quite contrarily to what they were set out for.

This thesis finds parallels in, and thus questions the nature of similar ‘solutions’ proposed in response to threats of Earth crises, and their conceptual and organisational logics. It suggests acts and architectures of reservation as a medium with which to think through and engage with the causes of, and proposed solutions to threats of Earth crises. It will argue that such questions may be effectively addressed by a critical examination of the real capacity that both of these – causes and ‘solutions’ – have of provoking substantial and highly detrimental disturbances in the environment. In addition, it will further propose that the architectures supporting (both the causes and) these ‘solutions’ are more a part of the problem than they are of any real solution. This, this thesis will argue, is due to the means, proper to architecture, that these employ to act upon the crises: the inherent hostility, and indeed duplicity, of the tools and endeavours architecture supports, that have themselves come to cause and announce many of the anthropogenic Earth crises we are facing. As part of this hypothesis, this thesis claims that these solutions not only have negative implications for the environment, and our safety, but are also detrimental to the discipline and practice of architecture itself.

Since the 1960s⁵, we have witnessed an exponential growth of interest in the causes of issues of Earth crises, as well as in their possible solutions. The increase in environmental and ecological concern during this period, (alongside that in the number of irreversible collapses) has centred on all sorts of ruinations and accidents. These include: the depletion of natural and artificial resources (and of many energy sources), damaged ecosystems, the extinction or near-extinction of many species, and the accumulation of a number of pollutants in the air, soil and waters. Moreover, as above, these concerns and debates refer to the deleterious impact of the way ‘we’/humans have continued to pursue development and urbanisation, and so transform the planet for the ‘betterment’ of the social, with the help of a pernicious architecture.

Those leading these concerns and debates, as noted, have put forward theories and evidence to assert that ‘we’/humanity have disregarded the entanglement between human and non-human and ‘Earth’ others, put the planet under pressure and destroyed life-forms and Earth systems that human life itself depends on for its very survival. They come from diverse fields and disciplines such as the study of culture, the natural

⁵ While the mid-twentieth to the early twenty-first century does indeed form a distinct period, it should also be noted that evidence of environmental change and destruction, have been divulged, and concerns for an increasingly ruinous (natural) environment discussed since at least the mid-eighteenth century; and that such concerns gave rise, throughout the early twentieth century, to sharp insights about the effects of human actions - arising from many different fields, stands and forms of environmentalism and disciplines such as from Earth sciences, geography, literature and the arts (see Chapter II), as well governments (see Chapter III).

world, the Earth (and social) sciences and radical forms of environmentalism; from eco-criticism, (bio)political and speculative philosophy, critical theory, contemporary media and even science fiction and the (other) arts. In general terms, as will be discussed in the chapters to come, their theories are centred and converge on ecology, health, human and natural rights (those of nature), and have provided notable information on the global side effects of environmental abuse and neglect, helping to define a pattern of ecologically and destructive forms of human life with observably interconnected global damage, as well as on possible, less harmful responses. Thinkers such as these have framed thesis such as Climate Change and the Anthropocene, as a means to focus public attention so as to initiate (and often subsequently to advise on) processes aimed at overcoming the problems, with results.

This ongoing, extended and ever-accelerating encounter with the threats of Earth crises has fostered both responsible debate and a growing ecological and environmental awareness that has engaged the efforts of a number of individuals willing to make it the object of serious reflection, as well extending to ever-wider audiences, those fearing for the end of humanity. From Rachel Carson's *Silent Spring* (1962) and Meadows and Randers's *Limits to Growth* (1972) to Isabelle Stengers' *In Catastrophic Times* (2009), some very 'inconvenient truths', as coined by Al Gore, in 2006, about climate change and global warming have been tabled. Despite the scepticism and denial that have striven to debunk the threats (and have thus negatively impacted on the collective will to cherish the planetary environment), during at least the 1980s and 1990s, evidence of the threats posed by Earth crises have shaken conceptual and metaphysical conventions as well as political and governmental conceptions. In this sense, they have given rise to a new empirical understanding of the place of man and his relationship with the planet; have lead organized efforts to teach and implement solutions to the problems; been made an integral component of international cooperation; and are now also part of the United Nations policy.

However, the projections based on current patterns and conditions of deficiency that were presented by the IPCC in its *Climate Change, Synthesis Report* (2014) indicate that the destruction has and will increase sufficiently to render entire regions of the planet permanently uninhabitable, if 'we'/humans don't work together to *control*, and not only to rethink our impact. According to these predictions, the planetary environment appears to be increasingly circumscribed as if by 'limits' brought about by the duplicity of 'our'/human endeavours, which, despite being intended for the betterment of the social, have put it at risk.

According to the Intergovernmental Panel (IPCC), as well as other individuals and organizations involved in debating the causes of crises and the solutions necessary to secure humanity's survival, 'we'/humans have now to face, and begin to get serious about the urgent need for robust answers and effective struggles to unlock these 'limits'. *Saving* has become one of the most significant challenges 'we'/humans currently face. This, already seems to figure the Earth as kept in reservation, but also seems to encourage a sort of absolute exploitation; a strange double movement according to old 'conservationist' mores, to save the planet from harm.

Amongst the efforts proposed and undertaken to address the urgency that has come to characterize our present, sites intended to guard and defend against threats of Earth crises so as to safeguard the future of humanity, such as those noted above, have become a notable recourse. These are sites engaged by various actors to provide the necessary solutions to allow humanity to live up to both the current and our imminently-expected circumstances, and thus guarantee that humanity can continue its development and indeed existence. These are also sites that, as per the above-mentioned 'sustainable' and 'ecological' designs for domestic (and new) buildings, are integral to various plans that encapsulate architectural approaches to *save* the planet (and deal with current human anxieties) through a retreat to an idea of sustainable development⁶ based on partitions, divisions and distancings. This is a retreat, this thesis argues, that, as *solution*, repeats largely the same instrumental approach to guarding and defending against risks and crises-related threats as that of the reserves of the past, only according to a slightly different logic, and whilst expecting different results, as follows. In other words, this is a retreat based on architectures of reservation and the acts supporting them that were traditionally mobilised to hold and manipulate our 'funds' in reserve/s or stockpiles for future use⁷, but that are now being mobilised to quarantine threats and/or avert them from ever actually materializing. In brief, as this thesis argues, these are the actual and conceptual structures underlying the building of partitions – of *reserve/s* – aimed at guaranteeing the isolation and distancing necessary to construct our world *as safe*, while failing to acknowledge that this isolation and distancing is, ultimately, fictional – along with the safety it is held to constitute.

6 The now-dominant paradigm of efforts to impede environmental and ecological disaster promotes the conceptualisation of managerial innovations to equilibrate change through green tactics and preservation protocols to meet crises, as discussed in Chapters I and II.

7 Examples of these reserves will be presented in Chapter I and Chapter III. But here, consider for instance the material stockpiling and logistical mobilization and confinement of resources for war and consumption.

Researching Reservations

The key to the argument of this thesis rests on an examination of the interlaced forms of acts and architectures of reservation implemented to solve the three types of threats of Earth crises mentioned above, at a number of specific sites and even that of the planet, from its outer limit to its ‘core.’ Above all, these are understood here as forms holding more risk than anticipated in their design concerns, as illustrated in the discussion of a series of unplanned, unanticipated and unwanted consequences brought about by such reservations.

The sites that I have chosen to focus on include the recent international planetary defence initiatives to study ways to deflect near-Earth objects on path to Earth that are being built above the atmosphere; the relinquishment and conversion into nature reserves of former (protected and exhausted) military sites such as Kyshtym and Chernobyl following nuclear disasters; and the geological repositories being promoted by the International Atomic Agency as able to store the by-products of nuclear technology for one billion years, and without future management, thus keeping them under our soils – *as if* off or outside of the planet - to secure our world (and its surface) from radioactive harm.

As before, these are the sites of reservation and limit-building structures whose examination best suits the purposes of this study, as they are precisely the type of arrangements wherein the causes, issues (and discourses) of the above-mentioned threats are being inscribed. As such, in attending to their form, this thesis will select and describe a number of features at play in many of our attempts to pretty much indefinitely *put off* these threats into tangible reserves or reservation arrangements, located either *over, on* or *deep inside* the planet. These examples have been planned in accordance with decisions aimed at altering the predicted patterns of crises and predicated in the awareness (thanks in part to its unceasing announcement) of the need to redress what is now widely understood to be an ecologically destructive way of ordering and building the planet. They are built, based on a calculus of risk and risk management, to insure us against threats from the (built and natural) environment, but have other consequences that, as this thesis will set out to show, act to reproduce and redouble the problems.

The historical precedent for the establishment of sites such as these, that is most often-referenced in this thesis is that of the Cold War, whose apocalyptic sense of ending, via the threat of nuclear holocaust, epitomizes both the most dystopian potential

of factors jeopardizing the social and environmental order, as well as of an accompanying mindset characterized by a present awareness of the potentially imminent end-of-everything being projected into the future. The particular emphasis throughout this thesis on both the present reality and recent historical context of the nuclear is further intended to illustrate, as a prime example of the kinds of processes, conditions, stockpiles, policies and programmes in which acts and architectures of reservation play a prominent, though often disregarded role.

The nuclear has been chosen here to serve this purpose for the following reason-clusters. Firstly, because of the quality of fear that the nuclear inspires, including both nuclear weapons and the set of energy structures; for the reason that it remains the most iconic expression of a technological end-of-the-world scenario; and for the poisonous effects of radiation, with its persistent intrusion upon our lives and physical (infra)structures (whether by design and/or accident), its special invisibility and mystery, killing power and destructive capacity. Secondly, because of the methods and efforts applied to maintain control over this capacity and source of fear, more particularly, in the face of the numerous doubts regarding the means by which, it is claimed, ‘we’ are able to keep it reasonably and rationally limited, controlled and stockpiled, for the purposes of retaliatory force and/or the overriding illusion of these limits and controls. Finally, it has also been chosen because of the way that, this thesis will argue, all of these facts and factors pertaining to the nuclear have more or less unnoticeably reshaped our perceptions of all of the other threats discussed here, over time.

The contexts and sites chosen for study here at once follow and extend the mode of ordering and protecting phenomena that ‘we’/humans have built powers upon. Above all, as this thesis will argue, these are contexts and examples defined and conditioned by a mode of power and ambition that is (fundamentally) at odds with a fundamental unity between beings (human, non-human and ‘Earth’ others), the threats from Earth crises and their origins.

As will be discussed in Chapter II, this oddity is fruit of ideological, scientific and technological assumptions and procedural convictions; it results and has resulted in dangerous experimentations with *boundaries* where boundaries cannot be easily drawn. In addition, as will be presented in Chapter I and reiterated throughout the thesis, it has to do with an architecture implementing inadequate or incomplete solutions to problems with the strategic means of reservation that initially seemed to ‘us’ incisive tools with

which to unfold, order and construct our world, but that have now been revealed, by and with the crises, as perversely double-edged swords, as follows.

Firstly, these strategic means of reservation rely on an architecture that, to be effective as a ‘solution’, would have to take into consideration an infinite variety of seemingly extraneous forces and factors that are hard to predict, just as architecture itself must try to do – none of which are at all amenable to being reduced or restricted, nor capable of being contained entirely in ‘final’ and ‘stable’ designs. Many of these forces are not architecturally containable at all: they may hardly ‘take place,’ hardly fit in a place, and exist only as an image of the future. They belong to not just probabilities, but possibilities derived from the inextricable entanglement between human, non-human and ‘Earth’ others. That is, they belong to the reciprocity of processes, cumulative relationships and temporal qualities that exist on the planetary scale, and of which we/humanity will (likely) always have limited knowledge.

Lastly, due to this limited knowledge, the realization of reserve/s can only deal with and factor in those variables and threats that are known to us. It is upon this limited basis, and within this framework that we tend to proliferate means to hold them, and construct ‘ideal arrangement’ schemes, without any guarantee that they will not lead to the very situations and processes they oppose or purport to solve, or engender and exacerbate others. It is in this sense that the reserve, and indeed architecture itself, leaves (or *keeps*) its most ‘final’ and ‘stable’ projects incomplete and open; while keeping threats related to contingency and contagion at a *misleading* distance. Thus, and in conformity with comforting illusions of feasibility and safety, forming means of acting in accordance with the concepts of reservation identified here.

As a result, this means of acting through the construction of reserves has not only come to cover vast territories of exclusion, confirming the inevitable increase in limited habitation territories anticipated by IPCC projections (2014), but, this thesis suggests, has also come to settle at odds with the perceived threats, and their origin. Both this means of acting and the architectures it implements may be shown to exacerbate the problems they set out to resolve, and thus remain rather problematic, as discussed throughout this thesis. Examples such as architectures intended to deal with the fall of meteorites to Earth, the consumption of natural and artificial resources, and the large and massively expanding amounts of radioactive waste offer themselves to a taking stock and critique of the mechanisms that support modernity’s mode of ordering and perfecting phenomena, as well as its (and all of architecture’s) structures as

contingent and indeed fictional *buildings*, constituting illusions as they do, and in so doing, also fuelling a sense of insecurity and state of anxiety over both threats and porous boundaries, leading to yet further acts and architectures of reservation. The recognition of this ‘oddity’ (as described above) is useful if we are to realise the need to bring our activities into a closer fit with our experience of the planet.

For this reason, the focus of this thesis is ultimately the Earth, our planet, and the articulation of the chapters has been arranged in a way that is intended to sediment knowledge and provide us with images of modes in which the Earth is and has been constructed by ‘us’ as and by a series of nested and interrelated reserves. Thus, responding to, and enabling representations of the endangered planet – both in theories of ‘limits’ and things, here mainly related to the nuclear, its reality and contexts – but as well, in its total mobilization for the ‘betterment’ and ‘improvement’ of society as a whole.

This approach is connected to and conditioned by the idea that while our Earth is being treated as a technological apparatus, the interconnectedness of all its parts, systems and other constituents is far more complex and generative than many of us know or anticipate. It suggests that our planet, in all its complexity, is revealed as the new schema for rethinking both our practices and the world-historical conditions that are and have been confronting us with pressing urgencies and disasters.

In the end, this thesis situates the reserve as a project and/or organizing programme, building on architectural strategies and techniques that set out to address and anticipate an *end* as a limit – that is, as both as an end in itself, and also *as* limitation – of a kind that all such projects (and all architectural projections) determine and create through their own somewhat (at some points, at least) impossible activity. It thus examines acts and architectures of reservation as means that paradoxically attempt to forestall or control the limitations of ‘end’ conditions via the establishment of limit-structures and boundaries, creating new limits of their own. These are structures and boundaries inscribed in attempts to provide protection from the complexity of our planet and the uncertainty of things and their future: these include attempts to protect the present from the uncertainty of time itself, and, more frequently, from present projections of the future, while at once imposing limits before/upon/in front of the very limits they themselves aim to mobilize, including those ‘limits’ now circumscribing the planet.

In terms of their activity, these architectural strategies and techniques may be seen to compromise the ‘solutions’ to the issues of crises. They are both inherited, and inherent to, notions of order that institute partitions and aim to effect distancing or hard-to-sustain limits. These are notions that currently figure as the last resource to insure us all against the risk and reality of predetermined threats of Earth crises; notions which are also sustaining the weakness and limitation of many of architecture’s engagements with limits and limit points.

Structure of the Chapters

The introduction to this thesis has thus far outlined its general fields of interest, its general argument and what this study aims to accomplish. The following chapters are divided into two parts and organised under a chiasmic structure, reinforcing the circularity of the arguments and integrating feedback from the structures under analysis and problems presented here.

At the beginning of each chapter there will be a recap of the previous chapter and an outline of the coming one. The intention is thus to intertwine the discourse among and between the chapters, while affirming that each is able to be read alone, and help situate the reader within the thesis.

Chapter I, entitled ‘Reserve as Response,’ is the background chapter of this thesis. It complements this introduction, and describes in more detail the hypothesis that brought me to address the causes of, and proffered solutions to Earth crises. It focuses upon my encounters as an architect-practitioner and researcher with the concepts, tools and logics of argumentation that have helped establish the reserve within, and at the basis of, various efforts and arrangements aimed at either solving or avoiding the problems of Earth crises (and coping with their related anxieties), as well as with certain cultural and ecological constructs of the very same crises, and my reflections upon them. My concern here has been to track a critical path through acts and architectures of reservation, built and/or conceived as intentionally constructive responses, while being at once, in fact, part of a troubling subtractive process, with respect to the conceptualisation of the spaces, forms and dynamics involved. The purpose of this chapter is also to articulate both the reasons given for reserve, as well as the impacts that future-focused reservations have upon the present, and the ‘place’ to which these reasons and impacts offer – or indeed consign – interest in issues of Earth crises.

In light of this aim, Chapter I is divided into two sections. The first, entitled ‘Concerning Reserve,’ details some of the ideas that led me to raise the various

questions addressed in this thesis and arguments enunciated in this introduction, mainly those relating to the practical activities designed to guard and defend things against threats. More concretely, it exposes those general, widely-held concepts, practices and ideas which frequently govern the task of keeping a suspected threat and/or threatening future under control and in suspension which architecture integrates within its own actions. Having set out these ideas, I then describe forms of housekeeping that provide a more complex perspective on the work of architecture and the reserve, and a few crises connecting both. The domestic serves a useful model for the architectural and for the planetary way of managing and organising (things in) space, and against threats of crises. It is therefore helpful, to understand how architecture both builds on concepts of reservation and builds reservations based on limits and tipping points, so as to reveal the illusion of security that both architecture and the reserve afford ‘us.’

The second section of Chapter I, ‘Reserve Responses’, offers more detail on the theoretical approaches that I have made use of in addressing architecture’s involvement with Earth crises. It gives the general outline of those essential features which I have found useful to define and demonstrate the fact that many acts and architectures of reservation (inevitably) arise which are linked to perceptions of negative environmental and ecological parameters, both as source and as a result of architecture’s relationship to the planet. In addition, it sets out the questions driving this thesis. As such, it is intended to provide the reader with a solid foundation to go on.

Chapter II is entitled ‘Earth and Crises Responses’ and it is the ‘Literature Review’ chapter of this thesis. It develops on the questions introduced in the first chapter, and describes and situates the theoretical approach that has been exerted upon them, within its specialised domains and own special history. More specifically, it provides a description of the arguments and inquiries employed in this thesis to productively problematize current ‘solutions’ to Earth crises. The chapter then integrates these arguments and inquires into the main thesis, developing a sequence of intertwined arguments leading away from the current general disappointment with the state of the world and the prospect of Earth crises, toward a renewed commitment to the opportunity we have to change the course of catastrophe, Earth crises introduce.

The first section of Chapter II, ‘Earth-as-Planet’, thus examines the place that the Earth, our planet has come to occupy in the current Earth crises-related debates. It also outlines the basic assumptions, forms of consensus, salient themes and critical relations that figure in relation to the human-induced disaster, in terms of how crises are

conceptualised, and provides further context to the ways in which acts and architectures of reservation, reserve strategies and formations function as conceptual rescue and immunisation devices, holding life itself in waiting. It explains that these ideas are informed by (bio)political discourses providing shared context, support and legitimacy for the construction of a political ecology that is fundamentally complicit with conceptual, techno-scientific and ideological ordeal foundations – and it describes ideas which stand in opposition to them.

In line with this idea, the chapter opens with a work of Arte Povera, conceived at a particular moment at which debate on ecological and environmental crises had intensified (and when there was an undeniably marked increase in such crises). This work, entitled *Socle Du Monde*, challenges the worldview, metaphysical tradition and agenda of the time, and affirms a different set of values to those then accepted as the norm. It points to a radically altered relationship between us in the West, and the planet, one that may easily be connected with other positive and inspiring reconfigurations, such as the displacement of anthropocentric relations towards an enlarged sense of interconnection between the human and the nonhuman, and the Earth as other (s); as material, yet not passive and inactive: vital ground. In addition, it opens to new ethical alternatives and relational values and perspectives, but which cannot be accomplished or realised without fundamentally changing our presence – that is, our perception of our presence – on the planet. This leads into the central discussion in this chapter of ‘weak thought’ as per Gianni Vattimo: a realm of inquiry that confronts the ontology of metaphysical power, only to distort and deconstruct its sources of attachment and introduce complexifying concepts and the reserve itself into the discourse.

In sum, Chapter II provides the lens through which this thesis analyses and criticises acts and architectures of reservation. In addition, as the second part of the chapter, ‘Planet in Crisis’ further exposes, it sets the scene for the thesis to argue that this means of acting through the construction of reserves is not helping to lessen the problems that it sets out to address – such as restoring or reviving that which is destroyed, exhausted and/or polluted. Instead, as this thesis argues, this type of ‘solution’ to threats and problems of Earth crises is itself, in fact, at the root of these Earth crises.

From this point on, the thesis begins to focus upon the distribution, conceptualisation and proliferation of a series of interlaced forms – acts and

architectures of reservation around the chosen sites – and the challenges they pose to the planet.

Entitled ‘Results Orientation’, Chapter III provides a still firmer foundation for assessing these challenges, which allows for the perception of these acts and architectures of reservation as both negative and positive responses to issues of destruction and danger and the exhaustion of natural and human resources. From the Chelyabinsk meteorite to ballistic missiles and the A-bomb, it compares distinct but interconnected potential threats to planetary stability. These are threats that sustain fidelity to national and rational government, and threats that legitimate militarized politics of protection (of space and populations) to establish and distribute a system of firmly physical but also epistemological limits, moral contours and reservation arrangements.

The first section of the chapter, ‘Risk Control’, examines the physical and epistemological limits directly implicated in logics of control and containment employed to construct a limitless, virtual extension above the Earth’s atmosphere, to forestall the Earth’s limitations and *keep* the planet *in reserve* for the purpose of strategic defence initiatives. This is an extension devised according to default strategies that are highly contested as science-fictional, i.e. scientifically fictional, and whose construction and implementation are held to be directly responsible for the escalation of environmental and ecological disasters.

The second section of Chapter III, ‘Building Subtraction’ develops further on these default strategies. It re-scales the focus of the analysis to an examination of a place where the impact of a meteorite has actually been felt. It does so also because this place is considered one of the most damaged environments on the planet, ravaged by deadly emissions from ‘a’ Soviet strategic defence initiative’s facilities for reprocessing nuclear missile technology – and has itself been designated and managed as a form of reserve, according to a strategy – or, more precisely a number of reserve strategies and formations, even undergoing a series of conversions, from natural refuge to military headquarters, then from military dumping ground to nature reserve and touristic destination. These conversions entail particular constructions of the place where the meteorite fell, and are characterized by a preoccupation with the disguising and secrecy of the site, so as to maintain it within *inviolable* limits. These are constructions imposing protected zones reliant on (local) territorial boundaries to confine and secure nuclear threats in a particular place. But, as this chapter demonstrates, as nuclear

reservations, such constructions provide excuses for extreme crackdowns on civil liberties, and are highly contested as such. The consideration of a reservation such as this also highlights ever-greater concerns regarding the interconnectedness of all life forms, and the inter-linkage between a staggering array of threats and infrastructures that are highly vulnerable to disasters, putting people who are thought to be safe at risk.

In response to crises, architecture is limited to prefiguring ‘stable’ and ‘final’ configurations: building limits, confined and bounded entities – reserves. Chapter IV, ‘Material-containment,’ proposes a more critical engagement with its works. It explores a system of limits and reservation arrangements like to that portrayed in the previous chapters, only here through the very limitations of limit-drawing practices and architectures. From the results of this undertaking, it then speculatively extrapolates the potential impact of future reservations – similarly created through the control and enclosure and isolation of spaces – upon the present. Here the focus is emphatically on the ecological and environmental effects of the nuclear industry and nuclear warfare. For this reason, the first section of Chapter IV, ‘Safety-Distance Safety’ reproaches the environmental costs and the ‘*inviolable* limits’ exemplified by the 1986 Chernobyl disaster and clean-up, in particular the establishment of an exclusionary zone around the Chernobyl Nuclear Power Station to deal with the release of radioactivity into the environment, at the ground level.

Having set out these ideas, the second section of Chapter IV pushes the enquiry to the underground, to the very earthliness itself; the history of the Earth and the Earth’s geological structure. Entitled ‘Isolation Protection’, it investigates the Onkalo Nuclear Waste Repository, now being hollowed-out 400 metres deep, intended to last for a million years into the future. This facility fits the profile for a future structure that is creating artificial forms of fossils intended to disappear together with the toxic and nuclear materials embedded in them. These fossils engage with strategies that are determined by a specific relation of Western culture to epistemology and a set of relations that support a correlation strategy which, this chapter argues, diminishes the awareness of time itself and leads society to be even more apprehensive of the future.

The aim of this chapter is to demonstrate that the potential of this particular structure is resolutely spatio-temporal, but also science-fictional. As paradoxical as it sounds, it puts Subjects in a passive position of domination, via an artificial mimicry of (the artifice of) fossils that destabilizes the reservation arrangement aimed at disappearing with the toxic and nuclear materials, but a mimicry that, nevertheless

induces more persuasive reservations: persuasive, because, ultimately, these artificial forms of fossils follow acts and architectures of reservation ‘machined’ with the limits of our knowledge of, and in geological formations, as if off-planet, as before. This closure, this chapter argues, compromises the solutions to nuclear waste problems that are being posed (and imposed) in relation to Chernobyl’s plans for decommissioning. Most importantly, it compromises a more direct and engaged sensibility with the waste and the threats to, and arising from the environment associated with it.

Tools and Methods

In order to enhance the understanding of these sites and aid exploration of the problems, threats and obscure dangers they have unleashed, this thesis draws on interdisciplinary scholarly and evidence-based research, documenting and detailing the chosen sites. These include readily-available sources such as public records, films, reports, strategic policies, programmes and action plans; those published by international organizations such as the United Nations, as well as by scientists, journalists, artists and activists. In addition to these sources, it also includes interviews and site visits conducted within the Chernobyl Exclusion Zone⁸. These site visits were more experiential and observational than ‘fact-finding’ as that phrase might normally be understood. They were conducted to experientially contextualise and thereafter help me to reframe the facts and ideas consolidated around the zone, and to reflect on issues related to the feasibility of the Zone to hold or keep things and potential threats in reserves, as pondered by those legitimating and/or criticizing such sites as safe solutions.

To support its examination of the chosen sites, as well as the testing and presentation of the overall argument, this thesis builds on the theoretical and philosophical perspectives and conceptual reservations of such scholars and authors as Paul Crutzen and Jan Zalasiewicz, Gianni Vattimo, George Bataille, Jean Baudrillard, Bruno Latour, Isabelle Stengers and Paul Edwards, fleshing out the idea of an expanding field of architecture whose narrow framing and methodological limits demand attention. Other important sources have come from my appreciative encounter with radical forms of environmentalism such as those espoused by Mick Smith and Peter C. Wyck, and speculative thinkers such as Timothy Morton, who engage with the crises and the proffered ‘solutions’ to their problems, criticize their foundations and

⁸ These site visits were conducted on July 13th and 14th, 2011; these interviewees include residents who have refused to leave the Zone, technicians responsible for surveying the Zone, and Michael Madsen, director and Scriptwriter of *Into Eternity* (2009), a feature documentary about the Finnish nuclear waste repository, also the subject of Chapter IV.

directly ponder the (future) effect of architectures mobilized to construct and legitimate the acts of reservation intended to solve them. Crucially, these thinkers are among the few to engage with the serious impasse brought about by an emerging era of eco-catastrophic, social and anthropocentric acceleration that has the effect of placing alternative solutions (and priorities) into a dangerous (indeed, potentially fatal) kind of limbo.

In short, these scholars and authors have helped me to discover and forge links between processes, instances of architectural interventions and sites of reservation that might seem far apart in nature and even in time, but are in fact deeply interconnected – as well as to understand their entanglements with Earth crises. Most importantly, these authors have help me define the specific forms at play in the intention of *keeping in reserve*. They have further helped me gain understanding that there might be a way to think *with* architecture to meet – and fix – the crises. In addition, these authors have provoked ideas with which I am better able to describe the reserve, as the fundamental architectural means, constitutive part, preferred tool and main agent of strategic ‘solutions’ to Earth crises; as well as ideas with which to better articulate the features of architecture *as* reserve, as described in Chapter I.

Here I should highlight the fact that that the themes and concerns that define Martin Heidegger’s account of instrumentality in the *Question Concerning Technology* (1954), and also those of Michel Foucault’s analyses of governmentality in *Security, Territory, Populations* (1977–78) are the conceptual and theoretical territory on which this thesis is built (as are many of the works by the authors and scholars referred to above). Section 2 of Chapter I of this thesis, for example, is largely an expansion of Foucault’s analyses of governmentality to threats of the planetary environment. Chapter II, the literature review chapter, addresses and critically reviews a wide range of ecological and environmental problems caused and exacerbated by human action, as well as of the means and mechanisms proposed in support of an ethical perseverance to solve these problems, also in accordance with Heidegger’s thinking – further developed in Chapter II.

In the end, this is a thesis engaged in problematising acts and architectures of reservation, and their justification. It supports this undertaking by drawing on a series of critical positions which are found to be useful to engage and analyse the current state of affairs, and to unveil the responsibility architecture carries for it. It seeks further to expand and support efforts to work with approaches and positions usually neglected by

architectural history and theory, but which this thesis finds to be of interest and value, toward the creation of a conceptual framework for new methodological and architectural engagements; and thus hopefully to come up with alternatives.

There are, undoubtedly, ever more architects and architectures attempting to deal with contemporary Earth crises; schools offering masters programmes shaped by ecological thinking and other related subjects; new, green technologies and ‘self-sufficient’ and ‘sustainable’ solutions provided by the building industry. To some extent, however, these are independent of focus and do not comprise a comprehensive architectural approach to the way that both architecture and the threats of Earth crises are (being) mobilized and experienced. Due to the pace of development and the breadth of research needed, a truly comprehensive review is probably impossible, and certainly beyond the scope of this thesis.

It is thus important to note here that the intention of this thesis is not to pursue a systematic analysis of this mobilization and experience. It is by no means an exhaustive survey of how this mobilization and experience affects the profession and discipline of architecture alone. It does not attempt to exhaust all the options for a meaningful conversation about architectural experiments and arrangements. Rather, as before, its intention is to think *through* some of the spaces both constituted and utilized by efforts that seek to achieve and develop strategically appropriate solutions to threats of Earth crises, but which do so *whilst* encapsulating causes and consequences now perceived as dangerous. This is the problem that this thesis investigates. A further claim of this thesis is that architecture’s interest, as a discipline, in engaging with, and seriously adventuring through the field of Earth crises seems to have lost power.

In Chapter I, this loss of power will be associated with aesthetic reactions and modes of defence on the part of the discipline against the critique and critical obliteration of its potential as a technical tool and agent of cultural meaning. And despite predictions, in spite of those more progressive, utopian and radical propositions that reflect an awareness of architecture’s role in the system of the planet, including those of the past, such as those of Buckminster Fuller and the counter-cultural architects he inspired, as briefly presented in Chapter II – this loss of adventurousness or ‘nerve’ on the part of architecture has been accompanied by a gradual disappearance of the vision of architecture as a tool for political, socio-technological and environmental change, and the growth of a new care and conservati(oni)sm⁹ within the discipline, in

⁹ See glossary of terms in Appendixes.

support of an orthodoxy inherited from modernity, even while being excited by new and green technologies, self-sufficient and sustainable projects, and the world these promise to make realisable.

While the close and distant past may be full of examples apparently similar to those encountered in the present, and likewise of examples of the actions taken and sentiments held in relation to them on the part of the discipline (its historians, theoreticians and practitioners¹⁰), as well as of architectural structures aimed at manifesting these actions and sentiments¹¹, this thesis contests that the character of these particular issues and threats has, thus far, been little explored within the traditional field of architecture. Evidence of a thorough examination of the role that architecture and its projective tools, spaces and built formations play within Earth crises, is thus far missing within architectural practice, and has not been theorized as such within architectural theory.

One of the particular features and intentions of this thesis is thus to specifically address architecture this way.

Desirable Outcomes

At its conclusion, this thesis explores the recasting of acts and architectures of reservation that are centred on (and signifiers of) fear and desire to fix threats and objects of crises (thus fostering certain forms of architectural decision-making and the building of reservations) as objects of critique within an imprisoning omnipotent crises, by and within which architecture seems to be conditioned. In the context of many relatively recent and (held by the majority of the general public to be) severe environmental and ecological crises, the only choice is to acknowledge and assume responsibility for our involvement and investment in fantasies of safety, control and containment through partitions and distancings, i.e. built reserves. It is also necessary for architecture and the various authors engaged in and with it to admit of the growing set of threats and uncertainties that have been revealed and that will always, inevitably, remain at least partially encrypted. These are, as above, part and parcel of the world and milieu in which we live. The inability to escape them does not have to be architecture's

10 Examples of these range from Ian McHarg's theory for an ecological planning method to Etienne Turpin's *Architecture in the Anthropocene* (2013) and Douglas Murphy's *Last Futures* (2015), which traces the alternative futures proposed by thinkers and architects throughout the 1960s and 1970s.

11 See Diderot's *Encyclopédie's* (Noah's) Ark entry (as in Damisch, Hubert; Vidler, Anthony and Rose, Julie, 2016), Paolo Soleri's *Arcosanti* experimental self-sustaining city and Norman Foster's zero-carbon *Masdar* city (2007), their various postures and ambitions towards Earth crises.

motif to advertise impossible ‘final’ and ‘stable’ strategies to survive on, or keep on collecting faults of, the crises. Such admissions are an opportunity for architecture to *slow down* and perhaps even modify its basic tools, modes of thinking and ordering.

In this regard, it could be useful to recall Isabelle Stengers’ *‘Plea’ for Slow Sciences* (2011). Her work focuses on how reasoning is produced and practiced in the sciences, in an effort to encourage thinking to ‘slow down’ and productively confront what is happening in the world. She suggests a mode of inquiry preoccupied with better accounts of the world: i.e. accounts that can only be evaluated, according to her, through a confrontation with divergent and conflicting standpoints that encourage the invention of more active cooperation between practices and disciplines and their mobilizations of knowledge production. This is a process that architecture already knows (and does) by profession, that combines available means to put forward and reveal formal connections that exist between human structures and tools; a process that can engage with the processes that shape our world, in order to gain proper foundations for action. This kind of slow (but active) cooperative interdisciplinary process would surely enable architecture to resist the reduction of its skills to simple instrumental recipes and above all to help it not to lose – or even to regain – the relation between the consequences of its actions, means and goals.

Thinking *through* the challenges posed by these processes and the way of constructing the world as a reserve of reserves intended to sustain humanity’s development and indeed existence, I hope that this thesis at once grants visibility to the existence of this norm and offers a collection of structural and interpretative tools for enlarging the scope of the conventional discipline of architecture and architectural theory in this regard. To this end, this thesis articulates the approaches and positions that are its theoretical frameworks, in order to provide a platform that (as in Chapter I) can:

- 1) enable the original architectural format of reserve to be experienced as something operating in and on the basis of different registers and problems, and at a variety of scales, both concrete and abstract;

- 2) enable the critical review of the reserve site, including the mediums and design strategies employed by various strands of agency in building such enclosures engendered to control and guarantee future (ecological) planetary safety.

In addition, it is intended that the platform constituted by this thesis should:

3) act as a privileged site through which to understand certain dynamics and processes of modernity.

It is through this platform and proposition that, it is hoped, this thesis may contribute to knowledge regarding the nature and function of architecture, and help a broad audience to rethink Earth crises through it. Primarily, however, this thesis is intended to speak to the emerging interest amongst those architects and designers who are involved in the struggle to articulate solutions to safeguard our world, in and of a context where alternate architectural approaches might be found – so that architectures are created that do not exacerbate the crises but rather adapt to the complexity of the crises, with respect for the interconnectedness of all life-forms, and the inter-linkage between a staggering array of threats and the infrastructures vulnerable to disasters.

This thesis may also be of interest to the already fecund field of contemporary speculation and experimentation (including e.g. critical theory, cultural studies and the culture industries) that is influencing new methodological approaches and theoretical frameworks for investigating conceptual relationships with the crises and ways to deal with them.

It may happen that the reader will find the general form of this thesis, its variety of sources and its constant swinging from objective to subjective arguments unusual and hard to follow for a PhD thesis. To aid readability, a glossary of terms, comprising a sequenced set of concepts germane to this thesis argument, has been placed in Appendices, It has been so-situated to avoid disrupting the reading flow of the thesis. For similar reasons, there are no images to be found in this thesis, beyond three diagrams. This was a choice I took early on in order to prevent the deviations of meaning that images can convey, and engage the reader in a figurative, literary imagination.

CHAPTER I

RESERVE AS RESPONSE

As briefly noted in Introduction, in the last half-century, we have seen an exponential growth of interest in causes of, and solutions to issues of Earth crises. The prospect of biospherical problems, ‘limits’ and critical tipping points with possibly deleterious consequences for humanity, which began to be popularised in the 1960s, fuelled rhetoric of crises and survival and served as the basis for wider debate and public interest in means of security organisation to protect Earth against issues of Earth crises, which would, of course, directly impact us.

Although a prior idea of ours as a threatened planet, and the construal of the world as problematic¹ haunts this interest and debate, influential publications such as Rachel Carson’s *Silent Spring*² (1962), the announcements and extrapolations of the major and counter-cultural environmental movements of the late 1960s and 1970s, as well as reports by international think tanks composed by preeminent scientists and decision-makers, such as the Club of Rome’s foreboding report *Limits to Growth* (Meadows and Randers, 1972), gave rise to the articulation of concerns and agreements – from scholars and authors as individuals or in scientific societies and governmental organisations as well as working groups – about ethically-tuned needs and values, of and for humanity. These have helped redefine our relationships with the planet, including our design philosophies, with imperatives to connect our task and agency with the health and ‘limits’ of the environment. But also, and as this thesis is concerned, the very opposite in that these imperatives have also engendered a denial of the reciprocal tensions that bind our acts and architectures to issues of Earth crises and indeed to concepts of reservation.

1 As in introduction: Western and continental philosophy has a history of interrogating the foundational ground – both literal and metaphorical – to relationships guiding thought and action. Such historical frames include for example the mid-eighteenth century attention paid to the decay of civilisation – well advanced at that time; and have, since at least the early twentieth century shocks of the world wars, raised important questions about the negative effects of human actions.

2 Often credited with catalysing the modern environmental movement, Carson’s book analyses and warns of dangers related to the unrestrained use of chemical pesticides such as DDT in the agricultural industry since World War II.

As consequence of the exponential growth of interest in causes of, and solutions to issues of Earth crises, we have witnessed an ever-escalating growth of interest in, and corresponding proliferation of, acts and arrangements of reservation such as the establishment of Exclusion Zones³, nature and solar reserves, and blood, seed and data banks. Such reservations, as noted in Introduction, have variously been regarded as manageable, aesthetically potent and productive (scientific) spaces, aimed at solving and/or slowing issues of Earth crises.⁴ Their proffered ‘meaning’ often follows the formula of their being ‘efficient’ projects, be it e.g. morally or economically so, as in the case of federal and military reserves. Thus, their being projects that remain crucial to the integrity of several Western imperatives, including the evolving field of instrumental rationality engineering solutions for environmental control. That is to say, these are spaces that support methodologies of the ‘setting aside’ of surplus and resources, and/or providing for the allocation of such back-up assets and forces as are now placed at the service of saving humanity’s future and securing the continuity of life in the planet, both in nationally-specific and in global preparations.

The continued growth of interest in acts and architectures of this kind, however, is now no longer solely motivated by the reasons for which reserve spaces are, and have been instantiated as solutions to Earth crisis issues. Rather, it increasingly and critically relates to the fact that many extant acts and architectures aimed at solving such problems may be shown to have been informed by unfeasible intentions, and to have resulted in the production of more unwelcome situations. Most ironically, it relates to the fact that many of these very reservations are nonetheless still presented as solutions to offer environmental and ecological security and safety.

In this chapter, I present some of the ways in which certain of these unwelcome situations are embedded in acts aimed at guarding and defending against issues of Earth crises, and made manifest within architectural planning and practice, in terms of its methodological approaches. The chapter aims precisely to provide a more detailed and intelligible contextualisation of these approaches in relation to the topic and problems

3 The buffer zones established through the risk assessment for a natural or man-made activity. Examples include the Soufrière Hills volcano area, Chernobyl and Fukushima Exclusion Zones (as in Chapter IV).

4 As we will see ahead, with further detail, this relates with efforts and policies to conserve dwindling natural resources and prevent further deterioration of the environment.

discussed in Introduction. Primarily, amongst these approaches I seek to problematise here are those that proceed from the idea that issues of Earth crises may effectively be addressed by the modalities of architecture that facilitate practices of reservation, which idea itself I call into question throughout this thesis.

1 CONCERNING RESERVE

More recently, from across the natural sciences, as well as the arts, critical theory and environmental philosophy, concerns over the means and methods aimed at preserving life on the planet and guaranteeing humanity's future development have converged into a cultural continuum of (reactionary) theoretical practices that share an understanding of the finitude of our environment. Furthermore, it has raised concerns about attempts to control and (at least conceptually) break free from this finitude – to improve and guard against it, and to maintain our picture of the world (and of the planet) as still intact – which have sometimes only worsened the problem. Failing to achieve their goals, such attempts have often ended up exacerbating rather than lessening the very problems they were intended to resolve or ameliorate.

To characterise the continuum's two main tropes or poles: some of these perspectives contest the equation of 'place' with ownership and exclusion, the extinguishing of the 'otherness' of 'nature'. Others have helped to crystallise perceptions of human-environmental embeddedness in a network of relations, recognizing the potential for physical destruction that human agency's supreme reign over the planet could therefore constitute, and speculating as to its subsequent potential for recovery.

Some of the views and interests of the authors that are discussed in this thesis relate to postmodern claims and the decline of the main cultural and political theorems of the eighteenth-century Enlightenment and its developments (as in Foucault, 1984). Moreover, they are imbued with the legacy of the twentieth century and of an early twenty-first century Western morality, in which, deluded by the hopes (and accomplishments) of rationalist modernity, entered bankruptcy in front of its own safety-borne destructive powers and discourses. This thesis is particularly interested in the outcomes of the many acts and architectures that have both led and enabled these authors to report this state of failure. Above all, it is concerned with those acts and arrangements of reservation that have not only made visible the vulnerability of these very actions, but have also exposed the

flaws in the organizing principles and primary mechanisms of social and environmental management and risk control; flaws with which, I argue, most attempts to improve these principles and mechanisms are also shot through.

The basis of this thesis lies in the observation that these actions place finitude in a kind of permanent limbo of postponements thus installing what I call the ‘infiniteisation’ of finitude – a mode of action inherited from the twentieth century’s colossal investment in, and implementation of, safety measures for safeguarding things/the future – as the dominant organising principle and primary mechanism of social and environmental management and risk control. Rather than creating unproblematic spaces freed from threat and assured of continuity as they were set out to, however, these are actions that act – as (and through) architectural agents in support of reservation arrangements simulate and assimilate the structure and pattern of Earth crises – so as to remain problematic. Thus, as discussed in this thesis, the kind of interest and criticism that supports this analysis contests the ways, models and methods by which humanity has organised itself in relation to the Earth and nature, as constituting an approach which is no longer fit to meet the demands of contemporary Earth crises, as harbingers of global catastrophe. This approach may be characterised by the fact that it predominantly warns us of issues and (three types of) threats of Earth crises that, need to be neutralised, eliminated or contained.

These are issues and threats that have to do with the very conditions and systems of thought within which reservation arrangements are formulated and enacted; these are crises, furthermore, which feed back into and thus serve (and preserve) a belief in the making and provision of access to *order* all the while supplying and perpetuating possibilities for self-deception through the pursuit of various forms of resilience accomplished via reservation arrangements, by reason of not properly attending to the many forms of influence and impact such arrangements have had, and are having on the planet, as (inevitably) on us, also in terms of our cognitive and imaginative capacities and collective existence. The challenges posed by the threats referred to in this thesis are: the intensification of health concerns; the struggle to realise the scientific understanding of their causes; the development, evaluation and re-evaluation of possible approaches to meeting and managing them, i.e., usually, forms of preservationist and conservationist actions, issuing from fields ranging from ecology through epidemiology, environmental psychology, toxicology, genetics, geography and architecture, to state and corporate politics

of states and organisations⁵. These are challenges that, however, not only make us feel less powerful or confident, but they only elevate the (sense of) power with which humanity has shaped and insists on shaping, the planet: both as sovereign lords of the planet and (thus) as a hefty menace to life on Earth.

As before, this thesis examines how these challenges (and responses to them) are embodied in, and operate through, many interlaced acts and architectures of reservation that are invested with cultural fantasies about the future, in terms of (architectural) environmental and ecological security and safety measures. The specificity of these measures here relate to but are not limited in three particular sites of reservation⁶ that work to lull us into a false of assurance, and thus into further conditions of emergency. Through these sites, it will further be argued that in rushing to take an increasing number of decisions to ‘fix’ that which we have wrought and/or met with, there are a number of accidents and disasters that we not only still have not solved, but also seem intent on making considerably worse, both at a local and on a planetary scale. On the one hand, such attempted ‘fixes’ or measures may be conceived of in rational and responsible terms. But these are also measures that relate to decisions and answers that expand (in) a bewildering crisis, by reason of incorporating architectural thinking in acts, (structural and interpretative) tools and means to solve the crises only keeping morphologically reproducing, sustaining and installing the ill effects of these threats, as Chapter III and IV, in particular, will elucidate.

Especially since the arrival of the modern era, architecture has continued to establish spatial entities and shape the built environment by the organisation and partition of spaces – a summary definition of what architecture does, or *is* – not only as a means of control, over nature, time and space and the social, but *also* as a means of problem-solving in specific circumstances, offering ‘solutions’ often based on enclosures, postponements and/or withdrawal. Such architecture has contributed to the creation of human-dominated systems able to engage and transform those circumstances with design strategies, or

⁵ The list of relevant scholarly texts in these fields is extensive. E.g. Nature, along with other, similar peer-reviewed journals, publishes weekly references to these.

⁶ The recent international planetary defence initiatives; the relinquishment and conversion of former Soviet military (protected and exhausted) sites into nature reserves; and the geological repositories to storage nuclear waste, as in Introduction (p.19)..

projects⁷, as an extension of the means by which it is able to grab hold of many threatening future possibilities in the present, and, in this way, to protect the ‘inner body’, i.e., that which the reservation keeps within, thus helping it to subsist within those (reserved) spaces, and thus ‘guarantee’ security and safety. This is especially evident in understandings of ecology, and in the use of enclosures to achieve the stabilisation of ecological processes, as ahead.

For this reason, this thesis takes architecture, as discipline and practice, as a space in which to analyse the way we have been shaping our environment – *through* architecture, and with the help of science, technology and imagination – to withstand not only nature’s normal deteriorating mechanisms and natural hazards, but also non-natural and anthropogenic influences and disasters: all this, through the consolidation of many acts and interrelated architectures of reservation, operating as – but not restricted or reducible to – reserves. It also reflects upon architecture in terms of the objectives and techniques, both political and economic, and requirements of government to maintain order and ensure continuity. This is a reflection on architecture in terms of its practices, and as a supporting element of our collective infrastructure, which as such, or by extension, then allows us to rethink the enduring, modern methodological approach to processes and their outcomes, which has long been integral (but is by no means exclusive to) the theory and practice of architecture. This approach has been *so* enduring, and the potential for rethinking it is so important that, it is taken as a site of, and for examining, several of the factors that are at work in the way in which our Earth crises – framed as the most visible outcome of our creations – are being both addressed and organised.

Reserve, in Architecture

Part of the work of architecture, argues Vitruvius (Marcus Vitruvius Pollio⁸), the architect at the service of the Roman Emperor Augustus, is the attempt to draw the *world* in, or with, a line. The line defines, constructs and structures space. Space, as a product of architectural practices (and of which architecture is a vehicle of articulation), comes from the establishment or drawing of lines, the setting up and spreading out lines. The line marks

⁷ Here project – as the very term itself suggests, and as Massimo Cacciari argues in *The Unpolitical, On the Radical Critique of Political Reason* (2009) – is understood as strategy of future dominion essential to the techno-scientific project and the programmatic side of modernity: that also has been architecture’s most powerful instrument and ‘building block’ since the advent of modernity.

⁸ Known for his ‘Vitruvian Man’ and the multi-volume and highly influential work *De Architectura* (1486), Vitruvius is also claimed to be the first to codify architectural practices.

horizons, and provides an organising framework for establishing positions as well as relations in spatial locations – on the plan or on the map. It is tasked with the filtering, structuring and mediating relationships: between inside and outside; between where we can go and where we cannot; and increasingly, between the known and the unknown, the possible or probable. This way, the line dominates both design and constructions, and reproduces structuration according to axes of direction and signification, knowledge and reason.

Modernist architects like Le Corbusier, for example, reflected on the regulating line as ‘a necessity for order (...) a means to an end’ (1920:60) of verification, i.e. to ratify all work created. He believed the positioning of walls depended on the type of support as well as load-bearing and foundational functions, the blocking of views, sounds and access (as peripheral means of control) but also on geometric proportions. In their indictment of ‘the architecture of reason’ supported by modernists like Corbusier, the Florentine architects Superstudio, part of the Radical architecture movement of the late 1960s, affirm that architecture insists on the use of geometry, ‘to realise cosmic order on earth, to put things to order and above all to affirm humanity’s capacity for acting according to reason’ (1969). According to this understanding, the realms of theory and knowledge at once dictate and act according to, and under the senate of, reason to structure the field of social relations, within which it – reason – thus introduces a certain number of effects. To this end, architecture treats the line as an essential and reliable tool. The line, in architecture, in turn depends on the *rationale* for its creation. It embodies architectural ideas and is ‘part and parcel’ of the process of *delineation* developed to assist architecture in its endeavours.

As it is widely formulated, all architecture colonises space for human habitation and/or appropriation, defining itself a boundary line of domination, set against a boundless and possibly hostile background of chaos, in order to overcome and exclude contingent or ‘unnecessary’ presences, and provide a more ordered environment. In other words, architecture is posited as an act of delimitation *against* nature, and the time (or duration) of nature: as a force and practice to be exploited, so as to ‘dominate’ the possibility of certain (at least permanent) changes within the contexts – tangible and measurable features – of its environment, and thus allow a better manipulation of space. It is for this reason that architecture is understood as a mediation between humans and nature, and thus that, translated into the complexification of self-referential and rational order, its three-

dimensional, abstract and conceptual means are (increasingly, and especially in the case of the architecture of reservation) aimed at orchestrating and/or intervening in to impede and/or change a multitude of hybrid social, cultural and natural or ecological interactions; that is, encounters or engagements with the *other*. It achieves this through a retreat to notions of order, and the imposition of limits capable of providing at least a ‘sense’ of isolation, security and safety.

From the first recorded Roman accounts of architecture, through the eighteenth-century interpretations of Vitruvius’ architectural theory by Marc-Antoine Laugier (1753) and the theories of Jean-Nicolas-Louis Durand (1819), to more contemporary interpretations⁹, the concern of architecture with external forces and influences – the very gesture, task and technique embodied in the domain of architecture – is defined by a set of operational rules and tools specific to an instrumental culture of, and ideological will to, separation. It involves various forms of knowledge, a concrete set of ‘natural’ and rational arguments, assumptions as well as techniques sought to assure their own futurity, security and stability. Not only must it keep in constant view its intentions, and the matter and manner of their manifestation – i.e. how the partitions and boundaries of places are (to be) accomplished by the use of the line, but also how it considers and visualises its ‘line’ or ‘lines’ over time, so as to anticipate and mitigate whatever might be expected to affect the present and future efficiency of its buildings. Hence (and thus like in this thesis, which must therefore take this as among its own concerns) it is also charged with a projective and pre-emptive *abstract* expertise and programme, and not only with the strictly *technical* and *spatial* rationales of exclusion.

The act of architecture has something to do with material decisiveness and determinism; the control of the *limitless* (that is, the) continuity of the *infinity* of time or the future. That is, it focuses upon enabling the futurity and longevity of structures (including buildings) for the security and stability of territories and populations, and to provide humans – and thus reason – with greater domination over their social and physical (including ‘natural’) environments. ‘The defensive energy it deploys to determine otherness (which would introduce disorder) from what is to follow is what sustains it’, writes George Bataille (in Hollier, 1989:49). Outside of the discipline itself, this defensive ‘energy’ of

⁹ such as those interpretations of Pier Karsten Harries (1982, 1997) and Paul Shephard (1995), Jeremy Tills (2013) and Pier Vittorio Aureli (2011).

architecture has variously been discussed by sociologists and philosophers including Bataille, George Simmel (1909), Peter Sloterdijk (1998), Jean-François Lyotard (1988) and Jean Baudrillard – as part of a fundamental human will and tendency: a general principle of social closure, and of the shaping of things that is chiefly prescribed by, and manifested in architecture.

As an asset, architecture not only colonises but consolidates and also cultivates power: in places, forms and responses, (such) as in reserve(s). This requires and entails very precise (tools for) spatial and temporal modeling and ordering. This architectural agenda also and especially governs the building of spaces for saving and storing – of reserves, i.e. – thus ‘invading life’ with the refuges and stores that are structural manifestations of such acts of architecture. Their basis, or motivation, remains essentially domestic: that is, to provide residence for the prerequisites of essential life practices – and/or those of socio-political projects – and only becomes more so, as the implications of Earth crises are increasingly taken to indicate that such acts and architectures of reservation are absolutely essential to ensure the safety of life on the planet.

As means for ‘holding back’ or restraining against *the future*, reserves may be structurally and conceptually, understood as the most paradigmatic of architectural assemblages – (arche-) prototypes whose own archetype is the ark¹⁰. These are vehicles that save (one/‘us’) out of danger, by ‘crossing over’, i.e., allowing the transcendence of hazards. Uniquely bound up with the idea that the better-contained a place or ‘inside’ is the more protected or secure it becomes, reserves thus uniquely exemplifies the architectural use of, and reliance on, *tracings* – that is, lines of calculation and acts of structuring and separation – as the means to an end of *control*. Not only do they (reserves) enclose places, ‘spaces’, air and/or things, and act as a mechanism of domination, assuming a kind of supreme authority over a place at a specific time, during a certain period and/or over a stretch of time; they also assume the role of protection – of shelter, that is – as withdrawn places of refuge, security and safety.

While these types of spaces keep in reserve, as content-containers; they too are withheld and maintained, *as* contents, within designed spaces. It is for this dual character most of all, that the reserve can serve here as the analogous of ‘blueprint’ underlying *all* of

¹⁰ Meaning the vessel in the Genesis flood narrative, see Hubert Damisch’s *Noah’s Ark, Essays on Architecture* (2016).

architecture's buildings and design philosophies. This, then, is the figure, which aids architecture in developing its structures, actions and plans. More concretely, it is the figure of a way of grounding and stabilising formal systems and formalist modes of thinking within an external, thinkable space of measure, mastery and management, connected to a very Modernist abstraction and orthodoxy. That is, it is the figure of an architecture connected to the orthodoxy that, certainly since the dawn of the modern age, has treated architecture as a powerful vehicle for articulating space (and order), thus fulfilling the role of its being the primary means of achieving a reconciliation between humans, 'nature' and time, or the time of nature, and for removing the trace of the 'other'. Yet, at once, the figure of the reserve is that of an orthodoxy that is somehow given over to uncertainty and a daunting *void*, wherein all that is proposed is architecture's projected ideality and ultimately fragile limits.

To be sure, all things, including architecture, exist in an ever-changing now, or a sequence of nows; or let us say, 'in' a spatio-temporality, which bears the changing effects of time. This time may be calculable and anticipated, but it is at once also always outside a horizon of expectation and predictability. By its nature, it may be inferred that its arrival is at once unexpected and unpredictable.

Functionally and structurally, literally and figuratively, intentionally and not: architecture thus not only builds reserves to keep things as they are known *in* reserve, but also keeps uncertainty *in* reserve *in* its works. As a consequence (or by virtue) of the will to construct a solid edifice and establish order (and structure) therein, architecture is fundamentally an act of reservation. As a matter of both fact and of imputation, architecture (and the reserve) is oblivious to mystery and the chaotic and manifold space of becoming; permeated as it is by the limitations of its predictive and productive dimension and character. It is precisely for this reason that it offers an interesting model in and through which to read and analyse those modes of the ordering and protecting of phenomena that set out to resist and withstand particular crises, or prevent the impact and capacity of threatening acts to *threaten* which are themselves based in the anticipation of an end or limit with limits of its own (i.e. as discussed throughout this thesis).

Architectural Reserves

Architecture assumes it can collect and hold space and the time of nature, representationally and/or technically. In the best case, in its efforts to do so, architecture accepts the existent

and contextual as its logical priorities, but either way, it presumes it can *fix* time *in* space, and for space to *continue*.

In the words of Jeremy Tills, who investigates contingency in the practice of architecture: ‘Architecture attempts, in its conceptual genesis to freeze time, to hold onto that perfect moment of completion of the building’ (Tills, 1996:2). And of Bataille: ‘Architecture or sculpture, is the ideal and immobilizing harmony, guaranteeing that motifs, whose essence is the canceling of time, will last’ (Bataille in Hollier, 1989:46). This presumption is especially perceptible in, and as a consequence upon our awareness of, and engagement with, the deep anthropological past of humanity, in terms of its material remnants and their impact on architectural design and theory. In the passage of time, architecture becomes an important way to preserve memory, serving, indeed, as memorial; it allow us to declare that *this* memory is enclosed in the particular structure of a given *oeuvre* and so preserved for the future. This enables us, historians and archaeologists, to develop theories and to question architecture as a *document*; as a sign or collection signs of something else, that is; or in the words of Michel Foucault, ‘an element [...] whose unfortunate opacity must often be pierced if one is to reach at least the depth of the essential in the place in which it is held in reserve’ (Foucault, 1969:155). This *document* helps in the reconstitution of the past, on the basis of what it says, or hints at of the past. Above all, this document serves us in the building of new foundations; in the rebuilding of foundations; and in the planning of foundations *to last*, for buildings that can accomplish both the function and goal of a built reserve.

The revelation of tomb art, and the opening up, or literal ‘discovery’ of other hidden subterranean structures that have outlasted many of the above-ground works of Roman, Egyptian and other ancient civilisations, is commonly known to have sparked speculation and wonder about their methods of and reasons for construction. Likewise, the invention of modern, intentional monuments (Riegl, 1903) and time capsules¹¹ are proof of a related intention. These *documents* – that is to say, these structures and events of discovery and encounter with them – thus deliver the past(-present) to a future generation, and allow us to form hypotheses, at least, about the architectural theories informing past built

¹¹ Examples of these time capsules include the Thornwell Jacobs’s Crypt of Civilisation, at Oglethorpe University in the US state of Georgia; and William C. Maybury’s Detroit Century Box, Detroit. They were both conceived as memory-keepers, to give running accounts of civilisation, its history, customs and cultures to future times.

environments. They also enable informed conjecture as to architecture's permanent capacity; that is, its capacity for persisting into the future. This guarantees the historical and material value of architecture *itself* as an act of reservation, and suggests it as a mechanism by which, in some tangible way, to keep the present 'intact'¹².

In this way, architecture offers itself to reflections on evolving schemes of governance for holding authority over the future; ways to fix time in order to guarantee that such-and-such a space can be so-organised continuously. What these projects share is their holding of an image of the future; to archive the present for future use. Implicit in the holding of such images, such a project for the future is the programme of the reserve and its significance as a place intended to outlive or outlast the period in which it has originated.

A myriad reserves are conceived in line with this programme, as instrumental means to human ends, so that what might otherwise end or be erased *not* end, *nor* be so; that it might rather instead persist and compete, even, with endurance. In a way, it may be said that such projects permit us to confront and rehearse an end, and in so doing (at least attempt to) negate the powers and inevitability of end conditions *per se*. These acts and architectures of reservation are embodied efforts to rule time via space, aimed at guarding against the horizon of expectation, through predetermination, notions of the measured and predictable effects. As such, they are also explicit tools of pragmatic action; means justified by and for the *anti*-end of the keeping of a suspected threat in suspension; and as offering protection against a threatening future.

By their shared concern with constancy, many reserves thus announce what we fear to lose. In these grounds, their response could be labeled as an instance of what cultural critics like Michel Foucault (1977-78) but also Frank Furedi (1997, 2007), Nan Ellin (1997), and Zygmunt Bauman (1992) have referred to be also synonymous with a consciousness of risk, which has come to both stand for, and to inform the (cultural) response to security threats. These authors offer reflections of these responses to the fear of uncertainty and its pervasiveness in the cultural history of modernity – from its conception to its mobilisation in more contemporary efforts to ensure security. They investigate the relation this mobilisation maintains with 'a culture that is anxious about change and uncertainty and which continuously anticipates the worst possible outcomes' (Furedi,

¹² as Rem Koolhaas's Cronocaos exhibition (2010) and the book Preservation is Overtaking Us (2014) elucidates.

2007:6). This, then, is depicted as a culture which, thus vulnerable, is engaged in the process of developing increasing architectural cocoons, spheres (Sloterdijk, 1998) and enclaves (De Caeter, 2004) in which to set itself aside, in a form of preemptive self-protection from real and perceived threats and quantifiable risks (Beck, 1992; 2006). Thus alarmed at the prospect of (its own) ruination, as by (the ultimate fate of) death, (forces of) decay, deviation and forgetting, this is a culture that appears to be (re)acting not *only* as if to empty the world of uncertainty, but also in response to the anticipation of a *certain* end or limit – none other than its own, ultimately.

In this thesis, this postulated end or limit is understood as both the threshold and the catalyst of the management and organisational strategies that are ingrained in pre-emption and the techniques related to it, as it is in the (cultural) conception of responsibility for the future. This thesis thus posits the end, or limit, as a leading paradigm, foregrounding particular ends or limits as posing iterations of the task, that is called for, in the present day, of addressing the means to respond to the cultural and/or ecological Earth crises, and/or tipping points that have been looming since the 1960s, as these enter into experiences and discussion (that of global change and environmental disasters of varying kinds and degrees).

In effect, however, and paradoxically, as we shall see in Chapter III and IV in particular, such ends, overall limits and tipping points will inexorably lead (or so it is anticipated) to *x state* of futurity, give rise to a set of problems whose presence seems to distort, defy and call into question the ‘meaning’ of built reserves by exposing the ungroundedness of their acts and architectures.

Arch-structures of Reservation

Outside of specialist domains and the history of the ideas, perhaps one way to begin to understand the acts and architectures is by reflecting on the way that our homes, domestic spaces and private houses, are occupied, organised and constructed. What I mean by this is that the acts and architectures of reservation may be found to be apparent in the manner in which the conventional ‘home’, with its various components, rooms and furnishings, is designed to operate. Indeed, there may be no clearer image of the struggle for security and continuity, undertaken via the acts and architectures of reservation, than that manifested in domestic efforts to counter both real and perceived threats of destruction and danger, depletion of resources, waste and contamination. Our efforts to counter the ticking clock

must be included amongst these; against irreversible ageing and the biological imperatives of things, ourselves included.

Informed by such efforts and desires driving them, our homes become their reflection. As such, our homes are particularly privileged entities for beginning to examine the mode in which such efforts are reproduced and continually combined to distribute and organise things and relationships in space, and spaces across different scales and domains, from the most intimate to the collective and political. The figure of ‘home’ or ‘the domestic’ is also notably present in the ‘domestic organisation’ of life via national defence programmes and the militarised discourses of ‘homeland security’, and more generally, as an analogue for ‘the nation’, especially in intra-national and/or nationalistic discourses. The ‘home’ mirrors the way we manage and organise things in the world and provides us with a place where it is possible to assess the ethos for the implementation of, as well as the condition of reservation arrangements.

To some extent the homes where we live and which we may feel to belong to us, are extensions of ourselves and of our limits into external environments. They are conceived as, construed and continually adjusted to be secure and protected from outer harm, so as to secure and protect all that is contained within them, by the architectural lines or edges that are their walls, doors, windows and property lines. These edges are set and assessed against nascent forms of trouble and potential hazards, both ‘natural’ and artificial, in line with the three broad types of threat introduced above; against their own risks of deviation; and against foreign agents. At once thrusting aside risk and contingency, excluding as well as opening, such edges are amongst the simplest means to define space that we create (and perceive as) for our own protection. With them, as with(-in and without) our homes, which they delineate, we configure the possibility of relationships, of exchange and of constraint; thus with the outside and within the inside, with(in) our household and with other beings, things and forces, we limit and circumscribe movements and presences.

This type of *order-ing* – i.e. that of relationships, dynamics and activities taking place amongst beings and things with and outside of our domestic spaces – is spatial and architectural. It is set to secure and protect, spare and preserve (the future of) our carefully-constructed domestic lives, spaces, provisions and possessions: to keep these, as it were, in reserve. This order of ideas is exemplified in the idiom ‘*feeling at home*’, expressing a state of satisfaction of the urge people feel to create and gain control over their ‘own space’; this

in turn, may be understood as the driving *rationale* for ‘building a keep’, in order to ‘defend’ it, according to a typical, functional and normative strategy of control and containment (see Reserve of Reserves, below).

In one way or another, our homes follow a pattern of enclosures, separations, deferrals and distancing; also, as George Simmel reminds us in *Bridge and Door* (1909), that of being secure threshold spaces where the exterior and the interior, the public and the private, work and leisure, the intimate and the communal, the forbidden and the permitted, merge. According to George Teysot, who, in *A Topology of Everyday Constellations* (2013) draws on Simmel’s work to further blur the dichotomies at play in our domestic spaces, they offer the means to *settle within*, but also permit one to step out or to *unsettle*. Both Simmel and Teysot focus on how homes embody unity and division, isolation and confrontation, according to a logic based in the limitation, restriction or elimination of that which is other or uncanny, the *unheimlich*, that is, that which is outside or unwelcome and cannot be incorporated. This is the logic that defends the confines of the home and the entire household against threats and challenges, and that keeps the entire domain of the house – as safe and protected confine – *as in reserve*, for future and private manipulation and revelation. Through this logic, an agency manifesting security and segregation is set in place, and the conception of domestic space as a space to which we can withdraw, its structure of control and impermeability of organisation, and the negotiations of its complex parameters of comfort, construction logic, economy of means, significations and desires, are all made possible.

The conservative German philosopher, Peter Sloterdijk, describes this agency – and *rationale* – as related with the active ‘function’ of living. For him, ‘living always means building spheres’, and ‘living in spheres means creating the dimension in which humans can be contained’ (1998:28). ‘Life is a matter of form’, he writes, and sphere-building a characteristic of human culture, intrinsic to the earliest attempts to create shelter and the most sophisticated cities of our present’s immunological (i.e. protective) developments alike. As Jean-François Lyotard also notes in ‘*Domus and the Megalopolis*’ (Lyotard, 1988: 191–204), the evolution of these ‘spheres’ of ‘artificial human nature’ may best be understood as a history of strategies for organising spaces that replicate and repeat the cycle of domesticity. This pattern is, and has been, imposed by ideologies of ownership, kinship, family, techniques, civilisation, intimacy, and privacy and even the state as an instrument;

and further prescribed by architecture to meet and fit with various different intertwined and overlapping reservation aims and acts.

Reserve of Reserves

As closed spaces (as they are commonly regarded, in architectural theory as in the social sphere), built and sealed away so as to limit, contain and distinguish controlled environments, our homes are thus spaces distinct from the chaotic and hostile outside or context surrounding them. They are spaces or constructions that represent, instantiate and enable people to live in privacy; that is, they enable the choice of whether to interact and engage publicly or to retreat from society and the outside. Such dissociation, from the space or world-fabric that the home excludes, enables us to ‘construct’ home as a space disengaged from, and hypothetically/symbolically immune to, the norm and codes ruling beyond it. Hence ‘home’ is a space we can control on our own, and in which we can create our own refuge, quiet place and even climate; both figuratively and actually. Ideally, this generates and affords us personal, unique and manageable realities of total ease, comfort, privacy and independence. Thus understood, home is a sort of minimum-security system of solitary, or household/family confinement, where one, or we, can isolate and hide from the unknown and indeterminate space of the outside. As such, our homes and houses promise a psychologically secure and protected space for life, in which to make sense – that is, to imagine and create ways – of *being at home*.

To arrive in our homes, there are doors and possibly gates, pass codes and/or electronic key fobs and close-circuit cameras to be negotiated in order to gain access. These are part of the rising obsession with security, and the improvement of security in our homes. They are tools to control the access and egress, secure private and personal domains against ever more skilled criminal or invasive activities, and protect lifestyles and/or community enclaves. These tools support the perimeter defences – that is, the stable and referential physical boundaries or walls of our homes – and turn them into strongholds.

Long considered the most efficacious instruments or defence mechanisms against threatening proximities, by reason of being *fortifying*, walls are drawn to mark and frame the edge and architecture of containment (or confinement) of any bounded spaces. In our homes, they create protective barriers to divide and isolate space. Domestic walls may or not be altered in time and space by conditions and mechanisms of control, expansion and exposure. Within our homes, walls make perceptible the limits of the managerial domestic

space, and limit the horizon of domestic experiences and spaces. Above all, they secure, keep back or set apart, safeguard and protect the domestic from the nearness of unwelcome things or events. Within or inside these walls, we believe ourselves safe from, or are at least less afraid of, whatever lies without or outside those bounded spaces. Domestic walls ensure, or are intended to ensure, that we can properly design the spaces of our houses to bear and support the individual lives, bodies and desires circumscribed within them. They are built by layers of distinct materials conceived of and developed in terms of the years of durability and permanency they offer; proved and approved as both efficacious and safe to separate the inside from the outside, and protect us from climatic influences as well as from social threats, noises and circumstances. These layers are formed of insulating but also absorbing and conductive materials, as exemplified by the Faraday meshing, used to block electromagnetic fields. These are materials that are used together in concert to constitute what are more fully operational, risk-free and future-proof buildings.

In light of these powers, alongside (more or less effectively) meeting our demands of protection from the outside world, as well as the promise of permanence which attaches to the house's physical structure and building systems, our houses have come to accrue valuable virtual – and not only physical and symbolic – interest. As Keller Easterling writes in *Subtraction* (2014), the house appeals to a:

long-term source of income that is also specially tuned with an arsenal of tools like equities, currencies or hedge funds for the manipulation of and protection from the market. It can be bought and sold in milliseconds and sub primes can be shorted to hedge against loss. A pawn in a high-powered game of finance, the house is a volatile currency, a set of sentimental scripts about homeownership, and a durable object, in that order' (Easterling, 2014:20-1).

Its spatial and physical attributes are traded and speculated on for those who owe to ensure economic stability or to provide them with alternative and interesting forms of revenue, and financial reserves. These are thus inseparably linked not only to a system of the individual ownership of property – a system of super-profits derived from banks' and investors' stockpiling of financially worthy properties, potential interest rates, and asset classes – but also to the architecture and architectural plan of the house, of which all the elements, not only the house perimeter, can be changed (i.e. removed, relocated and reinforced, according to individual or collective interests, requirements and agreed relationships) but are at once stable and intended to last.

Finally, the house and home has become something as technical and impermanent as an appliance, or piece of equipment. In addition to being fortresses for private lives and financial speculation devices, our homes are also arenas of improvement and indeed of self-improvement. Architecturally reified by internal boundaries, fixed or not, in particular places, our homes are planned in such a way as to compose, enhance, maximise and administer their spaces against an ever-expanding field of external as well as internal threats. Its conventional layout and customary arrangement is subdivided; compartmented into independent, clustered functionally-differentiated rooms with an eye to stockpiling.

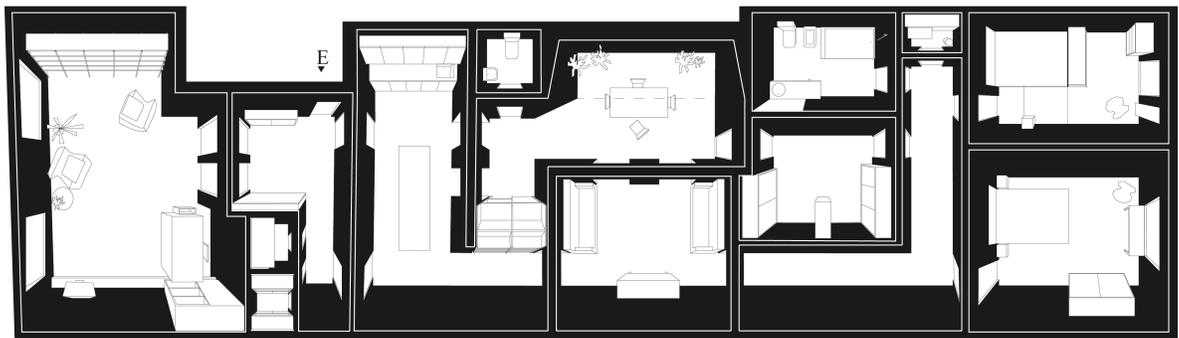


Figure 1 . Diagram of my own home

Each room of a house has a strictly defined role corresponding to one or various functions and actions, and it is carefully optimised to allow for responsibility to suit and secure the different moods, rituals and ceremonies connected to the scenes, programmes and actions or habits of daily household life over time. While the independent rooms of a house permit numerous occupational possibilities, the bathing, sleeping, cooking and living rooms, for instance, are usually clearly demarked parts of the house plan(-imetry), whether or not we eat in the bedroom and sleep in the living room.

Regardless of how differently the rooms of a house are shaped and sized, how variously they have been occupied and multiplied, on the one hand they refigure the machinery and economy¹³ of the world outside the house, while on the other hand, they become condensed spaces of intimacy and of interiorisation, reflecting our tendencies to accumulate in, and close off further space. Each room organises particular everyday practices, provisions and possessions, and is often filled with storage spaces and repositories of the activities, memories, fragments of the past and other goods connected to the scenes and habits of our daily lives, while at once it also contains and so shelters the

¹³ More detail also in OIKONOMIA in the glossary of terms, in Appendices.

needs, crimes and tensions affecting us. Each room is at once mobilised by these needs, crises and tensions. It is thus perhaps possible to map the real and perceived problems, and insecurities haunting the enclosed space of a house, and not only the levels of comfort required by a specific domestic life, by a consideration of the numerous closets, drawers, storage lockers and trunks filled with objects, boxes and various other types of containers; the number of portable hard disks and libraries, and other containers that make up the house collection of furniture and appliances.

Such furnished containers *expand* the household with fears of loss, contagion and ruination. They populate the house with spaces destined to the preservation of various assets, sentimental eccentricities, objects and tools that are reserved to re-serve but often also convey a feeling of unease, anxiety and disgust. Secured by various doors and locks, they are reserve spaces in themselves, containers destined and/or dedicated to that which is necessary for the functioning or well-being of our houses and ordinary (inner) lives, embodying choices, governed by more or less clearly attributable dates of expiry and validity of what to keep and not clear out. As such, they seem to be suited to our reserved nature, or to mine at least; without them, I and my objects am uncomfortably limited to surfaces, deprived of intimate space and spaces that are not open to just anybody¹⁴.

Threat Reserves

Thus, my *own* closets, drawers, storage lockers and trunks, hard disks and libraries organise all my belongings –wools and silks, bed linen, data and film collections, books and mementoes, old things and other special belongings – along with the house itself. I thus treat them all as the refrigerator, as proper machines to preserve and keep things that are unforgettable, necessary or intimate, hidden or on hold. That is, as machines to secure, separate and defend them against material decay and organic threats of destruction, such as those issuing from germs, worms, dirt and contamination. And so I delay, or even put a halt to their ruination, at once so as the house itself might be ordered, and so protected from a disorder of uncontainment.

Against disorder, my summer-, winter-, outer- and underwear, books, dry store cupboard food and groceries, beauty and cleaning products are thus distributed and stored in separate closed or semi-closed different containers. I spray chemicals, pile up cedar balls

¹⁴ Perhaps reminiscent of Superstudio's continuous glossy Supersurface (1972).

in the winter knit drawers against moths; I set out mouse traps close to the kitchen, and store food in the freezer. Even waste, I subject to this separate containment, to accumulate there and wait to be taken either to landfill or a recycling centre. And, the greater and more various my collections of objects, and even waste, so my preservation machines, techniques and instruments of organisation, order and containment, must increase in number, if not necessarily always in size.

In *Purity and Danger* (1966), the social anthropologist Mary Douglas famously claims that ‘in chasing dirt, in papering, decorating, tidying we are not governed by [*sic*] anxiety to escape disease but are positively re-ordering our environment, making it conform to an idea’ (1966:2). An idea, that is, of external reality and the order of society. To me, this idea is not only guarded by dangers and danger-beliefs, as Douglas writes, but is also related with of the particular experience of hostility that motivates efforts to defend and guard against the threats of destruction, which exist in all the domains of a house. Much of house-planning is indisputably concerned with issues and assessments of destruction and danger, depletion of resources, dirt, contamination and pollution. These remain salient fears, affecting the ways in which people perceive, construct and use domestic spaces, and have done since at least the introduction and normalisation of hygienic and sanitary regimes such as those that are codified in the 1932 Athens Charter.¹⁵

In fact, with the help of design-related tools, monitoring and surveillance technologies and sanitary habits, the planning of, and within, houses is, increasingly, preventative in nature, and no longer only reliant on remediative measures and measures of purification. Such planning is deployed against possible threats, not only to prevent the spread of disease and contagion, but also to keep the house, and the things in the house, clean; to reduce the possible accumulation of dirt and eliminate odours, as well as to reduce the transmission of noise and shield us from other deviant behaviours (and to shield ours). The various species of household products for cleaning and disinfecting are even clearer exemplars of this preventive planning.

In accounting for the pleasure we take in cleaning, or in cleanliness, at least, we describe it in terms of the (acts of) separation, purification, demarcation and the punishing

¹⁵ The Athens Charter, written mostly by Le Corbusier (1933), summarises the core ideas and principles of modern architecture and urban planning set in the fourth of the International Congresses of Modern Architects (CIAM), which called for a total remaking of cities in industrial world, to make them more efficient, rational and hygienic.

of transgressions that are intended to guard and defend against many types and experiences of the hostility described above. So moved by these efforts, our houses or homes can be seen as spaces in which risk and hostility present themselves in the permanence of their supposed absence, and of their constant erasure. Reasoning the same way, they – risk and hostility, that is – reside in the most explicit acts and architecture of reservation. They haunt and inhabit them, and all the more so, as our (human) limitations become all-too evident, demanding more and more regulatory apparatus, technology transfers and the development of ‘green’ cleaning projects (and products) associated with acts of reservation integrating environmental issues, protection and markets.

In the wake of recent globe-spanning, geostrategic concern with Earth crises, and their proliferation, many extra-domestic and, indeed, often international regulations and protocols have begun to directly impact the design (and even location) of our houses. Technology is taking us ever-deeper into an ever-vaster, immaterial, digital, wired and telematically manufactured realm of virtual experiences¹⁶ (and overwhelming acoustical attacks¹⁷ achieved by audio devices). We experience more and more difficulty, meanwhile, in providing water to cities (not only those in arid climates) and cleaning up the wastes that contaminate the urban water supply after it has been washed or flushed with, then discharged, from our houses into the city’s collective and unitary sewage system, its municipally-planned residuum-retentive reservoirs and water purification plants, towards its end-(re)use. We must fight with increasing air pollution, and the many airborne fungal spores, that are present in the atmosphere outside and indoors. In face of a general lack of action on carbon dioxide emissions, we must fight against such global ecological stability as there still is being further jeopardised. Energy and food sovereignty of self-sufficiency require heavy and difficult investments that not all are up to making, and in some parts of the world an ecology of other problems – from natural disasters to monetary devaluation’s prone areas – houses have become a ruinous investment for owner-occupiers to keep *sustaining*.

While the geography of shrinking and abandoned cities grows, the paraphernalia of defense mechanisms on inhabited lands and developed or urbanised areas increases.

¹⁶ To read further into this matter see Tunh-Hui Hu’s *A Prehistory of the Cloud* (MIT, 2015), a book that develops on the architecture of the cloud exclusion zone and security apparatus.

¹⁷ George Teysot reports on this type of impact in *A Topology of Everyday Constellations* (MIT, 2013).

Ultra-sonic anti-loitering teen deterrent solutions, firewalls, water tanks and cisterns, household and community water treatment stations, waste-to-energy solutions, solar energy equipment and the like are examples of things arranged to ameliorate deteriorating ecological and socio-cultural conditions that are already impacting on societal perceptions of domestic security and risk control. The problem of ‘boundaries to be secured’ applies at every domestic scale, from that of the entire volume of the house, including all of its various rooms, furniture and appliances, to that of the neighbourhood, city and nation, as well as at a micro, mute and ethereal scale that does not respect human-scale boundaries at all.

In fact, and very much like in the haunted houses of horror fiction, a dynamics of rebellion against the imposition of acts and architectures of domesticity is always in play, thus animating domestic structures.¹⁸ It refuses the binaries of interior and exterior, inclusion and exclusion, and resists the current arsenal of technologies (house-cleaning, as the least, yet perhaps emblematic among them) intended to sustain both the foreclosing of crises, and attendant profits, in order to maintain the smooth control and functioning of the home and its design at every level. But zoom out from one’s home, and this struggle appears as no longer just a personal battle against waste, dust and the many others matters already stated, but rather as part of an incessant, intrinsic and fragile global management of risks and flows.

This is visible in Suzannah Lipscomb’s TV documentary series *Hidden Killers* (2013–2015), and the programme *Trust Me, I’m A Doctor* (2016) (both BBC). The first reveals the hidden quotidian dangers inherent in medieval ways of life, and those particular to the Tudor, Victorian, and Edwardian eras, which turned homes into hazardous death traps in the name of progress. These included the introduction of substances such as boric acid (used during the Victorian period to purify and prolong the life of milk as well as to clean bathrooms) and arsenic-based products to disinfect and keep the house clean of germs, the use of inflammable materials in the construction of chimneys and elsewhere in the house, and then their substitution with asbestos; and the (still ongoing) use of ammonia fumes in refrigerators, which could easily leak and potentially explode. Far from reassuring in the name of progress, the narrator of *Trust Me, I’m A Doctor* (2016) advances that:

¹⁸ Think of Edgar Allan Poe’s *The Fall of the House of Usher* (1839) and the image of the house and of its unintelligibly massive and pervasive vitality.

‘our modern homes are making this type of problem worse. Now that they are better insulated and airtight – due to energy efficiency standards as briefly presented in the introduction – the bad news is indoor air pollution: the chemicals that are released into – and combined inside – our homes’

Just so: the Scientific Committee on Health and Environmental Risks, one of the scientific committees that advises the European Community on such matters, provides web summaries of opinions on various topics in order to announce, on a regular basis, household exposures to mixtures of (both new and pre-existing) chemicals and other toxins. This list routinely extends from the levels of phenols to be found in disinfectants and antiseptics, glues and air fresheners, to the levels of chromium in toys and the consumption of deadly drain cleaner.

We may pretend, keep on building our homes (as if) to afford the utmost security, and act as containers against hostile threats, but they are, in fact, open to such peculiarly unstable things, ‘natural’ and fertile ecologies, posing dramatic dangers and alliances of which we humans are at once (just) a part, and apparently as yet incapable of perceiving as such, by reason of their either defeating our cognitive capacities or our traditional ideas of threats, and what may constitute them. The withdrawal that homes are supposed to afford us is thus an ideological and imaginary space more than an actuality.

Writing just over a half-century ago, in *The Poetics of Space* (1958), Gaston Bachelard argues that the house is not only the most intimate of all spaces, a space in which a unitary, intimate experience of living frames our understanding of all the other spaces outside, but ‘a body of images that give mankind proofs or illusions of stability’ (Bachelard, 1958:17). In it, he goes on, ‘we comfort ourselves by reliving memories of protection’ (1958:6). This idea, and the ways in which the same kind of largely illusory comfort operates in the keeping-in-reserve of all kinds of threats and dangers issuing from Earth crises (understood here as attempts to eradicate both sources, and our own uncomfortable perceptions of our feats and insecurities), stands as the basis of this thesis.

Environmental Concerns and Collapses

As part of the threat spectrum we contend with in life (and our concomitant strategies to ensure security and stability and continuity), issues of Earth crises such as on threats of destruction and danger, the depletion of natural and artificial resources (and of energy sources), and pollution and contamination hazards have grown exponentially throughout

the last decades. The methods of escaping or coping with these issues, and of surviving them, are reflected in the number of movies¹⁹, books²⁰, and works of art that deal with them; documented in the news reports on environmental degradation, and discussed in relation to increasing urbanisation and industrialisation, directly related with the results of the domestication of environments.

These are movies, books and works of art produced by an entertainment industry routinely embedding disaster, end-of-the-world and post-apocalyptic imagery as content, building on the terror-inducing tropes of unknown, hostile and unpredictable events impacting on the character and behaviour of individuals, communities and society as a whole. This particular niche of mass entertainment was born of, and concerned with ‘translating’, a threatening awareness of the potential for computer-controlled nuclear holocaust, and a series of human influenced catastrophes threatening to destroy (or at least chaotically disorder) overpopulated cities, poison homes and entire habitats, and annihilate humanity. Such was the character of the entertainment industry ‘serving’ a mass-mediated, electronic society in the era of the post-Cold War battle of ideologies, confronting the emergence of so-called welfare and security governance concerned with controlling information (and knowledge) as well as the many unintended ‘side’ effects of scientific, technological, military, domestic and political economic actions initially taken to reduce vulnerability and risk, while contributing to and sustaining the development of fears and paranoias emerging in response.

Taken together, the proliferation of challenges and the relentlessly negative consequences of various technological, domestic, industrial and military actions, looms as a king of a meta-catastrophe, threatening the existence of human society and rendering some parts of the world practically uninhabitable. This, has indisputably unleashed well-founded fears and helped perpetuate a sense of insecurity and of pessimism, profound weariness and distrust, and even raised the ominous prospect that it might be too late to *fix* the crises²¹. In the process, however, it has also helped set in motion, in public and popular consciousness,

19 From popular and mainstream films such as Roland Emmerich’s *The Day After Tomorrow* (2004), Alfonso Cuarón’s *Children of Men* (2006), Conners and Petersen’s *The 11th hour* (2007), Roland Emmerich’s *2012* (2009), and the TV series *The Walking Dead* (2010 – ongoing), to more specific films and documentaries, such as the Otolith Group’s *The Radiant* (2012), to recall just a few.

20 From Bill McKibben’s *Earth* (2010) and *The End of Nature* (1989) to Elizabeth Kolbert’s *Sixth Extinction* (2015), for example.

21 Although recent reports reveal certain policies and technological innovations are making clear positive impacts and help reverse some of the problems, such as ‘healing in the Antarctic ozone layer’ (Chu, 2016).

and thus in architecture, a now widely consensual quest to rise to meet the problems, motivating us to change behaviours, in order to change the current course toward collapse: to expand protective zones and studies, broaden worldviews and incorporate ways of working through the crises with what technology has to offer. Most importantly, persuading us to rise to see and meet the problems produced by unanticipated effects and unintended consequences, and that have brought humanity to the brink of destroying itself through the planet.

Amongst the ways of working through these problems; the efforts and attempts to eradicate the source and perception of our fears, and the insecurities they bring with, it is noted the deployment of security systems to govern more and more apparatus of division intended to eliminate or at least control and reduce risk to the lowest possible odds. These, as this thesis aims at elucidate, is particularly clear in relation to specifically Earth crises challenges such as those posed by the reservation strategies and arrangements built to cover up and remedy the remnants of tragedies engineered by nuclear weaponry and technology inherited from the Cold War clash of ideologies, which have resulted in issues of (mass) destruction and danger; the overexploitation and depletion of natural and human resources and nuclear contamination-related legacy problems, alone. More specifically, challenges inherited from the idea that the best, last, and really only line of defence to prevent radiation of sweeping out into the environment and (so) of keeping an intact Earth, is containment in reservation arrangements. Nuclear radiation is known for having helped to bring attempts to reduce and reverse the aforementioned issues; for challenging the prevailing views and bring forth a new understanding of these issues as existential threats: of human's power of nature as well as of human vulnerabilities, and as the most important factors and staples of environmental doom. These too, are lurking at the edges, walls, and (electronic) windows of our most private spaces.

Professors of history such as Darwin Hamblin and geographers as Shiloh R. Krupar, for example, narrate the roots of our Earth crises and its concerns; a growing awareness of, and sense of doom in relation to the interplay between scientific research, technical progress and the geopolitics of the World War II and the Cold War. Hamblin's *Arming Mother Nature* (2013) book, in particular, provides a good synthesis of the many mischievous ways that American scientists and the military-industrial nuclear complex attempted to recruit nature into their plans for waging a total war against the Soviet Union,

and their faith in technology. He discusses humanity's increasing ability to harness not only the atom but the (geo)physical forces, being brought to bear on turning all of nature into a resource to be exploited and brought to order in conformity with all of the combative powers and methods employed in an attempt to make the country less vulnerable.

Hamblin attributes the increasing prominence of ecology and new kinds of ecological thinking, global in scope and focus, during the second half of the twentieth century to the consequences of these very reservation schemes and abilities. He thus claims that these schemes and abilities have themselves encouraged the habit of thinking about interdependencies and the danger-scale of manipulations of the natural environment and environmental changes of our own making. But also, that have been mobilised in support of acts and architectures of reservation as structures for environmental and resource management that have been devised as intended to fix problems the Earth crises introduce. Indeed, these discursive scenarios have provided an orientating framework for the necessary investment in such structures, since then.

During the Cold War, writes Hamblin (again, in *Arming Mother Nature* (2013)), 'those charged with protecting their countries had' also 'to make bizarre choices – such as preserving frozen bull semen – about what to carry into a desolated, post-apocalypse world. They learned to appreciate biological diversity as a strategy of survival and began to stockpile seeds to keep under shelter during the coming holocaust' (2013:244). To build fallout shelters, was one of the most popular reactions of the time. Likewise, as Žižek writes in 'Ecology – The New Opium for the Masses' (2009), current trends take on similar solutions 'to intervene into the Earth ecology even more forcefully with the aim to freeze the Earth's change, so that its ecology will remain basically the same, thus enabling humanity's survival'. To this end, and since it is thought that conditions on Earth are likely to render the survival of humanity difficult, the collective (and widespread) goal is to build reserves to safeguard, this time, the dynamics of the entire planet; and comfort us with the illusion that such reserves will help us do so.

On the one side of these trends, optimistic discourses of environmental promise and obligations, related with the 'benign' and 'efficient' use of natural resources and the potential of scientific and technological advances are introduced to save and to perpetuate certain (anthropocentric) processes by maintaining 'imperialist' and 'utilitarian traditions: thus projecting a visionary confidence for a better future through attempts to escape into it

by means of the instrumental value of rationality. On the other side of these trends, a Romantic imagining of Arcadian life that sees anthropocentric processes as vicious agents of destruction, responsible for a loss of, and disconnection from the beautiful and effectively empowering natural world awakens conservationist ideas. While thus differing in their approaches to certain issues of Earth crises, and their reactions to certain features of human ecology, as elucidated in the 1960s and 1970s, these are nevertheless the two pole positions of traditional, reform environmentalism that - since then - idealises reservation arrangements. By doing so, these trends have also brought to light the preoccupation of a self-preservation impulse that appears to occlude and defer any re-examination of the imperatives caught up in self-perpetuating defaults as the reserve: being this reserve the very figure that creates and preserves crisis in supposedly closed systems and architectures of reservation, according to reactionary positions issuing from the community of those consolidating the field of critical encounters with traditional, reform environmentalism based on modernity and its ideologies, fundamental to this thesis positioning.

Reinforced by progressive or conservative think tanks aimed at re-evaluating the terms, and resolving the problems of the conceptual possibility of a custody of the whole globe to be held by/in reserves, these two pole positions idealizing such reservation arrangements have met with serious doubts – dissonant, conflicting and oppositional perspectives and interpretations – by a wide community of agents, investigators, cooperatives and synergistic networks, concerned with devising more responsible forms of thinking about, and understanding our actions and interventions on the planet, as well as to find a way to cope with them. A common premise for setting out hard objections to these reserves, certain philosophers and cultural critics holding those aforementioned reactionary positions now pose, revolves around the degree to which these have broadened the assurances of a hubristic humanism and its continual faith in the demands of its dominant ideological and organizing principles. In brief, these philosophers and critics (e.g. as developed by Žižek, Baudrillard, radical environmentalists and other authors developing on them (Chapter II)) now argue that the emotional and political investments in these reserves as counter-strategies have sustained and developed forms of ecological ethics and of political ideology, only to celebrate yet more technical and anthropocentric forms of dominance over nature and the future, providing for yet more artificial and pernicious partitions of Earth's ecology. For this reason, they are criticised as being more like the root of evil than they are oriented towards the benefit of humanity and the planet.

The negative aspects of this situation, these philosophers and critics agree, arise from a deep ontological uncertainty, related with a widespread uneasiness with the ‘shape’ of our world and the price it has cost us to shape it thus. This is an uncertainty based on a common threat and posed against the background of accepted ways of doing; and that, for this reason, has (at least since the advent of the 1960s countercultural *zeitgeist*) been positively imposing strong reservations upon the meaning and efficacy of our means of (attempted) reconciliation with, and responses to the situation. As such, this uncertainty already recoils at the effects of our technological idea(l) of progress and the way it further extends and intensifies the control and management of human and nonhuman life in order to (p)reserve and secure existence against the threat of disaster, according to either progressive or conservation standards – of the aforementioned two pole positions. This is an aspect laying an halt and raising issues of power and entitlement on the part of subjects that dwell in conservation and survivalist aspects, or in denial (see Klein, 2015), for continuing to oppose, and keeping in reserve, the open-endedness of the future.

The positives pertain to the fact that these ways of responding are together with the Earth crises (that ignite also them) helping us to register the new challenges and opportunities, emerging from dynamic processes of productive adjustment to these new geographical and temporal objects and forces. The planetary dimension of the crises, as it opens to us, has invited a number of inspiring reconfigurations, such as the displacement of anthropocentric relations towards an enlarged sense of interconnection between humans, nonhumans and ‘Earth others’, as material, yet not passive and inactive but rather vital common ground (ahead). It invites an engagement with its most comprehensive totality as the basis for new ethical alternatives, relational values and architectural perspectives. Here in particular, this thesis draws on the idea that that these alternatives cannot be accomplished without fundamentally changing our presence – and perception of our presence – on the planet.

Crucially, the following section and chapter will further detail, the impact of Earth crises and the prospect of planetary limits has caused a call to erupt, to resist the old immoderate and instrumental attitudes, and led to an increasingly widespread and restless erosion of the conceptual boundaries and certainties that Western humans had erected to sustain the much-vaunted rationality and hubris behind the dominant drive to mould ecology and modify the environment for the sake of ‘our’ urges, drives and desires. This is

erosion has been answered with a necessary collapse of the very space of architecture, however idealised in Western (Cartesian) thought. The space outside that of architecture's traditional value system might seem unthinkable therein; but in fact (and perhaps precisely as it is also a practical, material and far from absolutely abstract discipline) architecture already tacitly knows it, by experience, to be always contingent and non-anthropocentric, imposed upon and limited by the resistance of seemingly infinite extraneous and environmental forces, albeit that these forces and this tacit knowledge of them hardly feature explicitly in any formal architectural studies or curriculums for the study of architecture.

Perhaps, due to architecture's static appearance²², its embeddedness in the economic and social systems of political, legislative and cultural authorities, and its anthropological expressions – that is to say, its early marriage with power structures – this tacit level of awareness of our openness to connections with non-human and contingent spaces has been largely ignored and neglected until now, or has rather been re-acted upon with a marked tendency towards implanting yet more boundaries between us and them. Now that explicit notice is beginning to be taken of it, thus far such attention has centred on applying aesthetic and preservationist values (to 'nature' and our built heritage or environment) and creating categorically 'self-sufficient' and 'sustainable' 'green' projects promoting yet more complicated relationships between people and the environment; or gathering information towards an 'ecological determinism' (McHarg, 1966; 1969) in static maps, as Ian McHarg, who pioneer the concept of ecological planning proposes in his works.

These projects are, on the whole, intended as defensive measures, each tracing out a path and/or reactive framework (whether 'progressive' or conservationist in kind) for interventions intended to avert the ecological collapse and/or its impact upon us and ultimately our lifestyles. While some of these have been remarkably prescient and effective, others have failed, often due to an inability to predict all of their outcomes, some of which have proved to be destructive and to have given rise to narratives sustaining negative impacts upon the environment.

22 This is an appearance encouraged by the design process of separate and discrete plans and elevations as well as the images that often accompany discussions of architecture, and by the 'objective' nature of buildings, as Bruno Latour and Alben Yaneva write in 'Give Me a Gun and I Will Make All Buildings Move': An Ant's View of Architecture (2008).

2 RESERVE RESPONSES

In architecture, as per the evidence currently gathered by the Scarcity and Creativity in the Built Environment (SCIBE) research project, the aforementioned interventions are largely mobilised by ideas of vulnerability and scarcity, and the government policies and programmes informed by the same. Motivated by expectations of a catastrophic future time still to come, mainstream architecture and architectural theory may now occasionally be seen to abandon the longing for perfection and the aim of *securing* people, places and behaviours that have so often characterised the discipline thus far, as exemplified in e.g. *Doing More With Less* (Boeri and Berni, 2012), *Less is Enough* (Aurelio, 2013), and *Subtraction* (Easterling, 2014).

Whether the abandonment of the above aims would be enough to redeem a scared and suffocating planet, the gap between the physical and processual realities of our planet and architecture's artificial suspension *from* it, as between those visions and experiments intended to defend, contain and guard against issues of Earth crises, and their actual eventual results, however, does not prove a proper engagement with the crises.

In this thesis, I thus investigate this real and artificial site *between*, as it is manifested in acts and architectures of reservation. To this end, I look at some of the material infrastructures that support the fantasies and architectures of control, security and safety that have been proposed and promoted by various political and ideological discourses as solutions to planetary-scale problems and Earth crises problems. As indicated in the Introduction, these are spaces and partitions that make tangible the overarching principles and powers of the (steward or) *sovereign* to institute comfort via creating illusions of safety, and which are widely contested on these grounds.

On the one hand, these are spaces and partitions that are legitimated and presented as efficient solutions: effective means by which to withhold crises. On the other hand, these spaces and partitions are critically implicated as manifestations of a projected ideality, so conceptually fragile that they risk exposing architecture's capacity to provide for unforeseen events as a fiction. While some of the reserve spaces and partitions may not seem proper to the disciplinary field and practice of architecture as it is commonly understood, it is my assertion that, in one way or another, their investigation in this study can help to inform, define, expand, and above all contextualise modalities and forms of

architecture within the broader fields of forces within which the discipline of architecture is inextricably involved, and evolves.

For this reason, this thesis looks at how architecture, in its very essence, is bound up with forms of control, containment and indeed distancing building to guarantee and disseminate safety. How is it announced and celebrated as such. How it employs techniques and calculations to reduce the number of possible negative results down to numbers that do not constitute risk. How it is undertaking conversions of land and of ‘nature’, the elimination of mounting waste, and radiation threats in particular, to put off alleged risks and threats (such as contamination), pretty much indefinitely, in reserves, so as to insure us against *images* of risk and contamination by thus *postponing* rather than actually engaging with (much less resolving) dangerous situations and processes.

Such images of risk and contamination, familiar to many of us from the literary and cinematic genres of science fiction, horror and disaster, now belong to the realms of scientific fact and daily ‘breaking news’. It is not surprising that this fact (and this fictional-actual transition) continues to elicit a terrible apprehension and horrible realisation, and perhaps this is indeed the only way for us to *see* the problems. It must be hoped that this shock will help us move out of compliancy and complacency to acknowledge and respond to the severity of our Earth crises problems; and that all of this must be done in direct correspondence with the fast growth of certain global economies and activities, which are variously dependent on, and deeply implicated in relation to e.g. the quality of soils and waters that are now poisoned.

The acts and architectures investigated in this thesis are explored in relation to outcomes of this emerging recognition of the destructive effects we have set in motion, and in which we are immersed. The thesis also examines the fundamental role of the reserve, both in spatial and territorial politics and in discursive responses to those global environmental risks and threats of Earth crises, which since the development of the Cold War, have shaped the nature of the ‘social’ in interests of the social societies foregrounding opposed to, and foregrounding, planetary and environmental interests. The system of acts and architectures discussed by this thesis may be characterised as being driven by a regime of scientific and biopolitical management, operating on the largest ecological and planetary scales, but which is understood here as *mismanagement* – that of both beings and things –

and which thus constitutes, this thesis argues, a truly global disaster, in the form of a disastrous human relationship to the planet.

This leads me to further conjecture that perhaps the currently accepted ways of characterising the tasks of our time are not what they appear, but constitute rather a ‘professional’ defence against the inescapable cracks and flaws in the structures and methods applied. These cracks are revealed here, both in relation to acts and architectures of reservation, and architecture’s own relationship with concepts of reservation. That is, with the very acts and architectures, and the standards informed by them, which have wrought the unfolding ecological catastrophe caused by our disastrous relationship to the planet, to which they are intrinsic.

As we shall see, this disastrous relationship to the planet has engendered and supported the posing of many acts and architectures of reservation as instrumental solutions, intended to defend, contain and guard against threats of Earth crises. Such tools and means will be shown to have been used to promote ideologically-motivated moral claims about cleansing and purity, as vehicles for an apocalyptic ‘science-fiction’ imaginary of doom, in face of which the constant application and refinement of control mechanism is presented as necessary. This way, it may justifiably be said, exactly as the responses to perceived crises developed by the *Preppers* movement²³, such control mechanisms are locked in an all too-demanding (and auto-immunological) anthropological (dis)order building speculative/virtual crises to survive on them, and inadvertently threatening ourselves in the process.

Any significant criticism of reserve structures must surely begin by taking the risks and threats at stake to heart. A review must be undertaken of the relevant reports and forecasts of risk unpredictable consequences and levels of irreversible damage to ecosystems, habitats, inanimate materials, and beings, as well as of the technical strategies undertaken to defend, contain and guard against them; which, too, must be considered in relation to the many Earth crises that arise from them. Finally, and above all, it must be necessary to map the intricate relationships between people and the environments they

²³ Preppers are survivalist individuals or groups who are actively preparing for emergencies, local and global disruptions through emergency and self-defence training, the stockpiling of food and water, and the building of structures such as survival retreats and underground shelters to help them survive a catastrophe.

construct in order to assess of what has, and has not, worked in the past: all of this thesis sets out to do.

Limit-Structures

The regime of scientific and biopolitical management that I have claimed above to be driving acts and architectures of reservation is in turn discussed in relation to a regime of power and affect that organises, allies and distributes bodies and materials in space, while simultaneously controlling and developing relations between them. As first elucidated by Michel Foucault, this is a regime of power deployed from the eighteenth century onward in Europe, one ‘which has the population as its target, political economy as its major form of knowledge, and apparatuses of security as its essential technical instrument’ (Foucault, 1977-78:108-9). In the lecture series he delivered toward the end of the 1970s, at the College of France, Foucault defines the techniques of government applied through security devices concerned with the defense of the population against disruption and disorder. This regime, Foucault explains, intervenes to modify and impose norm, and above all to adjust and prevent parameters of an open environment so as to stimulate and channel probable behaviors of the population and manage the risks entailed by its free and natural mobility.

Thus setting out the programme for a genealogy of knowledge/power relations in the West, and the study of the ways in which the specific problems of life and population had been raised within a particular technology of (modern) government, Foucault’s mid-twentieth century theories and reflections on modern governmental rationality gave birth to a vast field of research focused, in particular, on the notion of risk: its conception, modalities of prevention and insurance, thenceforward applied to domains as distant from Foucault’s own chief interests as environmental governance and policy. As noted in the introduction, this field has yielded fundamental points of reference for the argumentation in this thesis.

To inaugurate his lecture series, published under the title *Security, Territory, Population* (1977–78), Michel Foucault proposes to analyse the rationality behind the emergence of the population as the correlate of power and as the object of knowledge, as well as the techniques of population management that are proper to the art of government which allows individuals to be seised, and that are normalised through security apparatuses and finally arranged within an analytical and probabilistic space or environment. Culminating in modern forms of bio-political governance, in particular the bio-political imperative at the heart of liberal governance, this regime caught the critical attention of

Foucault and his followers, for the manner in which it is situated and exercised at the level of *life* itself. More specifically, by the manner in which *life* itself is embodied and deployed in the set of mechanisms and apparatuses of power invested to protect and secure the societal body and maintain a stable balance within it. These are apparatuses of power meant to ‘exert a positive influence on life, that endeavor to administer, optimise, and multiply it, subjecting it to precise controls and comprehensive regulations’ (1977-78:137). Crucially here, these are apparatuses that appear to offer a key to unlock what is at stake in the acts and architectures of reservation undertaken to defend, contain and guard against issues of Earth crises, as integral to strategies of environmental and ecological governance and policy.

According to Foucault, in the second and third lecture of the series, the elaboration of a population-wealth problem (in its different concrete aspects of depopulation, idleness and scarcity) was the privileged object of the new governmental reason, and one of the conditions for its formation. This is understood on the basis of threats to security being used by modern powers as a means to exert power on the individual subject and their behaviour, and through the individual on the society as a whole. By projecting a threat – something that might not happen but remains possible – onto potential enemies (i.e. enemies that might always be different but that are likely to appear), power establishes and identifies presences, specific phenomena and processes in which it can intervene, in order to augment its force and capacity to act. It does so to direct and influence the behaviour of the societal body, and ensure the transformation, maintenance, enhancement (and optimisation) of life conditions. In this way, it also ensures the preservation of the state within a general order.

However, unlike in, and in a reassessment of, his own previous work in *Discipline and Punish* (1975), in which Foucault claimed power to operate through technologies of discipline, Foucault argues in this lecture series that the security apparatuses of this power/regime do not work only institutionally, through the factory, prison, school, hospital and even familial policing of behaviours and application of disciplinary measures of self-monitoring and self-governance. Here he says that they work also through a series of networks functioning throughout the societal body as systems of relations. These systems, Foucault identifies as *dispositifs*. These are part of a systems architecture, neither fixed to any institution nor guaranteed by architecture alone, in the sense of constituting discrete

unitary buildings or building-complexes, but belonging to an order of construction, in the broad sense of the term, conceived with a dominant strategic function in mind: that of responding to an urgent need specific to a given historical moment.

To conceptualise these *dispositifs*, Foucault explains that they are called upon, to take hold of population-wealth problems and threats to security, through the logics of preemption, precaution and preparedness, based on the systematic predictability of specific relations of power, knowledge (of causes and consequences that can be dire), subjectivities, regulatory decisions, laws and architectural forms involving many strategic acts and architectures of reservation, while both relying on (or exploiting) and promoting those same threats so as to guide and legitimate the practices and aims of governmentality in its various forms and power relations.

Foucault discusses these *dispositifs* in relation to, amongst other issues, disease patterns and scarcity, both as manifested in recurrent catastrophic events such as mortality rates, epidemics and famines, and as threatening limitations upon governance, in terms of the possible disorder and dangers attendant upon them. Hence, Foucault's *dispositifs* involve forms of knowledge (and of the dissemination of knowledge) about deteriorating conditions; the market; the optimisation of strategies of well-being and of illness; the finitude of resources; and exigencies of survival. They also involve control over the circulation of such manifest threats to health and economic threats, so as to reduce their harm and control of their sources. Here by 'circulation', Foucault means the:

material networks that allow the circulation of goods and possibly of man, (sic) but also circulation itself, that is to say, the set of regulations, constraints and limits, or the facilities and encouragements that will allow the circulation of men and things in the kingdom and possibly beyond its borders (Foucault, 1977-78:325).

These 'things' in circulation include not only the 'stable reserves', but also – to borrow a formula from Heidegger – the *standing-reserve* of such resources and means of power keep in reserve, or reserved to be employed, exploited or put at use, in the future.

In *Question Concerning Technology* (1954), Heidegger uses the term *standing-reserve* to describe the essence of a new form of power that 'entraps' everything, including us humans, as into the domain of objects, so as to be exploitable and storable, and thus more efficiently and flexibly ordered by this utility for human use and power. This is a power that takes the form of a technology and changes the very nature of being. As part of

Heidegger's elaborated proprietary language and terminology, the concept of the *standing-reserve* describes an unconcealedness as mode of ordering that culminates in technological modernity's capacity for the total disclosure and manipulation of all beings. It reduces things by disclosing them as objects, tools or equipment for future use and action – thus concealing all other possibilities in and for them. This unconcealment concerns the world and nature, above all, as the chief storehouse of the *standing-[in]-reserve*, and it implies that the things that stand in reserve, stockpiled, stand thus at our beck and call, both ready for deployment and/or held to deserve it: awaiting human activation.

Often termed as instrumentalism, or 'resourcism', this is a mode of ordering that transforms all relationships into simple subject-object relations and sets the guidelines for how to manage them well, based on a particular set of parameters and the fact that a population *requires* resources in order to survive. It assumes humans to be the measure of all that matters, and has brought them to a position of astonishing mastery over the planet and its resources. But it is also a mode of ordering that come to be highly criticised as the object of predominantly pessimistic views and analyses of its impact on beings and its relationship with the planet, and only more so since the world come to be seen as a fragile and delicate system, not infinitely abundant but limited in resources, and since the very aims and assumptions of modernity and its consequences have begun to be forcefully called into question and thus factored into environmental and ecological security problems, as we will see in Chapter II.

The themes and concerns that define both Heidegger and Foucault's arguments have helped substantiate a critique of technology's (and the reserve) relationship with power. Both share the view that individuals in modern society are, to some extent, determined by technological structures that objectify and order them to mobilise and manage the forces of life – *as* a resource – for the sake of the enhancement of power. In this respect, both Heidegger and Foucault have generated analyses, that (together with those of other thinkers (with interpretations derived from Heidegger and Foucault's accounts) have been instrumental in the theorisation of types of metaphysical, anthropological and stewarding power, and their relations with the mode in which we occupy, engage with and conceive of the planet. However different their focus and respective interpretations, both have helped conceive of environmental problems as components of larger social and political power interests, and formulated perspectives on the power-enhancing aspects of

environmental governance. Interestingly enough, each has both been instrumentalised by approaches that resist environmentalism, and also equipped to defend their criticisms of instrumentalism and ‘resourcism’ via appeals to practical benefits, moral and political orientations and scientific findings regarding issues of Earth crises. These are crises that have forced us all to face what has unmistakably occurred and is occurring on the planet, and that have come to reveal the destruction of multiple life forms and other dangers arising from environmental catastrophes; the destitution of once abundant resources, both human and natural; the rising pollution levels; and other practices threatening the health and well-being of human and non-human organisms.

In the fields of scholarly debate over our actions (of e.g. construction) and attitudes (of e.g. domination) towards the environment, and our immediate experience of it, as well as that concerned with environmental governmentality, Foucault and Heidegger’s work has *also* provided a challenging set of tools with which to reflect upon idealist (and often patriarchal) impulses and sensibilities. These are impulses and sensibilities aligned with the growing awareness of Earth as a complex but single and singular organism, endangered by a pattern of ecologically and socially destructive forms of living; by the annihilation of species and exhaustion of resources, by failures and disasters, by the advent of technological poisons such as pollution and radiation, along with our hyper-vulnerability to both natural and non-natural crises. These are the ideas that have come to dominate environmental and ecological thinking since the start of the 1960s, and that serve the traditional, reform environmentalism and its investments in acts and architectures of reservation as solutions to the problems these (might still) raise.

Fuelled by the fear of nuclear radiation, a radical sense of finitude brought about by images of the world seen from space²⁴, influential publications such as the aforementioned Rachel Carson’s *Silent Spring*²⁵ (1962) and Club of Rome’s *Limits to Growth* (Meadows and Randers, 1972) (which predated but was informed with an equivalent concern for the population as Foucault’s lecture series [above]), these ideas and their proponents have contributed to a unprecedented, public understanding of

24 Images such as the Earthrise image taken by the Apollo 8 crew on the Christmas Eve of 1968, and the Blue Marble image taken by the Apollo 17 in 1972.

25 In the book, she explains that the use of and trust in pesticides, intended to reduce the chance of famine and disease was putting not only human health but also the health of the global ecosystem in danger, accumulating as it is in a strange ways, and with carcinogenic effects on certain animals and humans. Such use was indeed on the edge of silencing (and/or destroying) nature altogether.

environmental threats. In doing so, they have brought an increasingly eco-apocalyptic sense of doom into daily life, and have managed to cast doubt upon the narrative of progress and development, its rhetorics of improvement and the erasure of past mistakes (see Weart, 1988). They have added a sense of impending collapse to the present, inspired environmental ‘calls for action’ and a politicised ecology, proposing that environmental protection should be a governmental requirement and a critical element of decision-making. More importantly still, they informed a political rationale that extended the biopolitical concern with human life to the entire biosphere, and reconstrued the environment as an environmental resource problem upon which human populations depend, as we will see in the following chapter.

While it may be argued that the holding of this set of ideas is not yet a fully normative, or normalised social phenomenon, having been intentionally discredited and removed from the mainstream political agenda for at least a generation, its advent and spread has nonetheless led to the diffusion of important thinking concerned with the need for a planetary environmentalism suitable to its, and our, continuity, and a widespread acceptance of the need for us humans to use all our capacities, so as to more sensitively discern, act on and attend to what gives itself to us.

Environmental Challenges to Continuity

At the basis of the emergence of this idea of the Earth as a complex and endangered single organism – as premised on a number of signs that things are not going as planned, and that ‘we’ (humans, but not all humans) may instead have irrecoverably doomed the planet and thus humanity – there looms the threat of a worldwide environmental catastrophe. This points to a critical situation and, if we are to avoid the worst, a necessary transitional phase. To save our world and the planet, political ecology argues, we must think through these far-reaching problems, change the course and move away from the negative environmental trajectory we are on, whose outcomes are expected to impact upon humanity with enormous destruction. We have reached a point at which we are running headlong towards environmental Armageddon, an end point, at the prospect of which the idea of the planet as ‘just’ a place, a source of lifeless, de-animated and desubstantialised ‘matter’ to be used and manipulated in support of our actions and constructions, upon which conception Heidegger based his arguments, is no longer conceivable *or* sustainable for us. It must now instead be recognised as *vital*, as many argue: as a ‘ticklish being’ (Stengers, 2009), ‘collective giant’

(Latour, 2011), processing a dynamic and ‘vibrant materiality’ (Bennet, 2010), constituted by life and non-life forms posited as once at the mercy of, now in opposition to a (dis)ordered humanity.

Rather than a pre-given globe, our planet is now contemplated as the space of a great *denaturalised* – or indeed *post-natural* – world, liable to global (and galactic) mutations, an assemblage of forces and (non-linear) processes indifferent to our reason and our projects, even though in part fabricated of extended and fearful social networks and challenges. It is now conceived, in some quarters, as a sphere of networks, at once fearful of, yet more resistant to the authority of all currently established forms of containment and subjective knowing. This is no longer the reliable and stable ‘natural’ background of our lives but an obscure, unstable, abyssal, and incessantly generative ground: *A World of Becoming* (Connolly, 2011), composed of heterogeneous force fields.

To be sure, newspaper headlines treat daily of the challenges arising from Earth crises, detailing the escalation of numerous warnings, the extinction, or near-extinction of many species, damaged ecosystems and their limited capacity to absorb the filthy by-products and other effects of our presence on the planet. These are crises that concern the entire planet, its atmosphere, soils, water, plants and animals, and which carry the risk of destroying many more extant forms of life, including the human; crises that declare themselves – and have been declared – as expressions of our power. At the same time, they are hard facts of our impotence that help declare the impossibility of avoiding the sequence of events that our exercise of power has brought about, and its deep and troubling consequences at many different scales and across many domains, spatio-temporal and socio-geological areas. These are thus crises that form a basis for the thinking-through of, ‘the state of things’ - meaning the state of an unprecedented environmental and ecological emergency - one that is pan-global in scope and that must be considered on a vastly greater scale than that of, say, the collapse of banks and the destruction of buildings, as Naomi Klein writes in *This Changes Everything* (2015), and as many other environmentalists have been claiming for so long.

The wide range of environmental problems mentioned above announces something final and defeating. They seem to constitute an unquestionable limitative authority, equivalent to a form of an agency that demonstrates and imposes limits. These are limits that, as the Club of Rome’s reports (1972), include ‘natural’ limits to growth,

whose implication of finitude has been part of the environmentalist discourse for decades; and what are conceived of as social limits, meaning limits to our knowledge of how to safely synthesise ‘natural’-social interaction and to deal with situations of risk and uncertainty. The very formulation of this ‘social limit’ indicates a deep contradiction between nature and society that in itself constitutes an inherently limiting and disempowering logic, negatively affecting the prospects for environmental continuity and our ability to act, and, crucially, to *think* for the future.

Central to the project of resolving (or dissolving) this contradiction, there stands a new interdisciplinary thesis and working group that is engaged in dismantling the and/or divide between culture (humans) and ‘nature’ (the planet): this is the *Anthropocene* thesis. It understands Earth as a body composed of (hybrid) nature-culture relations, thus emphasising the idea that human culture and the planet are not two distinct realms but are instead linked by a broad, middle ground or enmeshed system of relations between non-human entities’ embodied practices and human artifices and their presence and impact. One of its key contentions is that ‘Human activities have become so pervasive and profound that they rival the great forces of Nature and are pushing the Earth into planetary *terra incognita*’ (Crutzen, Steffen and McNeil 2007:614).

Popularised by the atmospheric chemist Paul Crutzen, who uses it to describe human impact on the Earth at a global scale, the term *Anthropocene* aims to define the Earth’s current geological period. As the etymology of the term denotes, this usage defines this as an anthropogenic geological period, based on overwhelming global and stratigraphic evidence of human change and troubling impact on the entire planet. The Earth scientists unveiling this new actuality use this term to mark the extent of our transformation of the Earth, such as defaunation and other ‘overwhelming’ evidences of destruction, collating temporal, natural, spatial and human data to form scientific consensus about that the Earth has undergone a shift from the ‘natural’ geological epoch of the Holocene (Holo- meaning ‘whole’), to a new, artificial form of ‘nature’. Presented *as* an epoch, as a formal unit of geological time, that is, the term centres discussions of this profound and ‘palpable’ new factor of human force²⁶ and its outcomes as leading an irreversible shift.

²⁶ As investigated not only in geology, by Charles Lyell’s *Principle of Geology* (1830), but also in the field of the humanities, by George Perkins Marsh, who documented the effects of human action on the environment in his book *Man and Nature* (1964).

The *Anthropocene* thesis is discussed stratigraphic terms of a pervasive, anthropogenic threat to all life-forms on Earth – humans included – and entailing the irreversible destruction of worlds and ways of life. The *Anthropocene* thesis holds that humanity has reformatted the face of the Earth and the biosphere according to human spatio-temporalities, rivaling and potentially supplanting the primacy of the Earth and/or ‘nature’, as previously understood, as the ‘ground’ hosting and dictating forms of life. According to the thesis, and debate surrounding it, humanity’s recentring of ‘the world’ around itself has engendered threats to (the biosphere and) the actual geological planet, challenging the fundamental boundary condition of – and basic possibility of survival on – the planet.

The expressive and productive character of the *Anthropocene* thesis, and surrounding debate, has come to the forefront of our collective contemporary agenda to trouble the nature of human exceptionalism and the very legacy of Cartesian thought and division: that is, the ways in which many humans have built their worlds, futures and environs based on these. In this respect (and developing from an increase of interest in, and enquiries into ecologic transformations), a new, distinctly *Anthropocenic* appreciation of our entanglement with the material and intangible, the organic and inorganic, the living and non-living, and critique of disregard for this, has led to the emergence of interdisciplinary perspectives acknowledging the basic ontological features of the *anthropos* as geologic world-maker/destroyer of worlds (Yusoff, 2015) - and about what all this might entail for the future of human action and responsiveness, as Chapter II will define.

Some of these perspectives, emerging from the technological and scientific spheres of human thought are announcing aims and suggesting ways to enhance and systematically align human society (and its practices) with the natural world – this despite increasingly widespread expressions of doubt about the way humans notice change, and the way those changes are affecting their habitats and those of other species in actuality. Other perspectives, however, in the interest of meeting the need for a new political sensibility, have helped to homogenise understandings of Earth crises towards what might be called *worldliness*. This new understanding may best be described in terms of radical and speculative forms of environmentalism (such as Deep, Weak and Dark ecology (Chapter II)) and, to use Heideggerian notions, of a fundamental condition of *being-with* and

inextricably part *of* a world – not ‘our’ world, as the old grand theories and narratives²⁷ would have it, but a world that we share, co-constitute, create, inhabit and destroy with countless other (human and non-human) life-forms and beings.

Almost without exception, the current discourse of ecologists and ecocritics involved in the aforementioned forms of environmentalism, whether or not they are involved in propounding or debating the *Anthropocene* thesis, challenges anthropocentrism to define deeply enmeshed nature/culture relationships in the world and offer a paradigmatically *globalised ground* made of an at once very localised but interconnected global ecological catastrophe. That is, a ground that does not provide a foundational anchor (or any certainty of promise for continuity) but is instead characterised by a succession of (bio)stratigraphic signals and an ongoing discursive interplay, affecting, and effected by, ontological distinctions modernity has built on. Herein, the dimensions, causes and natures of the environmental ills and effects documented are called upon, toward an acknowledgement of a new earthliness of the Earth, thus asserting the planet’s material planetary vulnerability to what is conceived of as an ongoing, worldwide ecological event irretrievably linked to a mode of existence that has thus far been largely insensitive to the environmental devastation caused by our techno-industrial progress.

Following the loss of the world of the *Holocene*, as the social historian Dipesh Chakrabarty suggests, contemporary ecological perspectives ‘saturate our sense of the now (...) while challenging at the same time our capacity for historical understanding’ (2009). They arise in individuals, groups, and governments, and range from denial, disconnect and indifference, to concern, engagement and activism of varying kinds and degrees. Although there is a consensus upon the existence of a threat of the breakdown of critical natural systems inextricably linked to life *in* and *on* Earth, one more serious than any of those that have preceded it, these multiple positions entail a disagreement, an emotional and cognitive dissonance, about the direction of change itself – both in terms of the likely changes that such a threat, if realised, might provoke, and the changes we should enact to redeem ourselves. That the threat exists is, according to those concerned, ‘a ground of order that is beyond question, or rather, a ground that is in question of the beyond’ (Rory, 2011). This consensus discloses the state of the world as having already exceeded certain critical

27 Theories and narratives developed in periods dominated by idealist and humanist thought and emphasising a constitutive process, relationship and divide useful for the government and appropriation of resources, as noted by Michel Foucault and Michel Heidegger.

thresholds or tipping points to provide a diagnosis of a planetary crisis; and with this, the evidence we are ‘in charge’ of the Earth, requiring that decision-making policies must be influenced and accompanied by the knowledge that we must now ‘master our mastery’ if we are to manage it well, whether we like it or not.

For the moment, such politics have implied a security and survivalist rhetoric, and the adoption of conservative approaches and attempts to act through changes of policy and legislations, with a marked preference for the imposition of prerogative political imperatives – such as emergency measures and militaristic remedies and metaphors – inherited from a modernist propensity to lend it the mantle of catastrophe, and then steer the displacement of catastrophe towards planetary control and stewardship. These measures are undertaken, according to their own logic, as Chakrabarty writes, ‘not only as a way out of the present but as a way of keeping us out of harm way into the future’ (2009:15), since both our short and long term survival, and the survival of the many species, territories and landscapes that enable it, seems to depend on their promise.

Problem-solving Endeavours

The prospect of these crises, and the attribution of geological agency to humans involves an attention to geological time which only heightens the disjunction between its duration and the lived time of human experience as it appears against the background of the technological, political, legal and spatial orders. This disjunction, Mark Fisher writes, ‘is now not just a question of metaphysical contemplation but a matter of urgent political concern’ (Fisher, 2014:231). It instills an uneasy suspense about what to expect from the future, and a real distress about how to (re)conceive of and (re)imagine the possible. In the face of the changing conditions of the planet, and in the absence of any certainty – for so it stands in the thriving postmodern literature on environmental pressures – the whole trajectory of, and source of attachment to, the future inherited from the modern ideology has ceased to suffice. The rise of environmental histories and problematics seems to be challenging the ‘sense of posterity’ or permanence in time and durability of human deeds and of the *moderns*.

In addition, such changing conditions of the planet has paced humans as symbiotic slaves and agents of the terrestrial globe and its inhuman geography as well of its own horizon, the invisible boundary shrouding ‘earthly life’ and beyond which nothing can now escape. In other words, with the arrival of our current environmental and ecological

concerns about the future, the horizon of modernity appears now as a reality whose *force*, in the geological sense, threatens the possibility of continued human existence on Earth: since in terms of geological timescales, the *Anthropocene's* impact appear not all that different, in its significance, from that of a large impact event, as it will be seen in Chapter III.

Now, in the place of the *radiant future* promised by the narratives supporting a modernity governed by linear time, and images of the present as embodying progress and optimism, there looms instead a disturbing image of a radiant and dire, shifting but futureless present (Fisher, 2014; Bifo, 2011). There are certainly reasonable scientific grounds providing evidences of this present in – per example – Chernobyl. Chapter IV will demonstrate how these are indeed foreshadowing alternative but uncertain conditions, impeding our capacities for both prognosis and expectation, and thus for forcing us to accept an inconstancy and futurelessness that prevents the construction of possible futures from presenting itself from being any sort of easy labour. The concrete facts of the newly articulated *earthliness* and *illness* of the Earth, in terms of destruction and danger, depletion of natural and artificial resources, contamination and pollution, at once diminish and expand one's temporal and local horizon line to a focus upon the total circumference of the planet's immanent form, as a whole system waiting for more responsible and especially more ethical actions.

While this new earthliness of the Earth encircles the present as a hyper-referential and accelerant *aporia* forecasting not only the obvious factors to come but those obviously internal to the global environmental system, it is also provides a reason for spatial immunitary spatial design systems – in the form of acts and architectures of reservation and a calculus of new reserves – to be systematically called upon by humanity, posited as a problem-solving endeavour and *rationale* by which to bridge the (our/the Earth's) losses. Undertaken, in some cases, without a proper foundation in knowledge, the reserve thus has (nonetheless) come to be seen as a potentially useful form of construct with which to ameliorate negative ecological impacts.

However, even though political compliance with environmental governance and political ecology often entails endeavouring to take responsibility for, and literally contain the effects and trouble caused by our actions, by providing evidence and calculations supporting decisions about futures far beyond our sense of connection, and spaces as if *off*

the planet, it also seems to be supporting acts and architectures as anticipatory and forward-looking means to conceal, and not solve, the countless ecological changes and challenges posed by the catastrophic direction and environmental calamity. It is, in fact within this framing that the very idea of protected and perfected reserves is presently being both contested and/or construed as provisory means to forestall and make catastrophic possibilities disappear – that is, to provide structures or systems with which to apply the great power of the *Katechon*²⁸, as discussed at length in Chapter II.

Examples of the application of these control systems have been giving rise to new divisions of given ecosystems into either refuges of wilderness, or sacrifice zones for the poisonous world. These are found in those acts and architectures already referred to in Introduction, and thus in many communal forests around the world, which are being turned into private tree (p)reserves, in order for their owners or investors to collect carbon credits, or part of the Environmental Bank's so-called 'biodiversity offsetting' programme. This thinking is also behind the positing of a series of new geo-engineering solutions, such as ways to cool the planet, and ways to engage with the risks of a number of threats of Earth crises and the problems they set, and as so to unlock *new* reserves of (finite) resources.

The examples of acts and architectures of reservation, mentioned above and discussed in this thesis, are of the kind wherein forms of nearly-lost nature are intended to be restored, safeguarded and kept aside as remnants or resources for our security and continued existence. Besides stemming from faults and out of the intention to minimise loss and finality, and meet demands of life, they also assume, in physical form the anthropological interests that both attempts to limit and unfold its power. These have been construed and theorised (by those building them) with every technique that is available, including those of literature and scientific data, diagnosis and practice, and the languages and application of biology, technology and even artificial intelligence, and their applications, adapted to suit the forms of containment and immunisation – i.e. security and protection – it is deemed necessary to set against the threatening world and the dramatic crises of the Earth's ecology and environment, and so offer assurances that these can still be 'tamed' (i.e. 'domesticated'), even though, most of the times, without any guarantee that the result will not slip from human control.

²⁸ See also in the glossary of terms, in Appendices.

The currently unfolding discourse of the term *Anthropocene* articulates a continuum between the human, nature and technology, and as consequence it provokes new questions for and about this type of architectures, and the acts supporting them, along with their participation in the transformation and possible protection of the planet. It challenges the long-standing conception of systems, structures and buildings – in particular, reservation arrangements – as objects autonomous from the environment, governed by a conceptual separation and an operational divide orchestrated by the line, as an experiment in invalidating the traditional architectural guarantees and remarks based on the use of the line (as seen in the first section of this chapter). The idea of the Earth as a complex and endangered single organism and of the *Anthropocene* involves the recognition of the destructive effects we have set in motion, and in which we are immersed, as arising from principles and an ordering logic, and the constitution of spaces (and architecture) as a means of exacting (anthropological) control over the environment. For many scholars involved in the discourse of the term, these principles and ordering logics are leading the Earth and humanity as passengers to ruin, under the umbrella of safety and survival.

At the core of the dialogue between architecture and the planet stands a field of relations in which factors and forces are far more numerous and extensive than we previously thought; not fully predictable but inevitable, irreversible, shifting and marked by intensities connected in a vast, entangling network (Latour, 2002; 2004 and Stengers, 2010) or mesh (Morton, 2005; 2007 and 2010 as ahead) that envelops all our activities and extends beyond them towards a permanent, unified and world-scale socio- and eco-technological arrangement (or enframing), where any kind of ‘nature’ develops for us and is developed by us (Nancy, 2007:94). This shows that humans are now *de facto* planetary makers, and thus smaller in relation to their works: works that must now be understood to extend to and include the entire terrestrial space and geographical stratigraphy, involve a ‘nature’ we help produce and within which we have to live, and indeed learn to survive within. This is a ‘nature’ no longer natural, and bigger than architecture itself – as an act – can comprehend, let alone isolate and divide.

These forces and factors are now understood to have changed the relationship between humans and ‘nature’ – from its being considered stable (whether as with a provider or an enemy) to being much more ambiguous and far less subservient, but still bound up with our habits and utterly dependent of our actions. These changes undermine the logic of

control and of safety, and allow us to reflect on our ability to destroy and to protect (and rebuild) the planet, on a scale formerly reserved for geological phenomena. Ultimately, and accompanied by our ever more uncertain and contingent exposure to danger, this unravels our confidence. And, as many proponents of the *Anthropocene* note, the accruals of our traces – that is, signs of human presence – have reached a stage, which has placed the planet in a deadlock situation, and us between the crosshairs of threat.

In an epoch like the present one, continually crossed by conflicts and concerns over the environmental disasters and Earth crises wiping out animal and plant species, and threatening entire areas of the world (with irreversibility), the only choices before us, they say, are to rise to our globe-managing responsibilities, and manage Earth well. Or we can remain inept and toxic to the diversity of life, living in denial or desperately attached to the conditions of our impotence, our actions limited to those of emphasising the inhumane aspects and problems of a catastrophic imaginary of post-human hybridity, continuously proclaiming crises and dramatising end conditions.

As discussed in Chapter II, responses premised upon a world characterised by endings – as upon eschatological conceptions of historical time focused on all kinds of exhaustion, extinctions and anthropological pressures that determine and structure the future as a pressing disaster – increasingly take the form of calls for new and preventive measures – i.e. *reserves* – to ensure the survival of, at least, our status quo. The question of how valid the most valued remains are is the focus of this thesis. Other questions addressed here are those of how the search for spatial order has been an integral element of our experience and understanding of an environment crisis as well as of the needed responses; how our acts and architectures encounter and articulate this need and order; how do they relate to the instrumental behaviours which produce the processes that construct and intend to fix our environment? But also, how the reserves sustain their forms of rationality; how they work, and proliferate; how they situate themselves in their field of action; how they are challenged; and, more specifically, whether they can provide the ground for critical discourses and ways of partitioning space and dividing categories. Finally, what is the relevance of our acts and architectures of reservation in the formulation of new and more ethical ambitions, both for architecture itself, and for rethinking our relationship to the environment and the planet?

CHAPTER II

EARTH AND CRISES RESPONSES

The previous chapters have briefly presented some of the ideas and methodological approaches by scholars and authors involved in a cultural (and reactionary) continuum of environmental perspectives and intergovernmental forums and work groups, (both scientific and otherwise) who have deemed the late twentieth, early twentieth-first century to represent a critical stage. Marked by battles against the three types of threat of Earth crises previously mentioned our vulnerability to (and their effects on Earth's physical structure and life systems) this stage is defined by a pattern of ecologically and socially destructive forms of existence, rendering difficult the survival, continuing stability and integrity of the planet and its life forms. From this pattern, these scholars and authors have produced a synthesis of our Earth crises with the observably interconnected global damage, and have enabled the recognition of both a long-held disregard for the entanglement between all beings – material and intangible, organic and inorganic, living and non-living – and of the interconnectedness between our planet's, and our own complex human dynamics, meaning the way humans and non-humans interact with each other.

Altogether, the above has raised several themed – albeit with substantial differences – environmental and social concerns about what living with the consequences of our experience on Earth, and, more concretely, within the effects of the imperatives and hazards of modernity might entail, in terms of human action and (the) survival *on* and *of* the planet. These perspectives and enquires, often present global development to the general public in a discourse mobilising its consequences – whatever their properties and potentialities – to humans as well as other 'actors' than humans, with a tendency to foster debate and effectively raise the raw physicality of the planet against us, in environmental, socio-cultural destructive and economic terms. The scholars and authors involved do so, to hasten the conceptual possibility of a custody of the whole planet to be executed through acts and architectures as they have been applied to sustain humanity (or societies), or to contest it.

This chapter will offer a more formal introduction to the opinions and positions contesting such custody. The social and countercultural developments that have emerged with the Earth crises, and that sustain such contestation, aspire to transcend the form of dominance and of partition of the planet and their forms of building reserves against crisis threats, while helping to define the anthropogenic hypothesis and the negotiations defining the impacts of Earth crises that characterise them. These are critical opinions and counter-positions that, as briefly presented, take on various reservation arrangements to signal a profound ambiguity being perpetuated in solutions to crises. They add momentum to the critique of the established world-view, and the metaphysical and political order of things, by further placing the ontological, epistemological, cultural and political dimensions in which we (in the West) have conceived of, and transform the planet in its entirety, with the help of architecture for the ‘betterment’ of society.

The central concern of this chapter is to present, within this history of ideas and its specialised domains, the theoretical sources and approaches that have shaped my readings and analyses of the acts and architectures of reservation, and in relation to any threats of Earth crises. To do so, this chapter presents the key ideas and theories that have helped me to interpret and critically evaluate those efforts to understand, and attempts to act upon the threats of Earth crises which are enabled and expressed by many of the reserves that have been designed and built as solutions to Earth crises’ issues.

1 EARTH-AS-PLANET

In 1961, at the peak of the space race, and at the inception of the Earth’s re-imagining as a planet¹ with a concomitant articulation of global environmental concerns in interconnected terms that refocussed our relationship to the planet as to an ecosystem², the Italian artist Piero Manzoni placed a 82 x 100 x 100 cm metal plinth inscribed ‘Socle du Monde. The Base Of the World, Homage to Galileo’ upside down, in a field in Herning, Denmark. This

1 Inseparable from the images, meaning, moral reflections and practical actions apparent in representations of the globe – known till then through maps, graphic cosmographic images and atlases – but at a time prior to the (scientific conquest and publication of) the first photographs of Earth, in its totality and from outer space (as in Chapter I, Section 2).

2 Mainly from a broad-based environmentalism that articulated ecology as a subversive subject with perspectives that, as we have seen in the previous chapter, are based on powerful analysis and evidences of pollution, destruction, depletion of resources and contamination of the planet.

gesture and inscription produced a very captivating object by which to present and understand the ideas and realities posed by the abovementioned social and countercultural developments and that constituted a critique of the mode in which we continue to assert ourselves in a disastrous relation to the planet. In addition, the work offers a means by which to convey the challenges posed by recent theoretical innovations employing the insights of radical forms of environmentalism, such as Deep³ ecology, as Weak⁴ and Dark⁵ ecology. These are the critical and counter-positions that are extending and enhancing the discourses of environmentalism to affirm a different set of values to those of hegemony, with an alternative image of the world and relationships *on* and *with* the planet.

Manzoni's use of World rather than Earth emphasises the work as homage to the man who cleared the ground for the construction of an objective world, and material reality – discerned only via our instruments and equations, and independent of awareness or subjectivity. Galileo helped to assert that only those properties of matter that are directly amenable to measurement are real, but also confirmed that our planet is a sphere (and merely a sphere) in a system rotating around the Sun, not the Sun around itself. Challenging the moral order, the views of great scientists and other ancient and medieval Christian fundamentalists (who believed the Earth to be the centre of the universe) Galileo's discovery – and devotion to Copernican heliocentrism – developed into a criticism of teleological anthropocentrism, and a break between two fundamentally distinct epistemological and metaphysical paradigms that, since then, have divided the world into a realm of matter (*res extensa*) and a realm of will or mind (*res cogita*).

This radical division, marked by René Descartes' ontological arguments in his well-known *Meditations* (1641), is largely considered (after Husserl, 1954) to be the foundational edifice on which Western technological and scientific thought (with its calculative thinking of the rational ego-consciousness of the subject) was constructed in order to make it possible for man to 'stand outside' 'nature' and material reality: in order to

3 An ecological and environmental philosophy promoting the inherent worth of living beings regardless of their instrumental utility to human needs, as introduced by Arne Naess in 1973. For details see in the glossary of terms, in Appendices.

4 Or an ecology of weakness - calling for an integration of environmental theory and cultural studies - as advocated by Peter C. Wyck (1997) and Michael Marder (2016)..

5 A radical new form of ecological criticism, with affinities to Object-Oriented Ontology claims, as pioneered by Graham Harman. Thus, based on an uncertain attunement to the shadowy world of nature and the limit of our imagination, as proposed by Timothy Morton (2007, 2010, 2016).

comprehend, or dominate, it completely. That is, for man to ‘identify the laws that nature obeys’ (Stengers, 2009:102), and this way gain mastery over, and enjoy a privileged access to that which is whole; to treat the whole as determinable, objectively discernible, and conquerable through a Promethean scope and mentality.

Often termed the Cartesian divide, Descartes’ affirmation articulated an intricate constitutive process that placed consciousness in opposition to nature and matter, resulting in an absolute equation of their division, and cognitive victory (*cogito ergo sum*, I think therefore I am). By extension, this paradigmatic shift proposed a separation of man from Earth, which has transformed the world dramatically. It has led an anthropocentric rationality to constitute the grounds for a new epistemic certitude, one which places ‘man’ as the author of ‘his’ own reality, destiny and being. The division at once posits the human being at ‘a distance’ from Earth and as the ontological centre of our world and material reality. With this centring comes our responsibility as global sovereign agents and, as we now like to style ourselves, custodians of the planet and guarantors of the continuation and existence of life on it. It situates us as the basis of everything in which we are immersed, as the cause and saviour of the consequences from which we are suffering: a model that is anthropocentric in the extreme.

Manzoni’s plinth thus honours the powers with which modernity constructed its actual possibilities and continues to construct its ideas. However, the immediate temptation is likely to argue that Manzoni’s plinth also exhibits something of the opposite. Conceived at a particular moment when debate on and an undeniable growth of Earth crises was starting to intensify, and as part of his series of *Living Sculptures* and *Magic Bases* (1960) – proto-conceptual Arte Povera⁶ - the plinth points to a radically altered relationship between us (in the West) and the planet. It turns the entire planet into a ‘readymade’ of sorts (to recall Duchamp). Yet it is a readymade that, through its excessively open and inclusive framing – displaying our world and Earth’s living being in its entirety – contradicts the radically impersonal character it is (as ready-made) supposed to transfer. The plinth shifts the ground on which we stand, and by which we know – and boldly experience – the planet according to reason, and anticipates a direct and subjective experience, necessarily relative

⁶ Whose emergence is connected to the radical politics of the time, with its awareness of changes which were taking place in everyday life and a questioning of conventions of artistic (and creative) practices and the ability to affirm a different set of values to those accepted as the norm.

to our position or place on Earth. In doing so, it reifies the planet (and the world in it) as an all-encompassing unity, one that exhibits forgotten elements embedded in the Cartesian philosophy and equation. This may be easily connected with other positive and inspiring reconfigurations, such as the displacement of anthropocentric relations towards an enlarged sense of interconnection between humans and the planet, as advocated by the above critical opinions and counter-positions.

The planet upon which the plinth stands is the work; the essential form and object of appropriation supported by the plinth. Hence, our World is ‘elevated’ and turned upside down, resting upon an architectural support in a radical conceptual gesture that challenges our orientation and affects our awareness *of* and experience *with* Earth, alongside the very logic of our foundational edifice. Manzoni’s plinth reorganises the relationship between the Earth and its ‘place’, at once reorients *us*, and in so doing confronts us with a new relationship to the planet. What the plinth manifests is an acknowledgement of an almost unimaginably alienated, uninvolved kind of being *on* and *with* Earth (that was then current). The plinth feeds us a novel, overwhelming, strange, and literally uncanny⁷ sensation, one that immediately comes to haunt any empirical, sensorial, aesthetic or perceptive ordinary and Cartesian preconception that its human witnesses may have of the planet. This no longer accords to the Cartesian conception of human life. Instead it sets a stage or frame that does not simply separate us from an Earth understood as our ‘great outside’, an inert entity, but transforms it into a living field: a common and relational sphere and environment, inevitably conditioned by its own dynamics, metamorphoses and qualities. Included in this transmutation, humanity is newly conceived of as one kind of thing or being among others, and above all, as dissolved within the environment.

From this perspective, Manzoni’s plinth offers an affective awareness of the global system-view that is elucidated by ecology⁸, environmental philosophy and praxis, articulating Earth’s absolute and somehow subversive position (having to do with its/our

7 In Freud’s terminology, the uncanny is ‘the return of what has been repressed’ (Freud, 1919:155), the revelation of what was concealed that implies a cognitive dissonance within the experiencing subject as the negation of Heimlich, home’(oikos).

8 Ecology as an expanded conceptual framework through which we come to perceive the world as a network of interrelated systems; at a level of relations between all entities: humans, nonhumans and their environments, not simply the natural world apart from social structures and configurations. Ernst Haeckel was the first to describe this notion, in his *Generelle Morphologie* (1866); however, popular translations of the term and concept started to emerge from the 1960s and 1970s onwards as an element of the counter-readings of the way we treat the planet.

state of being in a condition of crisis) so as to challenge and decry the human focus on dominion. More concretely, it offers a configuration with affinities to those experiences and intuitions being discussed and situated in relation to the Earth-as-planet within environmentalism of the post-WWII environmental movements, and more recent ideas extending and enhancing its discourses.

This configuration is reinforced by a double and ambiguous articulation of a type of *mise en abyme*. By the attempt to ground Earth with it, the plinth asserts our World is groundless(ness). In other words, the plinth amounts to a revelation of Earth's lack of foundation. It comprises a reproduction and reversal of the elementary operation of the founding modernist commitment, that is, to hold humans apart from nature, with the (consequent) positioning of the Cartesian divide; setting Earth on a plinth, as an object of study, only in such a way as to reveal our being *in* and *of* nature, and no longer as the separated centre of the equation but embedded in and utterly dependent *on* it.

The focus in Manzoni's art piece is thus shifted to Earth, as in itself a 'work of art' that according to Heidegger, presents how things are constituted *in* and *by* themselves. The work effects the historical emergence of an accessible image of the world apparently threatened by a pervasive existential meaninglessness. It opens a world newly bereft of the orientating principles of modernity, that is, of dialectics, as a recognition of our entanglement, replacing the old subject-, or agent-centred viewpoint that would divide humans and nature, thus freeing us from the metaphysical theory of reality. An accompanying realisation displaces humanity onto a relatively small and surely not separate or *dis*-associated part of the Earth, demonstrating the limits of the Cartesian ontological argument and its capacity to behold what lies 'before', or beneath its subject(s).

Thus, like that which has been brought forth and made manifest in and through environmental theory, and that persists throughout radical forms of environmentalism and the (newly framed by) *Anthropocene* discourse (as outlined in Chapter I), this recognition, too, effects a displacement that engages and participates in the field of ecology to realise another inherent potential than the homocentric or nature-centric poles of the Cartesian divide. Manzoni's plinth rearranges the 'man-nature' dialectic, shifting nature and the environment to occupy the new conceptual position of a central and inclusive category of which humanity is part, impoverishing and extinguishing the Cartesian world(view) in favour of a subjective, emotional and intuitive experience of embeddedness. This

intentional reorganization and new position that Manzoni's plinth effects creates of Earth a preeminent 'unintentional monument'⁹ (Riegl, 1903), which contains the meaning, virtue and value of Earth as source of wonder and life. It enables a powerful re-visioning of Earth as planet (and the life upon in), and provides both a means and a model to conceptualise our relationship with it.

World at Risk

This re-visioning of the Earth as planet is advancing in current debates (now also outside countercultural and scholarly debate) with the intention of understanding the Earth as a ground composed of nature-culture inextricably linked and interdependent. It challenges the incumbent philosophical, cultural and political agendas to respond to the overwhelming and irrefutable evidence of planetary vulnerability. The perspectives and the attendant ideas that support it pursue a critique of the way the modern world has thus far made sense of, and gained control over our environment as only serving particular anthropological and specific ecological ends, exposing not only our modern reason and its relation to the planet and its developmental history, but also some of our present interventions, as an affront to the necessary conditions for all living organisms to survive on the Earth's surface. Indeed, these propose the dethroning of the anthropocentric (and humanist) modern worldview through a material critique encompassing both the history of ecological disasters and the global (and cosmic) environmental threats that assert the planet to be an unstable and incessantly generative ground, intermeshed with human agency.

This is a ground shaped by (the examination of) an interdependency of all life on the planet, and an entanglement that characterises the ontological, epistemological, cultural and political actions by which we have, thus far, inhabited and transformed the planet in its entirety – not only at the level of material reality, but that of intelligibility also – as negative forces. As outlined in Chapter I, this is no longer the reliable 'natural' background or stable ground of our (former) lives but an active and lively part – and agent, even in all our (contentious) negotiations and attempts to keep on trying to tailor it, by partition; to indiscriminately exploit, dominate and/or preserve it, according to our emotions and

⁹ The concept of 'unintentional monument' is used in Riegl's *The Modern Cult of Monuments* (1903) as distinct from 'intentional monument', and as specific to Western culture. Their value is relative and their meaning left to our subjective preference. It is defined by the process of a oriented analyses by which a spectator constructs a monument. 'Anybody can be the focus of provisional monumentalisation', writes Nena Dimitrijevic in *Flash Art*, with respect to Manzoni's plinth.

rationales, and in defense of cultural life. Rather, it is now being understood as a real constraint for the continued development and even existence of humanity; taken to frame the collective problem and opportunity – for who has agency to attempt to tackle the issues it presents; and thus to sustain and also confront the claims of mutual exclusion that characterise the Modern relationship between cultural and natural realms.

This ground has duly become the locus of contexts seeking environmental alternatives. It is a symbol for leading ideological discussions and decision-making to articulate the spatial limitation of the planet, and an ideological and intrinsically socio-cultural and socio-political vehicle. This is a vehicle that has come to simultaneously serve ideas of, and to criticise modernity's emancipatory and epistemological visions. Moreover, it has come to be used to expose the limits upon which these visions are (being) built. Those in support of this critic and exposing these limits, are focused on a reconception of space which is prior to and/or beyond the old confrontation between *res cognita* and *res extensa*, using instead the kind of phenomenological investigations originally developed by the mathematician and philosopher Edmund Husserl, and more especially in the way that phenomenology and its method came to be modelled and applied by the German philosopher, Martin Heidegger. These are the philosophers broadly called on to illuminate and emphasise an environmentalist model which undermines the Cartesian ontological argument and basis for culture, and the traditional anthropocentric position of human power over and above the natural world as that which make us fit to be stewards over, or custodians of the natural processes of the Earth: the very positions of resourceism, instrumental rationality and inherently conservative practices of traditional, reform environmentalism which inform the construction of the acts and architectures of reservation, and which Deep, Weak and Dark ecology, all criticise.

In his own phenomenological investigations, Husserl suggests that the Earth provides our most immediate, bodily and temporal awareness of space. It provides space itself. He writes of the Earth as our primitive home and history: of the encompassing *ark* of the world, the common root of all relative life-worlds. The Earth is the body in relation to which the 'world' is dependent and the 'horizon' (of our knowing) is perceived. For in Heidegger, this world is not simply 'all the things that are' and that have themselves been revealed as products of human artifice or potentially so, but also that which radiates from the familiar environment and the related gestalts of nature and life, and manifests itself as a

whole. World and Earth are therefore (also in Manzoni's art work) not synonymous but concepts in opposition to one another (see Heidegger, 1971). World is something always *prior to* and in *excess of* the Earth; that by virtue of which we exist as *being-in-the-world*. The urgency with which Heidegger affirms the importance of realising a mode of thinking capable of restoring what he describes as the fuller meaning of world, is at the basis of his attempt to articulate a philosophy as a comprehensive world-view (*Weltanschauung*): as, essentially a view of life and of our *true* position in the world.

In his essay, *The Age of the World Picture* (1938), Heidegger makes the historical argument that modernity is the age of the world-picture (*Weltbild*) that is, of a theoretical view of the external world. With it, he writes of a 'fundamental event' and negative phenomenon related with this conquering of the world as picture. Whatever world there is, he says, it is merely derived through the frames of technicity and/or instrumental rationality. He departs from the instrumentalist conception of technology as 'means to ends' towards a more profound philosophical notion of technology as an originary mode of revelation in which beings are disclosed. This is no attempt to destroy the idea of a foundation nor to abandon the Cartesian subject, but rather to eliminate the ontological differences and distinctions by bringing them towards integration, to the forefront of the ontological debate and into a more authentic relationship with Being. In Heidegger's words:

[To say that] We get the 'picture' concerning something does not mean only that what is, is set before us, is represented to us, in general, but that what is stands before us – in all that belongs to it and all that stands together in it – as a system. [...] Where the world becomes 'picture', what is, in its entirety, is juxtaposed as that for which man is prepared and which, correspondingly, he therefore intends to bring before himself and have before himself, and consequently intends in a decisive sense to set in place before himself. Hence 'world picture', when understood essentially, does not mean a picture of the world but the world conceived and grasped as picture (Heidegger, 1938:130).

For Heidegger, 'the fundamental event of modernity is the conquest of the world as picture' (Heidegger, 1938:134), and the transformation of man into *subjectum*, thrown beneath it and 'suspended in nothingness'. That is, a world as system that stands before subjects and discloses things (and the world) in a powerful but limited way. The world is rendered as though it were something *before*: something that stands apart and distinct from humanity,

as the sum of all that is readily-at-hand or immediately at our disposal, via technology, and is thereby regarded as a resource or a commodity. His discussions break away from the one-dimensional man nested in technological and mechanistic materialism and serve to challenge anthropocentric attitudes towards the Earth and nature, while boldly contemplating the possibility of ‘letting beings be’ as part of the web of signification. He charges the Cartesian ontology with the idea that the earth, interpreted as nature has no other mode of being than substance, which is the constant persistence of the present and/or the readily-at-hand for present and future uses as/in reserve/s. For Heidegger, the world-alienation of humanity is to be understood in this context. Rather than dwelling *in* the world, humanity inhabits the world, but only as a setting-before and standing-apart from the world that we render as picture. As a consequence, humanity loses what is most proper to us, namely, the world. Modernity leaves humanity alienated, without the world, and leaves nature waiting in readiness, as raw material and valuable solely because it can be used in future technical manipulations or future revelations to enhance human power and security. It is thus ordered as resource:

Whatever is ordered about in this way has its own standing. We call it standing-reserve [*Bestand*] [...] The name standing-reserve assumes the rank of inclusive rubric. It designates nothing less than the way in which everything presences that is wrought upon by the challenging revealing (Heidegger, 1954:17).

As already noted in Chapter I, in the *Question Concerning Technology* (1954) Heidegger defines *standing-reserve* as the mode by which everything (including humanity) is turned into mere objects, resources for production and/or manipulation, and brought into relation with revelation, i.e. relevant meaning, and action-context relationships consonant with reason. The *standing-reserve* is a principle of order, or ordering, that turns the world into a set of ‘petrified’ relations: neither completely predetermined nor free. With it, Heidegger argues that a distance, both temporal and spatial, opens up. This distance is predicated on appearance (and visibility) and it is what makes the thingness of the ‘thing’¹⁰ (*noumena*) appear for us in abstract entities and quantified objects, to be controlled and dominated in conformity with a mode of instrumentality and our utilitarian interests. Beyond using them for our livelihood, humanity appropriates them, accumulating them in a reserve fund that

¹⁰ ‘Thing’ refers to the world, the non-human and the non-subjective. It plays a key role in questions of mediation.

can be manipulated in accordance with our interests, and for acquiring power or profit and even to produce the superfluous.

There were many reasons for Heidegger to affirm this through the use of the concept of reserve. Besides promoting and maintaining the satisfaction of growing needs, for Heidegger, the development of military, political, economic, industrial, travel and communications' technologies that are able to optimise methods of exploitation, production and consumption, enclosed us within our modern (post-enlightenment) world's 'enframing'¹¹ (*Gestell*), that is, our impulse and grossly materialistic orientation to the world. In the process, the 'thing' is surreptitiously identified as nothing more than an object constituted by universal characteristics, artificially fabricated to fit our will and technical capacity to serve and, or re-serve:

Air is now set to yield oxygen, the earth to yield ore, ore to yield uranium, for example; uranium is set upon to yield atomic energy, which can be released either for destruction or for peaceful use [...] the coal that has been hauled out in some mining district has not been supplied in order that it may simply be present somewhere or other. It is stockpiled; that is, it is on call, ready to deliver the sun's warmth that is stored in it (Heidegger, 1954:15).

For Heidegger, such developments challenge our planet's resources, exploit and exhaust nature, limit our experiences of the world and place human civilisation on the precipice of self-destruction. Via climate and habitat modification, they destroy the possibility for humans to dwell on Earth, granting them instead with a sense of root- and homelessness, contributing to the construction, perception and experience of the popular image of ours as an age of anxiety, doubt and fear, largely acknowledged through a set of symptoms of irreparable harm.

The reasons listed have entered into the debate which is now forcing us to consider enlarging and refounding our techno-scientific paradigm to cope with the unfolding conditions of Earth crises. But they have also come to underscore an essential theme for the radical wing of environmental philosophy and ethics developed from the 1960s onwards. They have helped them reveal the inauthentic attitude that Western humans have developed

¹¹ Meaning literally 'framing'. In Heidegger's words 'enframing' means the gathering that challenges one forth to reveal the real, in the mode of ordering as 'standing-reserve' (1954).

toward the environment and offer an alternative for understanding human-natural relationships. Many radical environmentalists and speculative thinkers or philosophers drawing on them (ahead), maintain that a division of the world in which the subject/ego is the ontological centre is not concerned with the phenomena of the world itself, nor does it succeed in determining the nature of the entities with-in the world, that is, of *Being-in-the-World*. Instead, it obliterates any possibility of the non-technological disclosure of being, and thus utterly destroys Being itself.

With this order of ideas, these environmentalists and philosophers lay bare the impact of modernity's technological dominance over Being, and show a concern for the total domination of the Earth by human beings. Heidegger's own effort to realise a means of disclosure by which humanity *can* participate fully within the totalising essence of Being departs from here. It aims to free and decentre the subject to retrieve the dimension of experience from which it arose. That is, in order to retrieve from modern metaphysical concepts – disclosed as imperatives of control and dominion – our primary relation to things. These environmentalists and philosophers provide us with a radically new starting point, with which to instigate a more radical way of relating to that which we take as world, and a perception of our involvement with things, as well as to cope with the unfolding conditions. They question things in their groundings and express, through non-possessive and non-instrumental reasoning, a new stance toward reality, advancing the need for taking effective action to reduce the accelerated rate of destruction and to find ways to reconcile human needs with the environment – or, better still, to reconcile the mode in which society is organised with the mode in which things and nature exist.

Breaking the Divide

Heidegger urges us to set aside what we think we know; to move outside-in of our 'outside' position (modern subjectivism) and simultaneously to establish a ground that offers both a critique and a non-, or anti-anthropocentric reformulation of our conception of the human/nature relationship, wherein humans become beings among many other beings. He further demands a rethinking of the manner in which we comport ourselves: beyond the will to acquire a world, and apart from a structure founded upon attitudes and practices of empowering/overpowering subjectivism. For this reason, the various theoretical perspectives and kinds of environmentalist praxis shown here draw highly on Heidegger's diagnosis and are connected with forms of radical environmentalism. Heidegger's work has

attracted their attention as a potential source, intellectual tool and orientation for rethinking a world that no longer corresponds to the binaries and antagonisms established by previous ideological configurations. Rather, it is defined by an entanglement and plurality of identities, entities and forces. Though they may conceal a mystery or betray it, these elements, which make a mockery of systems, have one serious meaning for radical environmentalism: that the world we thought we controlled was merely illusory and only functioned as a trap, or a series of traps, in which we had captured forms of life in order to hand them over to society.

The Deep ecology espoused by radical environmentalism asserts that the environment, i.e. the Earth's living systems, should be regarded as having indefinable infinite value but a finite worldly existence. It argues that human beings' care for the environment, or lack of it, has set in motion historical processes that will end in the culmination of history (Naess, 1973). For this reason, it develops a critical reassessment of the culture-nature dichotomy – the Cartesian divide that informs our epistemological and technological endeavours, and that considers the natural world as a useful realm – to propose, in place of humanity's distinctive status, an interconnectedness, of inextricable bonds, between nature and culture and their 'globalities'. It is the phenomenon of a planet, physically and biospherically altered by our intelligence on a global scale and dependent upon the complex systems of inter-dependent life forms, wherein all forms of life, organisms and entities are equal in intrinsic worth. This complex system, for Deep ecology, comprises a totality greater than what we know as the ecosphere and/or even noosphere¹². It implies a different, 'earthly' conception of nature, perceived as a single undifferentiated reality with its own singular forces and own voice.

The Earth, and all things within and upon it, are thus complexified as constituting, between them, the total sum of singular reserves. With respect to these reserves, many Deep ecologists claim that we ourselves should be contained. Our world-creating activities, acts and architectures of reservation from and *of* exploitation, are hiding from us the world-creating activities of nature. For them, as Mick Smith writes in *Against Ecological Sovereignty* (2011) drawing on their propositions, nature must be free from *all claims of human sovereignty* – over property, resources or any other necessary counterpart to human

¹² The sphere of thought or Earth's mental sheath as defined by de Chardin in 1922 (Vernadsky, 1943).

exceptionality – including those constituted by acts to save nature. The abuses and impoverishment of natural resources that humanity effects by conceiving of reality either as a stockpile, or as a threatened reality, equally present the natural world as just a means to suit human ends. Paradoxically, the increase of human power over nature appears coupled with the increased subjugation of humanity¹³. In its original formulation, as Peter C. Wyck describes it in *Primitives in the Wilderness* (1997) and who questions some of the terms, foundational assumptions and meaning of Deep ecology and its ‘critique of environmentalism based on sanctioned, short-term, economic, scientific and resource-ist positions of the emerging mainstream environmental thought’ (Wyck, 1997:35): a critique, that is, of traditional, reform environmentalism and also political ecology. In addition, it provides a lens through which to look at their practices and ecological perspectives.

For both Smith and Wyck, as claims of human sovereignty above the natural world, the acts and architectures of such positions erode humanity’s freedom to determine our own destiny by keeping us deluded and enslaved to the ‘sovereign lord’ position as custodians of the Earth itself, as Heidegger himself claims (1938, 1954). Within this order of ideas, as we will see shortly, the human interest in acquiring administrative control over the totality of the Earth crises threats posits a model of envisioning and ordering the planet which informs the construction of so many acts and architectures of reservation which is contested, as are the techno-administrative interventions and forms adapted for and adjusted against negative externalities¹⁴ manifest in many of the reservation arrangements tied to environmental management programmes (such as those belonging to ‘sustainable development’ projects).

These authors charge the means and logics that foreground traditional, reform environmentalism narratives of nature protection as deflecting attention away from the origins of environmental degradation; and the solutions derived by these narratives to account for and alleviate negative environmental externalities of economic growth, such as resource depletion and pollution, for their incompatibility with ecological limits. These charges arise from the fact that, and in agreement with radical environmentalism, traditional, reform environmentalism proceeds from a human-centered justification for the

13 For more on this form of subjugation see Adorno and Horkheimer’s thesis in *Dialectics of Enlightenment* (1944).

14 The concept used by economists to urge governments to adopt policies that ‘internalize’ negative consequences of an economic activity – such as the abovementioned issues of Earth crises – and as experienced by unrelated third parties.

purpose of maintaining the intrinsic values of natural and historic resources, rather than transcending the resource conservation, and utilitarian preservation perspectives. In their justification, there remains a strong case for building reservation arrangements as the best means to solve the crises but also for criticising the strategy that gives the reserve its critical, and limiting edge.

The primary methodological characteristic that their form of radical environmentalism takes from Heidegger is that of de-distancing, (*Ent-fermung*), a word for that which breaks the hold of the objective thinking which conceals the nature of things, and calls instead for a compression of distance so as to acknowledge the entanglement and engagement that is not established by us, but in which we are thrown. De-distancing refers to the spatiality that occurs in Dasein's *being-in-the-world*, that is, a being-open with beings in the world that Dasein (the proprietary term for Heidegger's concept of the human-being, as opposed to the Cartesian Being) inhabits. In other words, it is intrinsically related to Dasein, which literally means *being-there*, and its activity within a world that results from human attempts to *master* distance. The space it opens, in this regard, is perhaps best defined by Peter Sloterdijk's post-Heideggerian approach in *Spheres*¹⁵ (1998), where he draws on Heidegger's concept of Dasein to challenge the domination and imposition of (modern) knowledge and order, to investigate where humans can *come into being*. To this end, Sloterdijk refers to the form of distancing or de-coupling (from the environment) that allowed the prehistoric to discover what is remote, and to relate to it (Elden, 2012:84), and has allowed the modern to break through and *out* of the environment, via a certain protective strategy that replicates uterine conditions by way of building spheres: i.e. spaces artificially created to provide us with shelter, a sense of protection and security, in a material, but also ideational sense, as our homes (Chapter I). These act as architectural forms of insulation and enclosure that serve to give a sense of immunity to the human.

According to Sloterdijk's investigations, it is this *being-in-a-sphere* that has granted modernity its assurances regarding positions in the world; that has allowed humans to make sense of a reality, and to build an entirely artificial world island; and that has helped them with the *being-in-the-world*. *Being-in-the-world* is for him, first and foremost,

¹⁵ At the moment of writing this thesis, only the first volume of Sloterdijk *Spheres* (1998) had been translated and published in English. I therefore rely here on this volume and on readings of his works in German.

a *being-in-spheres*, where inhabitation is possible. From this point on, Sloterdijk speaks of a key move from micro (individual) spheres to an all-inclusive ‘macrosphere’, built out of all the multiple shelters, acts and architectures of reservation of our civilisation, that allow *for* and are constituted *of* life. These spheres are not (only) objects before us, but places of possibilities engendered by the exploration of knowledge and events forging their construction (see Sloterdijk on Elden, 2012:160). They are indeed, as Sloterdijk insists, part of a longing for perfection that humans bring to the creation of interior spaces; they make possible and give meaning to existence. Lastly, they also help humans to realise they are both *with* other beings and spheres, and constitutive *of* an all-encompassing sphere: revealing the complete use of the Earth.

This is also what is accomplished in Manzoni’s plinth. By raising an awareness of Earth as a singular and de-familiarised Other Earth that exists apart from us, yet simultaneously negating this otherness by foregrounding a concurrent inclusive relationship, the plinth calls forth a redefinition of our own standing in the world, and consequently of the knowing-subject position at a distance – as *being-in*, *with* and *of* the world. Far from breaking with its role as foundation, Manzoni’s plinth leaves us in a more complex position that does not deny, but rather links the two poles of the Cartesian divide with a powerful holistic experience of life on Earth. Within this experience, what is brought forward is a profound rethinking of all of the notions and pretensions of the ‘truths’ that served as foundations for Western thought. Thus, and for the interest of this thesis, it brings to mind the way humanity (in the West) has transformed the planet: the fundamentals and the consequences of our epochal crises, at the root of which lies a profound revision of modernity.

Rendering Modernity

This epochal crisis, appears when the critical character of, and responsibility for, the situation left open by our predecessors, their attitudes and models for inhabiting the world, propose order and remedies for ordering, is objectively stressed. It has to do also with a reaction to and about the contemporary world; one quite recently taken on, against a reality in which modernity unfolds itself in violent ways. Its dominant narration of the contemporary world proclaims that the worldview at the heart of the reasoning for our holding globe-managing responsibilities is ironic, as follows: those who live a sense of global responsibility are, unable to master the planet, incapable to understanding what it

makes possible or impossible, how it proceeds and where it leads. The parameters that regulate the conditions of the stability of our structures and the Earth, have by now assumed values that no longer offer stable conditions, and that are beyond our ability to interpret and to control. This too shows us that ‘the world is increasingly unthinkable – a world of planetary disasters, emerging pandemics, tectonic shifts, strange weather, oil-drenched seascapes, and the furtive, always looming threat of extinction. [...] It is increasingly difficult to comprehend the world in which we live and of which we are a part. To confront this idea is to confront an absolute limit to our ability to adequately understand the world at all’, writes Eugene Thacker, who is often associated with the philosophy of nihilism and pessimism, in *The Dust of this Planet* (Thacker, 2011:1).

The character or condition that the Earth crises have taken on, reinforces a general feeling of anxiety and fear over the impending end of the human race, and the lives of non-humans, corresponding to the magnitude of an apocalyptic threat. This has made a catastrophic approach to the process as structural permissible, and from this an eschatological urgency has been, and is being, defined. The urgency of the condition to which we are to adapt must be formulated and understood in the face of the impossibility for us to fully understand it, as concomitant with the impossibility to ignore that which is happening on the planet, in a way that increasingly foregrounds our interdependence. This is not only the fruit of an exclusively human-specific working of space (and of the succession of time) but of (a history of) human co-existences with, and co-evolutions between human and non-humans: a situation in which every human action is limited and inhibited by the proximity or nearness of other, following Heidegger’s ideas.

Our crises correspond to an epoch whose trajectory, from a moment where the condition of crisis as a premise for ‘growth’, a privileged instrument of progress and development, forever seeking to circumvent institutional control (Koselleck, 1972-79; 1988), has brought us to an era where *images* of crises are now either read and treated as fiction (Rancière, 2012), or as holding an evil power (Žižek, 2010): either way, as an autonomous, fatal, and inescapable force. Perhaps due in part to the major role played by the media, but also because of the crises themselves being entities of such vast temporal and spatial dimensions that they defeat both traditional, cognitive and imaginative capacities. Following Timothy Morton (2010) and Eugene Thacker (2011), images of crises are succeeding in producing an opaque filter through which it is difficult to understand a

way out. They appear, above all, as divorced from critique; to be understood as ‘merely rhetorical’ images, used either as a premise for the elaboration of yet more ideas of agency and discussions of means to an end, or merely for emphasizing the horrors and effects of modernity. The point is that the most prominent figure of our crises – its very existence – invalidates not only the scheme of ‘ends and means’ (of control) but also our sovereign and constitutive status distinction, i.e. that between humans and nature, by drastically restructuring our relationship with nature and the planet, and defeats or denounces our cognitive and imaginative capacity. In this era, two of the most notable questions are: ‘how can we understand the crises, and what can we constitute as security and safety measures?’, and ‘what critical re-orientation are we to give to our acts and agency?’.

For some, like Gianni Vattimo, crisis is still a positive condition and concept. Determined to combine these aspects of reality into a philosophical position corresponding to this new postmodern phase, epoch and structure of existence, Gianni Vattimo describes crisis as stimuli. For him, crises offer a conscious modification of perceived reality as a tool for greater (or more multi-faceted) understanding. Crises have the power to re-animate that that has been conquered and rendered silent through forms of dominant rational thought. His philosophy is interpretative in character, resistant to objective thinking, fundamentals and obligations. It brings to the foreground the limits and dilemmas (of Western metaphysical thinking) from which to take off on a path he calls ‘weak thought’ – a thought still issuing from the rational and epistemological, but concentrated instead on dealing with the nature of being. Coming from hermeneutics, an art and technique of interpretation that considers the rapport between language and existence, it changes and challenges universal and absolute claims to truth in favour of a dialogue that weakens them instead.

Analogous, while on a different track, to Derrida’s theory of deconstruction, ‘weak thought’ holds that there is no escaping of metaphysical thought, but only the possibility of a weakening the hold of metaphysical certainties and/or absolutes. It is the direct result of the *verwindung* (‘going beyond’), in Heidegger’s terms. For Vattimo, thought has arrived at the end of its metaphysical adventure, and the possibilities of theory itself are relegated to describing more anxious and localised fields and syndromes, placed in continuous flux and mutation, given the impossibility of establishing absolutes. ‘Weak thought’ announces a withdrawal from the quest for certainty, rather than the refutation of metaphysical truths (Rovatti and Vattimo, 1983:15). It takes indeterminacy and ‘active’ nihilism to be the

experiences that radically disrupt accepted norms and values and that invite us to face up to our freedom to act responsively. That is, to face an infinite openness to alteration and innovation that expresses new ways of being, and responds to the ongoing decline that Vattimo has entitled *The End of Modernity* (1985).

Evidence is produced by social pressures, conventions and plays of language and built upon the idea that humans interpret the world – and truth – within responsive linguistic horizons which are not fixed but historical, by assigning it a meaning and multiplying the complexity of reality instead of reducing it. Thus the notion of dialectics and the idea of rationality is changed and challenged in favour of dialogue. Because, for Vattimo, an absence of foundations beyond those constructed by the moderns has been precisely the ground on which modern subjects have been able to celebrate their claims of truth, reason and virtue, what demands attention is the character of the limits within which such claims have been and are still articulated. Such a position permits us to explore the alternative truths that our inherited traditions have excluded. It is a hermeneutic ground that responds to the ‘calling’ of the historical experience of nihilism, the epochal decline of metaphysical truth (Vattimo, 1985). It calls for a grasp of the present in terms of a weakening of Being (the human-being referred to by Heidegger as the strength of *Dasein*) in the world; a sensibility that is at work in Manzoni’s art piece, as well as in several forms of radical environmentalism, and a responsiveness that provides the philosophical grounding of this thesis.

Ecology and Sovereignty

In recent years, various scholars, and many studies that have taken up interest in threats to and from the environment (and its domains) have acknowledged (directly or indirectly) the virtue of Heidegger’s and Vattimo’s interpretations. They find these to offer the most likely as well as the most ambitious possibilities for change, and for some of them, the draw to using these theories is also to radically shift the emphasis on dominion, especially those engaged with an awareness of an effective historical interference with, and exploitation of the earth, as well as with what environmental history has to contribute to our understanding of the unfolding Earth crises. Among these authors, those who are of interest are, as mentioned: Peter C. Wyck, Mick Smith, Peter Sloterdijk, Jean Baudrillard, Timothy Morton, Bruno Latour and Gianni Vattimo.

It is worth emphasising that the attainments of Wyck (1997) and Smith (2011), in

particular, have however situated radical environmentalism within the complex cultural and political terrain of the last five decades and that these authors investigate. This is a terrain that helped define what human life meant after the World War II, often through attempts to redress the impossibility of modern experience as well as to prepare new departures. These are explorations aimed at attending to the deep cause of the abovementioned Earth crises, based on an attention to that which, under the spotlight of reason and of history, could not be discerned and made intelligible. This attention has characterised a vision of human coexistence with other cultures and beings, and departs from a radical environmentalist perspective to structure an arrangement where differences in planetary space are destabilised. Their position asserts the complex interconnectedness inherent in heterogeneity, wherein differences (subject/object, human/nature) come to be discernible only in terms of relative levels of organisation, in the construction of a new kind of foundation that naturalises the human world as eco-technological¹⁶: a world in which humans and nature are entirely absorbed, rather than merely standing in relation to (the omnipotence of) humanity.

Within their analysis and interpretation, Wyck and Smith articulate challenges to the details of traditional, reform environmentalism, to our affluent lifestyles, and to the instrumentalist trajectory. However different their inclination and approach, they have attempted to define new strategies of intervention capable of effecting responses to, and transformations of, the problems posed by the power structures and ideological dominions of the human and corporate global order, This is an order that has greatly accelerated the rate and risk of extinction, and bound the Earth (the biosphere, its landscapes and community of living and non-living organisms) to the human purpose of self-preservation.

To this end, and in line with radical environmentalism, Smith agrees that ‘protection and ownership have intertwined origins’ (as in Felger and Wilkinson, 1978:84), and seem also to be encoded into a figure of ecology increasingly reliant upon urgent intervention, linked to a system of belief for making order and providing access to order reflecting idealist and (and often patriarchal) impulses. Through this thinking, Smith problematises the ecological catastrophe, our characteristic relationship to and with nature

¹⁶ This world is defined by Jean Luc Nancy, in *The Creation of the World or Globalisation* (2007), as inseparable from a set of conditions that are referred to as ‘technological’ and where any kind of ‘nature’ is developed from and by us, ‘from its production to its conservation, its needs and its representations, whether human, animal, vegetal or viral’ (Nancy, 2007:94).

or the environment, and our perceived task of enhancing, protecting and (p)reserving nature and the environment as a way to achieve planetary integrity and continuity. The very nature of this task, for him (but also Wyck), excludes a third ‘conditional’ and ‘collective’ middle and mutual ground.

Taking on the task of saving nature and the environment and teasing out the contradictions that it produces, both Smith (2011) and Wyck (1997) expand upon the recognition of a dynamic destabilising dialectical thinking – its various methods of reasoning and discussion, ethics and instrumentality – even while falling back into it. They problematise the way a deterministic succession and the established order of things have historically been problematised and critiqued, only to concede everything to an understanding of the world as open to access via human progress, no more than what Heidegger calls a ‘standing-reserve’ (1954). Exposing the failures of apolitical and reformist (traditional and mainstream) environmentalism and its discourses, these authors criticise the still-dominant sense of urgency, as imperative, but doomed as a tactic to deal with the crises. Thus, they challenge those perspectives and positions engaged in, and committed to the construction of reservation arrangements to secure and protect life, and the approaches used to ground them.

In the final analysis, for these authors, it is this urgency that legitimates the idealisation of reserves, as well as the myth of a green capitalism and its ‘sustainable development’ rhetoric. It assigns power to specific agencies to promote the transformation of nature into real estate, spectacle and administered resources – from national parks to nature reserves (ahead) and carbon offsetting programmes – and that prompts discourses trying to salvage aspects of modernity with a new kind of totalitarianism based in, and indeed marketing threats of Earth crises. Rather than new forms of effectively ‘sustaining ecology’ and more attuned responses to the crises, it legitimates an increasing militarisation of the environment, based on a traditional, reform environmentalist ideology, as reflected in their level of engagement with the acts and architectures of reservation.

The authors mentioned provide valuable insights about the kind of ‘sustainable development’ that is currently dedicated to achieving the maximum sustainable benefits for the greatest number, and to limiting ecological costs as much as possible, by ensemble-effort of reservation arrangements, administrative interventions and organisational containment strategies and architectures (see also Luke, 1997:85) actively involved in the

work of producing (or ensuring) new natural funds and surplus of resources while also, as in the Introduction, promoting further destruction – to save the world. This is part of a world irretrievably subservient to economic and sovereign powers: being encircled by dominant circuits and circles of ecological alarm. For them, this is a possibly laudable notion, but one that may also allow not just nature but human life itself to be dominated. Through this construction they reveal the role that ecological consciousness plays in the attempts to address issues of Earth crises through ‘shock and awe’, political machinations and large complex bureaucracies. These are aimed at opening up space for the regulation¹⁷ and, in some cases, the proscription of a wide range of environmentally and socially-damaging activities, alongside any decisions of keeping in reserve what is ‘left’ of the natural world.

The working-through of this type of critical engagement is the key idea that has helped Wyck and Smith, to put the issues advanced here into the context of the *being-with* of human interrelatedness, thus opposing the divisive operations of the anthropological machine (those neo-) liberal forms of environmentalism such as reformist and traditional environmental stewardship and conservationism with arguments from contrasting radical political positions like those of anarcho-primitivism, in favor of ‘weak ecological interventions’, open to complexity, uncertainty and contingency. These are interventions open to a world composed of multiple interacting systems, affirmative of becoming with all its promises and its loose ends. In doing so, they allow for optional speculations and an opening up of meaning led by, and inevitably leading to, a questioning of the way things themselves are perceived and disseminated – with their attendant social and political implications and plans – in light of Dasein’s temporality and being-toward death. In affirmation of this, and resisting determination, Peter C. Wyck’s own work focuses on the theoretical and archival investigations of the practical relations between culture and nature, environment, landscape and memory.

In *Primitives in the Wilderness* (1997), he employs postmodern insights to expose metaphysical assumptions, further showing that the responsibility for the growing magnitude of Earth crises lies not only with them, but also the environmental movements’

¹⁷ Regional, continental and global regulations such as those being defined by UNESCO and other institutes devoted to help the production of legislation regulating any and all human activities, involved in and involving many reservations.

own untenable narratives and discursive symbols. Encompassing their widely divergent idea(l)s, yet essentially similar tendencies regarding the magnitude and importance of possible threats, the announcements made by the environmental movements in North America (and elsewhere) since the mid-1960s have demanded a concern for nature and the planetary environment in ways clogged with anthropomorphic vocabulary, and thus politics associated with it. In this way, they are somehow responsible for the insertion of nature into Western political thought: for the optimistic confidence afforded to rational politics and technology to enable humanity to meet the challenges, as well as the pessimistic sense of impending doom.

Enacted through the expression of a proliferation of feelings about the condition of urgency and emergency of the times, fearing humanity to be facing ultimate rather than local limitations, such announcements have promoted a holism (i.e. the vision of an holistic Earth). These visions combine an understanding of Earth's organisation in terms of, complex interacting disciplinary systems and self-regulatory aspects with that of the scale and character of the planet as a spherical horizon and closed system: an enclosure in itself. Inspired by the mathematical and intellectual developments in the potential of cybernetics as described by Norbert Wiener (1948; 1950) and which emerged during the WWII (see Chapter III), such vision would describe the planet as a living regenerative organism that maintains its conditions of equilibrium in a preferred homeostasis.¹⁸ The way it is supposed to function stems from the very crude abstraction of a mainly managerial-based economy of homeostatic control systems, positing reserves as homeostatic control systems, wherein it is supposed that the *ins* and *outs* of the systems will even themselves out to stability. This obviously threatens to oversimplify – at least in the fields of science and discourse – the dynamism and holism inheriting in ecology, with the potential for both promising and terrifying insights to inform interventions by scientific and technological means.

Machine for Living (in)

In the mid-1960s (and the 1970s), the favoured model for impeding or solving the problems

¹⁸ A term for the theory of organic regulation, coined by Cannon to speak of the *Wisdom of the Body* (1939) and to clarify an innate tendency possessed by all living beings. Theoretically, it helped define the principles of the organisation of ecosystems as self-regulating entities and has been transferred to economic, ecologic and cultural contexts. It sets out to explain the structure and the function of mechanisms involved in stability, regulation and persistence. For its application in the control of the Earth's biosphere, see Eugene and Howard Odum, *Fundamentals of Ecology*, 1953, London: W.B. Saunders.

set for ecology by the economy of natural resources, Earth's supplies and the many destructive or deforming impacts was framed by the opinion that Man (*sic*) was part and product of the evolution of the biosphere¹⁹, but his (*sic*) 'determined by his regulatory influences on his feedback with Nature' (Lem, 1964:87). Following an ecocentric ethical outcry blaming man (*sic*) for the despoliation of nature, this model was associated with a fairly balanced system of ecological relations within a regenerative and the regulative productivity of the biosphere, a coevolving and self-regulatory living organism of interdependent systems, best known as the Gaia hypothesis.

James Lovelock together with Lynn Margulis, at the start of the 1970s, formulated the Gaia hypothesis to mean the interdependence and holding-together of all organisms and their feedback mechanisms on Earth. The originality of this hypothesis relies on the assessment of a homeostatic balance actively pursued with the goal of keeping optimal conditions for life. The pollution, decay and loss perceived were registered as breakdowns in, or menaces to, the dynamic homeostasis relay between social and environmental systems. Moreover, as a morbid symptom of a fundamental misunderstanding about the place of Man in relation to the planetary super-organism, thus jeopardising nature's balance. The aim to discover a sense of ecological and harmonious equilibrium with the organic patterns, processes and cycles of nature, without compromising the ability of future generations to meet their own, was at the top of the list of concerns for correcting homeostatic imbalances – as later described in Lovelock's *Gaia Hypothesis* (1979) but also in architectural studies such as in Ian McHarg's *Design With Nature* (1969), Reyner Banham's *The Architecture of the Well-Tempered Environment* (1969) and Buckminster Fuller's *Operating Manual for Space Ship Earth* (1969).

To illustrate these type of responses, these architects²⁰, James Lovelock (1979) and other ecologists such as Kenneth Boulding (1966), Eugene and Howard Odum (1989), would use the image of an endangered and 'dangerously overloaded lifeboat' (Wyck, 1997:21) we can command, and the worldview term of 'Spaceship Earth', popularised by Buckminster Fuller. The concept provided these architects and ecologists with an all-encompassing metaphor to discuss the Earth as a magnificent craft, and to intervene in the

19 i.e. the global sum of all ecosystems and/or 'the place on Earth's surface where life dwells' (Suess in Veradsky, 1926).

20 As well as many others interested in ecological engineering to build environmentally friendly alternatives, such as John McHale John Frazer, Phil Hawes, John and Nancy Todd.

natural balancing systems that have been both replaced and threatened by humanity gaining the controls. It served to emphasise the limited and vulnerable nature of Earth's ecological and technological functions, from the perceptions of the dire consequences of humanity's failure aboard. The idea of *Spaceship Earth* depicts the planet quite literally as a hybrid techno-ecological life-support, a closed and mechanical system whose evolutionary interconnectedness and interdependence might be comprehended and maintained to resist the assault of natural possibilities and the potentialities of its own creations, as well as provide the basic infrastructure for the continuity of all social systems and earthly life itself: Earth as a *machine for living (in)*.

According to these ecologists, and architects, this was imperative if humans were to survive, and this fact justified a call to redirect the human/technological *telos* toward more totalitarian ecological interventions aimed at securing the survival of the human species, and for a more elaborate, total system to be orchestrated by the human gaze and imposed upon individual decision-making. In his book, Peter C. Wyck describes the way the *Spaceship Earth* image was more broadly used as a thought device for the constitution of a planetary administrative kind of panoptic²¹ schema; for the practices of omnipresent surveillance and exposure, as famously described by Michel Foucault in *Discipline and Punish* (1975). In particular, Wyck describes that such thinking seeks to induce a state of consciousness which is able to countenance and accomplish a symbolic and total technological colonisation of the planet, so as to assure organisational efficiency in the control and maintenance of the planet itself – locations, situations and relations – under state of permanent visibility.

In the process, the exploration of outer space, the construction of artificially fully-functioning self-contained *space cabins* capable of equipping life to survive in harsh environments, and the look back to the planet itself played an important and crucial part. It led not only to the expansion of our power complex and/or territorial sovereignty to previously unthought-of realms, and thus the strengthening of our power over the Earth, but also to that of our knowledge: in terms of property rights, wherein sovereignty is suspended and space is fully protected and reserved for scientific research, the betterment and

²¹ The panopticon is a mechanism of power, order and knowledge, the control of the body and of space integrated as disciplinary technology. It must be understood as a pure architectural and optical system in which observations are made productive and observable but not verifiable.

common property of humankind, as clearly stated in the Outer Space Treaty (1966); in terms of technopolitical achievements that have enabled us to explore space (and conversely to reveal the vulnerability of our planet); and in terms of an openness towards the universe and towards an ecological consciousness.

At the outset, it provided us with the advantage of a perspectival shift, and a distancing operation that transformed the way many of us think of, and to critically depict our planet, as elucidated through Manzoni's plinth. Although this vision had begun to emerge in artistic, scholarly, historiographic and political discourses long before the first photograph of Earth had been taken, the image nonetheless allowed a privileged view of the Earth from its very outside, encouraging us to speak and conceive of the planet as a single and singular 'sphere', encompassing all human and natural worlds, and to hold it and all its reserves *in reserve*, toward a brighter future. And, beyond this, to attempt to control the forces of universal destruction, exercised via the means of an infrastructural globalism governed by information and design – as we will see in Chapter III, Section 1 – and new biologically-informed, but also computational theory of inhabiting the world.

The abovementioned ecologists and architects, of the 1960s and 1970s, as well the major social and countercultural environmental movements, were excited by the possibilities of the Space Age²², and relied on the images of Earth sent back from the Apollo mission to support the ideas that we live all aboard a fragile and vulnerable spherical container, floating in space and sustaining all life on the planet. They focused upon the place of humanity as relative to, and dependent on, this insulated space capsule and operable techno-ecological system to configure a range of aspects associated with the constraints of living with a sum of reserves of limited and dwindling resources. This line of thinking would subsequently come to acknowledge that humans were not just another, albeit superior species, nor were they only the remote operators and administrators of the globe and its reserves, but rather agents within the interconnected planetary system that sustained them, and which humanity – along with the cosmos – was also understood to be shaping, in both constructive and destructive ways. As Wyck also emphasises, it has also established the guise that allowed the Earth and the world in it to be viewed and understood through a metaphor to address the shared conditions and fate of humanity, in which

22 Steward Brand's CoEvolution magazine *Space Colonies* (1977) provides valuable material about this excitement.

destruction, the nuclear threat and resource scarcity affects virtually everyone as a disease of the planet.

An example of the use of such a metaphor is presented in Lovelock's *The Revenge of Gaia* (2006). In the sequel of the *Gaia Hypothesis* (1979), he writes of the threats of Earth crises, the threatened and threatening Earth, via the metaphor of disease. This is a disease developed, presumably, by our attitudes, practices and actions. For Lovelock, the evolutionary interconnectedness and interdependence of all the natural systems provides the basic infrastructure for all social systems, and indeed Earthly life. Its breakdown thus implicates all organisms, although it is our fault exclusively. We are, and have come to be in our present state through our capacity for disastrous destruction, and we have few options: leave the planet or move forwards into a more sophisticated and high-tech kind of civilisation, one that offers a technocratic rationale and reformist vision for a 'sustainable retreat' (Lovelock, 2006) so as to retrofit our present civilisation and thus secure the very habitability of the Earth.

To retrofit and defend against the actions it is anticipated Earth can and will take against us, in fighting for its balance, requires, for Lovelock strategies and solutions, to shape natural resource policies, and permit direct interventions. His book claims that the world needs to respond to the operations of cause and effect on a planetary scale to avoid convergent environmental and ecological damage of and by the Earth. He develops this thinking through militaristic expressions, writing of a war that our development has unknowingly waged against nature, before going on to personify the natural world as an external aggressor and enemy of humanity and its cultural privilege. Thus, he posits Earth as our adversary and recruits an ecological understanding of our place on Earth's body toward the realisation of a state of total mobilisation that is, for him, necessary and able to guarantee our survival. For Lovelock, this total mobilisation should include such limitations as time, space, chance and human frailty, balancing the need to hold man (*sic*) back with the need to commit to battle, as noted by Clausewitz in his thoughts and observations *On War* (1873).

On War (1873) comprises Clausewitz's political theory, which entails that warfare has limits. To engage in war, man (*sic*) needs fight and measure its reserves (of forces available), not because man (*sic*) chooses but because nature itself determines it. According to Clausewitz, such a reserve of forces is both strategically and tactically necessary. Anatol

Rapaport, the editor of the book, writes in the Introduction of Clausewitz's book that, it:

has two objects which are very distinct from each other, namely, the prolongation and renewal of the combat, and secondly, for use in case of unforeseen events [...] in order to strengthen, subsequently, those points which appear too weak [...] so as to make it correspond better to that of the enemy [...] it is, therefore, an essential condition of strategic command that, according to the degree of uncertainty, forces must be kept in reserve against future contingencies (Clausewitz, 1873:284).

That is, as long as the reserves are used to advance military position.

In discussing the defence of the Earth's life, Lovelock gives an example of a force replacing a lack of knowledge and reports of specific ranges of uncertainty. Lovelock accepts that if the planet has opened hostilities, we must deal with its belligerence not through the deployment of brute and exploitative violence – by mere means – but by an organisational tendency and status. The crux of Lovelock's organisational blueprint lies in the widespread comprehension of the true nature and unity of the Earth and in understanding the lethal dangers that lie ahead. The failure to do so might, for him, set the erring community back on the path of catastrophe. Its own continuity and capacity to survive depends on the effective anticipation of problems and the lessening of the human footprint on the Earth. Lovelock's belief is that an effective defence of our civilisation depends on a reserve *army* cordoning off the chaos that might otherwise overtake us. Thus securing for humanity the role of control.

Contractual Responses

In general agreement with Lovelock, while falling short of total compliance, Serres writes about the long war humans are leading on Earth against nature. He writes that once 'conquered, the world is finally conquering us. Its weakness forces strength to exhaust itself and our own strength to become gentle' (Serres, 1992:12). 'We must make a new pact, a new preliminary agreement with the objective enemy of the human world: the world as such' (ibid:15). That is, we must seek a contracted partnership with the Earth: to work together and stand *in* a legal and symbiotic relationship with the realm of nature. Contracts are a pre-requisite for all laws, and due to the latent threat perceived to be inherent in the upheaval of the Earth, for Serres, the success of this contract is dependent on a common agreement – a peace treaty – based on an accord that closes and stabilises violent engagements in a mutualistic relationship defined as the living together of unlike

organisms.

An agreement of this kind is being developed as ‘The Earth Charter’, as a global human covenant with the Earth. Originating in 1968, the idea of the Charter is to guide the transition to ‘sustainable development’ and the renegotiation of moral relationships towards a universal ethics of justice, human rights and peace, under a holistic vision of planetary fulfilment aimed at preserving and restoring ecological integrity, and the widening of the circle of the moral community to include nature. Under the Earth Charter, law and science serve as the logical bases for the development of dialogue and a formal contractual agreement between the two hostile parties, humans and nature. This can be seen as a way of extending the structure of sovereignty further, from the biological to the ecological, to bring nature entirely into the realm of the cultural (and thus of meaning), thus providing the latter with immunity. The recasting of nature and the planet as a ‘subject’ or an entity possessing rights is expected to raise human consciousness to a sense of moral commitment at the required level – by the range, nature and scale of the phenomena, and the set of emotions attached to them – in order to handle the crisis.

In *Natural Contract* (1992), Serres also uses the image of a vessel (as the ecologists cited above) to model the globe as a reserve, and its natural systems as humanity’s life-support system, providing essential ‘ecosystem services’. Serres’ emphasis is on a symbiotic relationship of kinship, and the consciousness of an emerging bond between human beings and the planet, which is able to ensure the continuation of our global world. The vessel-as-reserve is an archetypal evocation of the antediluvian age in which a patriarch built an ark, as a model for the totality of space and time in which to prepare for the coming flood, during and after which it is to be hoped that the vessel will serve to preserve the remnants of our existence before it. It provides us with an image (and a detached view, even) that lends meaning and thus gives reason to our seeking to enter a contractual partnership, and idea of covenant with the earth, for:

On a boat, there’s no refuge on which to pitch a tent, for the collectivity is enclosed by the strict definition of the guardrails: outside the barrier is death by drowning. This total social state, which delighted the philosopher for reasons we would judge base, holds seagoers to the law of politeness [...] Since remotest antiquity, sailors (and doubtless they alone) have been familiar with the proximity and connection between subjective wars and objective violence, because they know that, if they come to fight among themselves, they will condemn their craft to shipwreck before they can defeat their internal adversary (Serres,

1992:40).

For Serres, the key to our social contract is an encounter with nature. Therefore, the crucial recalibration of the scale of violence cannot be separated from nature or from more earth-dependent sensibilities, dynamics and vulnerabilities. The necessary transformation, for him, demands our ceasing to treat nature as a passive and inert object outside our definitions of the social, instead presenting it as a form of life: as a global object of constraints and forces (whether resulting from our actions or not), and with rights. These should not be understood as rights that attempt to grant equal and just possession of nature, but rather as the rights that nature itself possesses: to exist, as recognized by the Constitution of Ecuador and the International Union for Conservation of Nature.

As way of exercising control over the decline arrived, and as effectively capable of limiting obsessive parasitism²³, such proposal has met with a certain amount of resistance. The mere fact of granting that nature and humanity share an equal legal condition does not necessarily mean that collective action can and will be taken in response to threats posed by Earth crises; even less, that the duties and moral responsibility involved can and will emerge to replace the lack of morality that has shaped our habits and the crises thus far. Jean Baudrillard, is amongst the most influential of the intellectuals contesting this proposition (and others like it), informed by Serres' Rousseauian confidence that a contract can and will resolve the 'death knells' Earth is diagnosed to have been sounding for humanity.

In *The Illusion of the End* (1992), Baudrillard takes on the morality of survival, claiming that:

when nature is recognised as a subject in law, as it is by Michel Serres, we have objectified it to death, and this ecological cover merely asserts our rights to go on doing so. All this has been brought about by the highly disturbing ways in which the concept of nature has evolved (Baudrillard, 1992:80).

In conceiving of nature as a right-bearing subject, he says, 'we are foisting on it (nature) all the vices of subjectivity, decking it out, in our own image, with bad conscience, with

²³ Parasitism is what Serres calls an interconnected chain of relationships characterized by power competition, hostility and asymmetry in the Parasite (2007).

nostalgia, with a range of drives' (ibid:80). In so doing, for Baudrillard, we discount its radical otherness, especially that of its being a *maleficent ecology* (also the title of the chapter being cited). It is against this paradox that Baudrillard affirms that the idea of conservation and the optimal management of the *relics* of the past and the anticipated *relics* of the future merely confirms the end of nature that it is supposed to deny. For Baudrillard, the merits of Serres' proposition lies in the 'symbolic rules' which give humanity the pretext for putting nature into deep sleep in salvific arks and other similar reservation arrangements. He relates this type of safety structure to the anticipation of an eschatological event, without which things (and beings) seem to face trouble in surviving or being saved from catastrophe. For Baudrillard, such anticipation results in the de-realisation of the real, in a world of simulation and artificial paths rushing the human race even faster towards its end. What is at stake is the time of catastrophe, lurching the species into the void and reducing life to the thirst of survival. This thirst, or obsession, is for Baudrillard the logical consequence of life and the right to life. But 'most of the time', he writes, 'the two things are contradictory. Life is not a question of rights, and what follows from life is not survival, which is artificial, but death' (ibid:87).

What we might understand as prolongation of life may be, in fact, an expansion of the process of dying, but it is the failure to die that assures survival. Through this notion, Baudrillard recalls John P. Allen's Biosphere 2 project and the way it follows the principle of immortality, the extension of life beyond its end. Built in 1991 in the Arizona desert, the Biosphere 2 comprises a three-acre, physically-closed off (i.e. sealed) ecological system²⁴, a technological simulation of the planet Earth (known as Biosphere 1) that supported an experimental two-year enclosed life environment mission. Its intended purpose was both to gain knowledge of the workings and effects of different ecosystems within a closed environment, and to test the possibility for humans to survive in an artificial environment for an extended period of time, as of interest in relation to outer space travel.

For Baudrillard, the Biosphere 2 is one of our most artificial, aseptic micro-

²⁴ That is, a self-contained space, sealed in a glass and steel structure filled with five interconnected 'wild' ecosystems, or biomes: the Earth's main ecosystem districts. The Biosphere was also an externally-powered environment: plugged into an industrial power station adjacent to the building, and a giant techno sphere of computers and machinery below ground, in order to measure levels of carbon oxide, oxygen and other gases as well as to pump water and handle air and heat exchanges, to deal with the data generated and to process the research.

universes, modelled after a kind of ‘prophylactic utopia’. As the concept suggests, this is a utopia intended to prevent disease, an ideal model of a ‘micro universe’ totally cleansed of any unpredictability. This micro-universe, he writes, makes an artificial synthesis of all the elements of catastrophe, and sacrifices all elements of life to ensure artificial survival. It is a spectacular embodiment of our enduring collective desire to re-stage and reinvent the world so as to exorcise the catastrophic within the realm of human competency. It provides the space to examine both the problem of survival and that of achieving immortality, together with the rights that should be granted to nature: all in order to prohibit the death of nature. This micro-universe shares a configuration similar to that which Baudrillard describes in *Simulacra and Simulation* (1981), as constructed via the cordoning off the Tasaday people within ‘the glass coffin of virgin forest’ (Baudrillard, 1981:9) by ethnologists in the Philippines.

Baudrillard uses the example of a protected indigenous reserve to demonstrate a total simulation and sacrifice supported by science in order to save the reality principle of their object of study; or better yet, to save the Tasaday people from ‘disintegration’ upon their contact with the contemporary world. This is the same type of sacrifice that nature reserves enact in order to mask the absence of nature and wilderness (the subject of Chapter III, Section 2). For it was only through the isolation of the Tasaday, locked away from the prying eyes of ethnology, that the group was able to survive, recover authenticity and indeed reality. Yet theirs is a simulated, virtual reality; the group has become a simulation of their former selves, ‘a model of all conceived Indians before ethnology’ (ibid:10). At this point in the text, for Baudrillard, this attempt to resolve the vulnerability of the Tasaday exemplifies all other attempts to protect and preserve nature in (artificial) enclosures, set apart from the complex system of which nature is part. As fundamental to them, there is a respect for the rights of nature and the prerogatives of endangered species and their habitats, but also an attempt to come to terms with the *maleficence* of the natural world, by maintaining it apart from human reality and all of its destructive follies.

Experimental Destinies

The origin of these attempts are attributed to the English, who, in the eighteenth century began to link the formality of the Garden to despotism, and generated a notion of nature as

worthy of contemplation in valued and symbolic landscapes.²⁵ Within this context, ‘landscape was embedded in relations of power and knowledge, and neutral geographical territories were turned into ‘protected areas’, ‘culturally defined landscapes’ and/or ‘specially designated lands’, generating and naturalising the identities ascribed to them and their inhabitants’ (Darby, 2000:15). Endowed with literary and visual significance, these landscapes led to a debate (at a national level), about not only how to defend against certain types of land use – that, from railways to mining interests, were placing further natural habitats under threat of massive and permanent danger – but also the need to preserve the public commons: the ‘natural’ spiritual, aesthetic and recreational values that traditionally defined those elements of such environments that were shared, used and enjoyed by all, and that had survived the parliamentary Enclosure Acts.²⁶

In 1832, the American scientist and artist George Katlin’s idea for the establishment of national parks – in America – enriched nature reserves with the idea of a necessary, legally-established boundary, whose function was not only to protect the parks from external threats and depredations but thus, also, to keep the nature therein untouched, protecting sensitive features and creating the means to breed endangered species within these ‘outdoor laboratories for research’ that would not harm the Earth’s ecosystem but rather enhance it. These began to spread around the globe, often, ironically, linked to ‘modernising’ values, as in the case of the Russian *zapovedniki* (see Chapter III, Section 2) and, more recently, UNESCO reservations. Formalised as biosphere reserves during the second half of the 1960s, these were later incorporated into the UNESCO’s Man and Biosphere programme, launched in 1971, intended to promote the conservation of nature in keeping with ideas of sustainable use and the optimal division of the planetary surface into managed areas. A great part of the purpose of these UNESCO reserves is to aid an international cooperation effort to fight Earth crises, and their harmful (side-) effects.

An examination of the Network of North America National Wilderness Preservation System that resulted from the US Preservationist Act of 1964, and considered

25 The first nature reserve was established in 1821, in West Yorkshire, to keep an undeveloped, pristine territory of reserve. This was privately owned, opened to the public and more of the type of museum, not altogether related with issues of Earth crises. The establishment of reservations for the natives in the Philippines, and the US Indian Appropriation Act, in 1871, which authorised the creation of Indian reserves and reservations as part of the National Historic Preservation Act for Indian tribes, from the conception of the Indian states and independent sovereigns, are to a certain extent even included in these attempts..

26 A series of Parliamentary Acts creating legal property rights to land in the United Kingdom, foreclosing commons.

the landmark of environmental legislation, reveals that the Network System was in fact the result of a compromise between preservationists and their environmental opponents, including those representing industry interests and/or grassroots groups, who gained concessions over mining access, grazing and recreational uses (Switzer, 1997; Klein, 2014). The institutional reasoning for this programme was that there was a need for national parks, forest and nature reserves, held aside from development and mechanised recreation, to remain in their ‘natural’ conditions. Its basic programme sets out protections for wild places and aesthetically unique lands as important ecosystem resources for the enjoyment and use of future generations. In *Green Backlash: The History and Politics of the Environmental Oppositions in the U.S.* (1997), for example, the author Jacqueline Vaughn Switzer traces the historical roots of the Act, and the opportunities opened up by it. She writes, with a critical concern, of the use and exploitation of wilderness and of nature as a natural resource, emphasising that the designation of lands as Wilderness areas, National Parks and Forest Reserves (like other forms of state enclosure) has allowed and indeed invited low-impact forms of use while prohibiting others, and has, moreover, amplified the demand for a ‘return to nature’, as such. Beyond environmental concerns, such state designations are also advocated in terms of efficiency in wilderness heritage resource management, and a growing interest in quality of life.

The Act is notable for having adopted the above-mentioned ‘sustainable development’ paradigm, as an opportunity-oriented philosophy and language with implications at the level of government policy and models, as well for issues of technology transfer, but the approach adopted works through exclusion, including and especially that of various groups, actors and users lacking the privilege to enjoy the wilderness from a community of mutual obligations. Thus, despite their being installed and maintained through an obdurate desire to protect and expand ‘open-access’ common lands, where no user has property ownership and where there are no actual limits on the number of people who may access them - as long as users meet the statutory conditions of permitted use - the Act has effectively enabled these lands and areas to be both nationalised and then privatised (see also Klein, 2014). Whether managed in this way by state agencies or private interests, such reservations may be experienced as a true tragedy of the commons, as Isabelle Stengers (2009), drawing on Garret Hardin’s thesis (1968), also advances.

For Stengers, enclosures of this kind are part of the ‘blind managerial bureaucracy

ruling in the name of the matter-of-fact of Gaia' (Stengers, 2009:6), 'the one who intrudes' (ibid). Thus 'to the question of the world that their efforts contribute towards constructing' (2009:8), Stengers asserts they serve to appropriate what was a 'good' common world (and that which gives it the definition of 'good'). In *Catastrophic Times* (2009), she adds to Latour's and Baudrillard's critique of the ideological conception of nature (as ahead) and of what this ideology serves: namely the etho-ecological gamble associated with political ecology, and the definitions and criteria that its formal and legislative approach effectively and pragmatically applies to a nature it cannot fully grasp (i.e. cannot fully access its value), in order to fit with the requirements of modern social, economic and governmental systems' approaches to saving the world. In the book she describes a world and a nature that is, itself, the main cause of our uncertainties, and the cumulative effect of crises enabling it to be taken as hostage in favour of interests that, in their turn, enable its commoditisation under new resource values. Her challenge is how to provoke and find a way of 'paying attention' to 'the intrusion of Gaia' (ibid:2009), that is not concerned with seeking and establishing guarantees in advance, but rather with inventing new ways to resist final solutions through enclosures, and to examine and redefine the concept of 'common'.

Stengers' *The Cosmopolitical Proposal* (2004) already comprises a defence of her above propositions, and of her concern, as formulated in *Cosmopolitics I and II* (2003), which, amongst other arguments, takes a position against the assumption that a common world ever existed, or exists, prior to its assemblage as such, and against the pretensions of objectivity and rationality that fail to register the politics of the non-humans through which a common world might, in fact, be composed. *Cosmopolitics* derives from this challenge. Here, the use of the term *cosmos* is meant to resist the reduction of politics to exclusively human transactions, and that of *politics* to resist the tendency of *cosmos* to mean a finite list of things and multiplicity of factors to be taken into account. For Stengers,

When it is a matter of the world, of the issues, threats and problems whose repercussions appear to be global, it is 'our' knowledge, the facts produced by 'our' technical equipment, but also the judgments associated with 'our' practices that are primarily in charge (Stengers, 2004:2-4).

These judgments, associated with 'our' practices, have actively built wide networks, regardless of any ontological and epistemological stability; linking – without fear, and,

more recently, also against fear – human interests with increasingly numerous and disparate non-humans. The fact of their being engaged to ‘domesticate’ the ecological and all that exists within it have leant these powers (and their infrastructures) the appearance of seeming less visible or aggressive than they otherwise might have done.

An example of these networks is described by Paul Edwards in *A Vast Machine* (1996). In his book, Edwards documents the history of climate science, and presents the models and data used to produce a knowledge of the global climate. This is a network of labours and infrastructures of observation, processing and modelling but also of collecting, transmitting, verifying, predicting and storing climate information. Favoured by Cold War geopolitics and ideology (as in Chapter III), this network has, over the years, converged to create a stable, reliable and trustworthy basis for objective scientific knowledge and global scientific sovereignty. Keeping with the idea of progress, and casting it as a useful tool to solve or at least acknowledge the reality of global warming and the world’s environmental crisis, this network has built a vast panoptic machine as well as a simulated Earth in and against the world. It works to reduce the world to a technical abstraction and as a means towards gathering ideal and necessary data for debating and then acting upon climate change, or to achieve *climate justice* and protect humanity, but also to shape our world in accordance with prospects.

In opposition to these ideas, Mick Smith, who (as before) develops deep ecology’s form of radical environmentalism, has criticised the immense global and temporal extent of human technical mastery over the planet as giving absolute authority to humans, their political solutions and technological (fast science-based) fixes. As far as Smith is concerned, such so-called progress has actually entailed a series of interrelated negative phenomena – from poisonous discharges to systems of production, and the alteration of global processes unavoidably mutating the intricate natural cycles that sustain us. Given these phenomena, he explains that an ambition and earnest desire to save the world, revolving around surviving and impeding climate change and the many Earth crises, took control.

In *Against Ecological Sovereignty* (2011), Smith presents these ideas as integral to the same process of domestication, as part of a political process in which humanity has engaged with ideas which reproduce a sovereign relation to nature via such rationalist tendencies as the incorporation of environmental ethics into conventional political and

juridical frameworks; that is, in terms of which myths, theory and institutions are entitled to provide technical fixes to ecologically and socially complex problems. Smith criticises the outcome of these models and conventional calls for ecologically-motivated action through a detailed analysis of these calls and models; their supposed origins, political, philosophical and strategic logic undertaken on biopolitical grounds. He asserts this position out of the desire for the formulation of policy – influenced by the notion that life is the determining basis of politics – according to an ecological ethics that rejects any form of sovereignty, whether social, political or economic. His book, as noted, is centred on this rejection, and provides notable nuanced readings of the acts and architectures of reservation in support of it.

Smith deconstructs the socio-spatial processes constructed not only in space, but also in discourse, to protect the modernistic distinction between ‘nature’ and ‘culture’. He challenges decisions that are premised upon, and are expressions of, a modernist metaphysical distinction associated with (at least some) ‘properly human subjects’ and the reduction of the natural world to property, resources and a definitional role as a necessary counterpart to humanity’s own exceptionality. His key point is to refute the separate autonomy of each of the modes of being, of ethics, politics and nature. This recalls Heidegger’s critique of the treatment of the natural world as a *standing-reserve* of lifeless, de-animated and desubstantialised ‘matter’, deprived of its ‘impenetrable density’. This view of nature, Smith claims, is systematically ordered and divided according to a technological enframing, transformed into an object amenable to manipulation and deprived of the possibilities essential to nature’s form-of-life. This is a process that, for Smith, produces an accursed figure: the citizen reduced to a life stripped of its political significance; as of its specific form of life, beyond the basic limit of life/death; and in reserve.

2 PLANET IN CRISIS

According to Giorgio Agamben, the Italian philosopher best known for investigating Foucault’s concept of biopolitics²⁷, the production of ‘bare life’ follows the materialisation

²⁷ Published in *The Birth of Biopolitics* (1978-79) and extending his articulation of forms of governance (of threats and risk) and population (as in Chapter I, Section 2).

of what is most often considered as a ‘state of exception’, in which the sovereign power of the decision over life/death is exercised, in times of political threat, beyond normal juridical processes: a power, which, after Carl Schmitt, is deemed the foundation of all ‘rule of law’. Bare life is primarily that which is *excepted* from that rule – or from many human and legal standards – and yet which is *included* in the mechanisms and calculations of those same standards, according to a logic of ‘inclusive exclusion’, as Agamben describes it. In other words, bare life is that part of a political subject’s existence which is *included* through, or by means of, its *exclusion*. It relates to the mode in which jurisdiction preserves its power and is always already captured by the political in a double way, ensuring a perpetual process between law as a means to preserve an end and law as means whose justification lies in the preservation of its very sovereignty: its ability to determine justice and exercise it accordingly. This exists in a kind of limbo-like state, a concentration camp-like space; an exemplary place of modern biopolitical apparatuses largely preoccupied with acquiring and sustaining only the basest essentials of life.

The biopolitical apparatus is affirmed not via the preservation of life but through the exercise of death. ‘It is a question of life and of death’ (Baudrillard, 1981:22). ‘It aims at curtailing (un)predictable events, achieving stability and eradicating internal threats, which often entail judgments about the kind of life that presents a danger to the population’ (Krupar, 2013:7). It contains death as its animating principle. In its essence, biopolitics is nothing other than *thanatopolitics* built on the murder of life. Built, that is, on the immunisation of life through the production of death, or from the implicit threat of death, and the construction of a body that ‘must be defended’, as presupposed by Michael Foucault (1977-78), and, more recently by Roberto Esposito. Death structures the idea of sovereignty (Bataille, 1985) whose ultimate expression resides in the power to dictate who may live and who must die (Foucault, 1976 and Agamben, 1997 following Carl Schmitt) and it is, along with crisis and risk, a germane theme and limit of this thesis.

In a way, this theme and the fact it is one, permits us to confront and rehearse an end and, as such, to deprive it of its powers, to negate the power and inevitability of an end condition with other ends. This is also what Mick Smith condemns in the idea of the human as steward of nature and sovereign lord of the Earth, as exercised via reservations from and of exploitation. For him, this idea implements the human as the agent that at once causes and is able to stop both the ecological catastrophe and the human excesses that have

brought us to the point of crisis through the separation of nature as ‘other’ in the first place. This separation ensures the endless instrumentalisation of nature as a means to suit human ends under the weight of technical developments.

In *Against Ecological Sovereignty* (2011), Mick Smith claims we need to no longer think of ourselves as the masters and protectors of nature, and the stewards who represent the interest of all other species. The politics of ecology, and its prospects for an ecologically-sustainable future, and green or environmentalist discourses relies on assumptions, which are, for him, profoundly anti-political and anti-ecological in this respect. He views an ecological appeal to a sovereign humanity as dangerous, equivalent to nature ‘being left in a state of suspended animation, as hanging dearly onto bare life above the gallows-drop of global capitalism. This is the condition of the nature reserve’ (Smith, 2011:103). To say that nature is reserved or in reserve is to express something of the same limited and limiting mode of existence that dwells in a concentration camp. He affirms that, paradoxically:

the decision to (p)reserve has become a matter of political sovereignty and asserts the nature reserve is exempted from being a resource, freed for human dominion, only by being already and always included within the remit of human domination [...] the nature reserve is the exception that proves the rule (ibid:xiii).

The separation of nature, to enhance, protect or (p)reserve it for and from humanity – for the survival and proliferation of each – is predicated upon an anticipation of death, the formula which gives meaning to life while nullifying it, as in Agamben’s thinking of bare life (and the debates around it).

In its attempts to protect life, for Smith the nature reserve ends up negating life. Its withdrawal and enclosure removes it from the world as a work-in-progress and collective creation in order to allow time for nature to act, recovering from the damage it has suffered. Smith argues that what we think of as nature – at least in the form of a protected nature reserve – is as much a product of the modern world, its politics, economics and technology, as it is of science, geology and ecology. Nature reserves are invested in, and only serve to further, the quest of humanity’s total control and dominion over nature. They are synthetic and designed, exceptional spaces and attractive places, products of urbanisation, and theoretically subservient to overarching modern principles, treaty regimes and acts of

provision that are chains of human sovereignty rather than claims for them to be conceptually contiguous with the rest of our environment.

Reservation arrangements such as nature reserves are, therefore, only reproducing the logic that dictates rational exploitation and its laws. They are mobilised in order to increase the human capacity to solve immediate problems in the medium and long term, by moderating, systematising and limiting the exploitation of the environment further; a negative form of protection that simultaneously reduces the power of nature in order to expand it. This negative formulation constitutes the theoretical framework on which Donna Harraway, Giorgio Agamben, Peter Sloterdijk, Roberto Esposito and others, drawing on Foucault's notion of biopolitics, inscribe the paradigm of immunisation. It is from this position that they propose the adoption of an affirmative (bio)politics – a politics *of* life (*biopotenza*) as opposed to a politics *over* life (*biopotere*), to be extended to the global liberal governmentality, working through the promise of protecting life on Earth rather than threatening it.

Peter Sloterdijk and Roberto Esposito, are both indebted to Heidegger's analysis of the relationship between technology and the human condition (1954) and Michel Foucault's analysis of governmentality (1977-78, Chapter I, Section 1). They engage more specifically with a threat hanging over multiple forms (and continuities) of life (not only nature), a life that groans under the oppression of an entire global apparatus of political decisions, economic praxis and their techno-industrial (and tele-technical) constructions. They posit the situation as the product of historical processes. Moreover, they perceive a strange reversal, an inversion or perversion that transforms a politics for life into a politics of death, that is, *thanatopolitics*. The immunological will implies the protection of an agent who, for purposes of that protection is exonerated. The immunological determination of modern sovereignty, Esposito writes, comes from life itself, separates itself from it, and forms a transcendent instance that bears down on life to the extent that it destroys it. As a paradigm, it is generated as a kind of counterweight and it follows the idea that: when the traditional natural defence, symbolic realms and theological-political matrix lose their solid ground, the biopolitical defence mechanism takes their place. It entails the sacrifice of the living for the assurance of its survival and with the purpose of defending its life it ends up, as Esposito writes, 'adopting the very enmity that characterises the political in its essential

form' (Esposito, 2009:102) with results that are, in accordance, anti-political²⁸.

The interests in, and efforts to understand the problems of environmental damage and the crises that they introduce at this point emphasise the significance of the 'immunitary' mechanism manifested in programmes for sustainable development and/or degradation, but as well in new, so-called eco-benign forms for the protection and preservation of life, and 'life-affirming' struggles and politics originating deeply in life itself alike; and this precisely because, if the time of crisis is also one of decision; of the necessity or demand to intervene, and take part, then the crisis reinforces a general state of anxiety and the sensation of imminent collapse against which both preventive measures and remediative interventions are required to ensure the survival of, at least, our status quo. It is for this reason that the development and perfection of all sorts of technologies that allow for the calculation of effects and the control of destructive results has been, and continues to be incessantly sought. However, as Massimo Cacciari explains, the social, economic and intellectual schemes we choose to employ, such as the calculus of risks, in order to fill the knowledge gap needed to implement solutions and programme responses bear an extraordinary affinity with the schemes of the theory of games.²⁹

The theory of games knows only time-crisis, as in this rests its extraordinary affinity with an idea (or ideology) of progress as perennial removal of catastrophe, evolution, innovation-innovation of the system through crisis capable of deluding and enchanting it (Cacciari, 2009:152).

'The more crisis threaten catastrophic results', writes Cacciari:

the more systematic will be the recourse to emergency governments to legalise conservative solutions of the conflict. Paradoxically, these solutions consist precisely in the institutionalization of conflict, and therefore to be founded on the permanence of crisis. The crisis is preserved in order to prevent a transforming break of government assets. Perennial emergency keeps in form a political system on the edge of catastrophe (Cacciari, 2009:153).

In such circumstances, it is not surprising that the threats of death, along with their

28 In the *Categories of the Impolitical* (2009), Esposito explains that the anti-political coincides with the political, because it negates, reproduces and emphasises it. It is bound to a presupposed dualism that impedes its very hermeneutic possibility. It is internal to modernity and, more precisely, to the extreme phase of its crisis.

29 Chapter III will develop an example of the theory of games applied to crisis situations.

inevitable possibility, are presented as the indicator of extreme biopolitical power, as Foucault also maintains.

Roberto Esposito, in *Communitas, The Origin and Destiny of the Community* (1998), writes that the instinct to conserve and preserve is part of the affirmative ‘decline of the fear of death’ (Esposito, 1998:4). Here, he considers fear as an element of strength because fear forces us to think how to get out of a situation of risk. Fear also allows us to transcend habitual or enforce customary responses. A variety of acts and architectures are, for this reason, deployed and cemented through public fear, and constituted by actual and evident problems and risks of a collective enemy, and the physical demarcation of boundaries³⁰. This variety is part of the fairly wide system of this type of analysis (as well of viewpoints) against risks, the measurable and ‘certain uncertainties’ and threats, enforced and emplaced to optimise life.

According to Ulrich Beck, who theorises about the distinctive form of our society as ‘a world risk society’ (Beck, 1986), risks are ‘not an epiphenomenon of society’ but ‘central to the condition of governmental management of uncertainty’ (Beck, 1986:264-5). For him, risk is characterised essentially by a lack: that is, ‘the impossibility of an external attribution of hazards’ (1986:183), and a concern with the distribution of ‘bads’. The science of risk detection and analysis has developed as a means of determining possibilities, their potential for damage and their spatial and temporal systematic distribution. It entails a belief in the predictability of the world. This science is being developed to complement our capacity to produce reserves and implement the acts and architectures of reservation. It is instrumentally devoted to preventing the destructive side of the processes of production, and its deleterious consequences, even while emphasising and building (on) it, as it is shaped by a preoccupation with fear and supported by the construction and narrative of the reserve as a *safe place* to conserve and preserve order – whether physical or epistemological.

Katechon

At the root of Carl Schmitt’s idea of sovereign power, Giorgio Agamben’s pathway for

³⁰ Examples of these are presented in the chapters to come but it is worth noting Nan Ellin’s *Architecture of Fear* (1997). In the book she develops on a range of other and more architectural (as it is commonly understood) solutions (or authors that reflect upon solutions) in which fear is both expressed through a typology of defensive architecture and/or generated by it; that is, by enclosed spaces that can either offer refuge or threaten security, depending upon the context.

messianic redemption (and intimately tied to Roberto Esposito's immunitary logic) is the figure of the *katechon*³¹, to which, in the context of the secular space of politics, the role, and creative solution of the preservation of order, or fragments of order on Earth, is attributed. The *katechon* is to be found in the eschatological context of Saint Paul's 2 *Thessalonians 2:6-7*, as a term for a restraining force in history, that which holds back the full force of the apocalyptic revelation of the lawless until the return of the law at the end of time. The *katechon* thus creates and preserves order to resist the permanent threat and risk of disorder. For Schmitt, the *katechon* is an influential theological version of a 'balance of power' and it serves the theological-political matrix that constitutes our/the Western world's order and rule. For him, modern sovereign power, like pre-modern religious power (that of the medieval Christian Empire) is theological and premised on the belief and task of holding back, keeping in reserve or postponing the materiality of time and history to ensure the eventual perpetuity of the sacred sovereign order or rule.

This modern sovereign power owes its force to the *katechon*: it thus *has* and *is* a power that seeks to impose a limit and endpoint to earthly matters, and the threats and fears that derive from them. It *has* and *is* a power that preserves and protects the sociopolitical and constitutional order, and redeems it by bringing the subjects of power and the sovereign into a communion. Thus, it may be said that the biopolitical bent of these times leads to the execution of the tasks of the *katechon* within geographically- specific reserves, whether of nature or otherwise. Due to the fear of ecological catastrophe, articulated in terms of this dualistic and determinist moral schema in which the apocalypse both responds to and produces crisis, these reserves reduce beings to their local manifestations and/or actualities. Within such reserves, the *katechon* is accomplished, and the logic of, and need for defence – from that which is inevitably defined as a constant threat and risk to existence – is put to work:

The Katechon restrains evil by containing it, by keeping it, by holding it within itself. It confronts evil, but from within, by hosting it and welcoming it, to the point of binding its own necessity to the presence of evil. It limits evil, defers it, but does not eradicate it, because if it did, it would eliminate itself (Esposito, 2009:63).

Understood in these terms, and in light of an intensifying spectre or threat of the breakdown

31 As in Chapter I, Section 2, for more details see Glossary, in the Appendices.

of the critical natural systems that sustain life, the destructive possibility of crisis is transmuted, in the reserve, into a creative force that challenges human sovereignty and puts us in a position of submission to a foreign power or authority. Such a possibility develops from a general call for a restructuring and reorganisation of what 'is left' according to new (and even, at times, pre-modern) principles, interests and needs. These seek to transfigure and maintain the assurances (and ambiguities) of the supposedly expressive and productive character of modern idea(l)s by the use of the technological structures of accountancy, redemption, and even exemption. This requires humans to engage with the environment in a way that emphasises relations and formulas, in order to extract and abstract entanglements and confront an image of the future with the past. Consequently, the status of epistemological and political endeavours are secure, so that politics may resolve the threats of Earth crises and even make them productive, through the use of devices to guard and defend life against them. Most of the time, it should be noted, such devices carry the torch for technologically sophisticated closed-system architectures.

Ultimately, the intensifying spectre of global fragility due to Earth crises reveals a humanity overshadowed by the destructive powers of modernity and threatened by the prospect of an unfolding catastrophe derived from the logic and distribution of the *oikos*, that is, the realm of domestic habitation and domain of the uncontested despotic powers through which paternalistic housekeeping maintains control, as an ecological and economic complex driven by the demarcation and distribution of *geospace*. Likewise, it thus unveils centres for the management of this crisis as being centres for the wise administration of the global 'household' and its increasingly limited global bio-space. It enacts control over the relationship of its members (*oikonomiké*) through reports on Earth crises illustrated by, amongst other things, the hastening extinction of countless species, the manufactured disappearance of many types of resources and the increased exhaustion of soil fertility, leading to an ever more fragile inhabitable environment. Hence a context offering the potential and motivation for the extension of the works of architecture to facilitate new (or different) modes of co-existence, ways of living and of experiencing inhabitation. But perhaps also one that encourages the tendency to augment the ecological rift, by *keeping in reserve* rather than reliving many threats of Earth crises and its causes.

The character and scale of these negative factors dictates and upholds the primacy of an objectified nature as the subject of dominion and appropriation, contributing to

attitudes favourable to the continued violent use, allocation and protection of material nature as a reserve of resources and/or of regeneration. It transfers the idea of house-mastery and home-as-reserve (Chapter I) onto the larger realm of nature and the realm of nature in possible surrogate reservation arrangements elsewhere. Hence, human subjectivity is placed in yet another privileged position, at or towards the centre of the conditions of possibilities, ‘the panoptic ecologising of the world, and the nostalgic restoration of the Garden/Wilderness’ (Wyck, 1997:134) so as to be able to run itself indefinitely.

Seen from this perspective, the conflation of the *res extensa* and *res cogito*, that of nature and culture, is thrust together by the risk of the-end-of-times that makes the issue of ecological sovereignty imperative, so as to handle the risk of cultural extinction and exhaustion of the Earth’s reserves and resources. The current crisis constitutes a risk to the Earth as we know it, and so to us also if we continue to ignore our interconnectedness with nature and the character of Earth crises. The intensifying spectre of the threats of Earth crises (treated in this thesis) mobilise us to proclaim our moral imperative; to recognise relations, confront our history and past, and to keep on recreating the planet as a hybrid entity for our total environmental control, thus developing a political ecology that, as Latour has compellingly argued in *Politics of Nature* (2004), is paradoxically condemned to fail and/or elude us, as a consequence. Along with this threat comes the problematic status of nature as Other, inherent in the very idea of it as external, ready-to-use and present-at-hand (Heidegger, 1954) and that of the way we have construed an idealised conception of the human and of the natural as if to wish away the harmful effects of the ‘modern’ era. As if humanity might somehow avoid experiencing lack or loss, and instead reintroduce this lost balance in an ecologically benign or at least more comfortable possible future, as forced to choose to do so. Indeed, a future that is predicated on and predicted as a catastrophe, both for us and the nonhuman, relies not only on our omnipotence to predict the consequences of our actions, but in our impotence, even if without a proper foundation in knowledge. This situation confronts us with an existing fear ‘that pushes us to plan measures that would protect our safety’ (Žižek, 2008:53), in order to offer solutions of faith and hope – of both descriptive and analytic categories – in need of scientifically and technologically maintenance.

Ultimately, as their emphasis on extinction and exhaustion reveals, these concerns consist of nothing more than the fear of the threat of the end, because once extinct and/or

exhausted, no species can (yet) be re-established (so far as we know) so as to permit the exploration of the conditions that determined its singular ecological role, and its resistance to extinction and exhaustion. The darkest meaning of extinction is that of termination, a unique and final event. The meaning of exhaustion is an end to possibility, wherein ‘the exhausted exhausts all of the possible’ (Deleuze, 1992:3). To mitigate and manage the problem, a combination of administrative rationality and technical innovation is being devised, but the technological way of thinking does not tell us what course of action needs to be taken. It neither satisfies the longing for understanding of the so-called environmental crisis, nor the feeling of ‘disenchantment’ (see Adorno and Horkheimer, 1944) that has been the subject of our attention since at least the late nineteenth century, if not dating back to the dawn of urban-industrialisation (as according to Worster, 1977).

As many critical theorists and environmental historians have noticed, the central themes of modern and contemporary environmentalism meet in the idea that humanity’s separation, our rejection of humility and of finitude, lie at the root of the experience that engenders guilt and antipathy to human domination over nature, and therefore that of the Earth crises. It entails anthropocentric forms of justification foregrounding the human-specific reasons behind not only nature’s instrumental, but also its intrinsic³² value. The fallacy resides in the attempt to interpret non-human nature through human categories, not unrelated to the idea of ecological limits and tipping points.

The realisation of there being ecological limits and limits to growth – at first by the report of that name, commissioned by the Club of Rome (1972) – within which, economical and environmental justice claims externalities, figures as a somewhat different, but not totally unrelated discourse. It draws attention to the physical limits of Earth’s capability to ‘carry’ us, and the fact that we are depleting the world’s resources and exhausting its (known) reserves, making it harder for us to fulfil resource demands and eventually leading to the collapse of our economic system: of whole cities, countries and landscapes. At the onset of this conjecture stands the task of neutralising or indefinitely postponing these limits, understood as the most fundamental problem, an ‘ultimate’ predicament for humankind. The alternatives are either to wait until technological tools able to suppress growth become

³² This is a value residing objectively in nature and irrespectively of its usefulness to the needs and wants of present or human future generations.

affordable enough to be globally implemented, or until the problems are simply deemed, fatalistically, to be beyond any technical solution; and either way, the problem of growth in a finite system remains, as Chapter IV will demonstrate.

Out of the contexts and multiple antagonisms outlined above have emerged not only the problematising implications of environmental collapses, but also a call for more sympathetic and alternative ethico-political and ethico-aesthetic articulations, such as Guattari's 'ecosophy' (1986). Such a perspective recognises three ecological registers as *inseparable* in the most mundane and practical sense. This is a tripartite way in which we can reinvent our relationship to others, via social ecology (including subjective relations articulating respect for the biosphere, biological and incorporeal species) and via mental ecology and environmental ecology. And a philosophy that invites us to think the project not only from the point of view of what each incorporates but also from the point of view of what it implies for each of the others.

Ecology Without Nature

In *The Three Ecologies* (1989), Guattari states that he has devised 'ecosophy' to offer a broadened vision, with new means and concepts with which to think through the answers to the problems that characterise the Earth crises issues of our era. His vision emphasises heterogeneity and difference, synthesises assemblages and multiplicities and the acknowledgement of nonhumans in the gatherings in which humans participate. These are his emphases because, as Guattari writes, traditional environmental perspectives have obscured the complexity of the relationships between humans and their environments through the maintenance of the dualistic separation of humans (culture) and nonhumans (nature) under the weight of technical developments. Guattari's 'ecosophy' entails a point of view, or views that behold the world as a dance between chaos and complexity. Its challenging nature is that of an emergent and processual (collective) assemblage that employs a logic of parts without discrete, transcendent wholes upon which to ground or stabilise ecosystems. For Guattari too, the breakdown of human relations with the natural world is objectively due to pollution and a certain human incomprehension and fatalistic passivity towards the natural world, as if they were ontologically independent of each other.

Following Guattari, and arguably also Alfred North Whitehead³³ and Raymond Williams³⁴, a number of contemporary cultural and social theorists like Bruno Latour, Slavoj Žižek, Timothy Morton and others call for an ecology *without* nature, because for them the ultimate obstacle to protecting nature is the very notion of nature itself, and our reliance on it. More emphatically still, these theorists call for more responsive acts and practices that openly acknowledge and respect the singularities and differences between all systems or ecologies, whilst identifying all nonhumans as *actants* (interveners) and actors with cultural, social and political agency.

At the basis of Latour's conjectures stands an argument for a new take on ecology and the politics of reality. Recognising a complex association of entangled socio-natural beings, instruments and practices, and their enactments, he calls for an art of governing without mastery, and takes a deliberate and critical approach to the Cartesian metaphysical foundations of our attitudes towards nature to oppose or at least weaken the claims involved (Latour, 1988:156). Latour asserts that 'by inserting nature into politics we are only exacerbating the paralysis of politics caused by the auspices of a nature-culture divide' (Latour, 2004:235) – a thesis he inaugurated in the pamphlet *War of the Worlds: What About Peace?* (2002), in which he explains that the actual dynamics of the composition of the common world (which is the name Latour gives to politics (2002:8)) differs from the politics of humans as much as from the politics of nature based on a strict separation between nature and culture. In this text, he writes that:

the notion of nature itself has been made to prevent a progressive agreement about the slow composition of the common world. With nature, unity is always the one thing that is no longer at stake, which does not need to be negotiated. Once nature enters the debate, others have only subjective and biased representations (Latour, 2002:41).

Latour's proposition, with all of its political implications, advocates a highly influential and major reorientation of our thinking and action upon the world. Together with his anti-foundationist remarks, axioms and methods, he decries a human- or culture- privileged and centred position, and those inherently conservative approaches of social and political theory

33 Whitehead is also a notable and significant critic of the Cartesian divide, referring to Descartes's *res extensa* as 'a dull affair [...] merely the hurrying of material, endlessly, meaninglessly' (Whitehead, 1961:412).

34 Williams, amongst many others, maintained that the notion of 'nature' is historically and culturally variable and that it is irresponsible to speak of nature (at large) in a normative sense (see 'Ideas of Nature' in 1980, *Problems in Materialism and Culture*, London: Verso).

that insert Nature (as known by Reason) concerns of ecology within the discourses of established political (and economic) practice, as only perpetuating an ontological distinction that compromises the very political aims (and composition of the common world) that such an ideology of nature intends to serve.

In a similar vein, Timothy Morton's *Dark Ecology* (2016) warns that the very way we think about nature – in interest in and debates of Earth crises – perpetuates a harmful (modern) distinction between nature and culture or humanity. He shares the opinion of the image of external nature being the main obstacle to environmental thinking and the ecological present. In his work *The Ecological Thought* (2010), a prequel to *Ecology Without Nature* (2007), he argues that nature (as social and cultural concept) is indeed a self-defeating and biased concept. It functions theoretically and ideologically through Western history to reflect that which is at once beyond and the object of our control, as well as the domain of balanced reproduction. Its fabrication, in the majority of the cases, forces us to resort to possible solutions and operations on the environment that threaten a more meaningful contribution to legal, political and cultural campaigns.

In the book, Morton explores the emergence of an ecological awareness as resulting from a rhetorical and aesthetic saturation of images and facts via an approach that historicises nature. He enquires into the concept of nature, exploring how it has reflected trends in broader ideologies of nature – nature seen as threat or opportunity, enemy to be overcome or ally on which to rely – and examines how it is being conceived of and even repurposed for political discourse – in support of engagements in attempts to manage, contain and prevent the ecological catastrophe by the applied principle of stockpiling³⁵. He understands these engagements (and solutions) to ecological catastrophe – its management, prevention and containment strategies through legal, political and cultural campaigns – as being deeply committed to material-discursive constitutions of nature; an idea that we need to resist in order to approach and structurally realign the world in which we live. Morton's arguments alert us to the real, literal and figural construction of nature and the environment as trapped in a perverse and contemplative distancing, tied to moral and romantic political concerns with the state of environmental crisis. This is because, for Morton – and here taking him literally, 'putting something called nature on a pedestal and admiring it from

³⁵ See glossary of terms.

afar does for the environment what patriarchy does for the figure of the woman. It is a paradoxical act of sadistic admiration' (Morton, 2007:5). This pedestal, also at play in Manzoni's 'Socle Du Monde conceptual piece, honours that which it dominates.

Also with reference to patriarchy, Morton develops a form of feminist environmental philosophy³⁶ to address, as inferior and problematic, the core features of any structure that includes (prescriptive) dualism, hierarchical thinking and the logic of dominion as a pattern of thinking and conceptualising the natural world that morally entitles its use as mere resource or mean. The underlying model shared by these forms of oppression are, for Morton and feminist environmentalism, based upon alienated differentiation and denied dependency. In his work, Morton declares that we should resist reducing nature to an object ready to be mastered and dominated for consumption or reproductive means, and avoid the re-enchanting and re-mystification of the environment to stop the danger of turning it into a conscious and conceptual fetish object. This is a practice that particular stances and proponents of eco-centrism (and traditional environmentalism in general) use to remedy the positivist disenchantment of natural things, through conservation and preservation, in the foregoing terms. According to Morton, there is no neutral ground from, or upon which to articulate such a remedy but rather a vast, entangling mesh of (w)holes with a fabric-like quality that structures all beings (human and non-human) together. Such remedies only legitimate attitudes and resolutions that lead to further reserves, tangible and conceptual.

In *Ecology Without Nature* (2007), Morton targets the idealised, monolithic and reified views of nature – such as pristine, as wilderness, as sacred and/or as evil – in literature and in theoretical articulations – to overcome nature and culture dualisms and promise genuinely ecological forms of culture, philosophy and politics. He asserts that such views of nature are filled with concrete aesthetic details, rather than purely ethical respect. He then refers the most influential of the cultural-aesthetic-ethical conservation areas set aside as models (*etalon*) of virgin nature, alongside the ideas of Romantic consumerism, utilitarian and scientific organisational models that have acquired a more specific meaning as nature reserves: i.e. as before environs dedicated to the scientific study of nature and

³⁶ An umbrella term for a variety of different philosophical perspectives on the interconnections between gender, politics and nonhuman (nature) issues – as linked with the unjustified domination and exploitation of nature and the environment by a patriarchal (Western) society.

propagation of a designated species. For Morton, these obscure the properly ecological forms of culture, philosophy, politics and art (2007:1) and retain profound commitments to traditional, epistemological and metaphysical foundational paradigms or models of the actual or possible constitution of the world. Ultimately, Morton's thinking suffices to characterise reservation arrangements as closer to the anthropocentric and self-preservational control and administration of resources than they are to a new and optimal ethical stance (and relationship) towards nature and the environment.

These reservation arrangements have developed with and out of the various legal, political, scientific and philosophical paradigms that are and have been called to secure survival within culturally controlled environments, functioning, at least theoretically, as counter-sites. In both *The Order of Things* (1966) and *Of Other Spaces* (1967), Foucault calls these counter-sites' heterotopias, i.e. sites whose potential lies precisely in the utopian double sense of perfection and deferral. Like utopias, these sites refer to spaces of *otherness*, spaces that can be connected or disconnected from the real and possess a precise and well-defined function within society, to contain exceptional activities and create either 'a space of illusion that exposes real space as still more illusionary' or 'another or real space, as perfect, as meticulous, as well arranged as ours is messy, ill construed and jumbled' (Foucault, 1967:5). As Foucault explains, these heterotopias constitute an 'ideal fortresses' which are 'entirely closed in on themselves' and displayed as 'independent microcosms'; spaces 'in which time never stops building up and topping its own summit' (Foucault, 1967:27). But spaces that follow 'the idea of constituting a place of all times that is itself outside of time and inaccessible to its ravages, the project of organizing this way a sort of perpetual and indefinite accumulation of time in an immobile place' (1966:7): to accumulate and protect all time in one space.

In contrast to other heterotopias, Foucault describes heterotopias of crisis that reveal a peculiar biopolitical approach, in which crisis is used to uphold heterotopic potentials and a kind of 'come back effect' (ibid). The heterotopia of crisis is generally recognised as a privileged or forbidden place reserved for individuals in a state of difficulty or breakdown. The ordering represented in nature reserves and in other reserves, framed in this thesis, thus qualify as heterotopic. On a straightforward level, these reserves of crisis appear to serve a series of functions indissociably attached to security, exclusive communities, and situations that are thought to be otherwise difficult to reverse. These

reserves place threatened species in places as things in a sort of *vacuum* packing: a form of space that is commonly used as a modern food processing and preservation technique. In the interest of perpetuating species – and saving things from continued destruction – the schema of these reserves appears to be that of congealing (through exclusion) the probable chain of transformations feared by concerned scientists. Devoted to the fostering of life, at the same time these reserves produce death and captivity to ensure survival and the privilege of safety for culture and its environs. From this perspective, it is possible to see why Baudrillard turns his attention to the links between the affirmation of life and the production of death. Baudrillard focuses on the forms of subjugation of life to the powers of death and the creation of death-worlds, in which vast phenomena and populations are subjugated to conditions of life that confirm a state of living death, as suggested in the ‘Ramses, or The Rosy-Colored Resurrection’ section of *Simulacra and Simulation* (1981). He writes:

the Ramses does not signify anything for us, only the mummy is of inestimable worth because it is what guaranteed that accumulation has meaning. Our entire linear and accumulative cultures collapse if we cannot stockpile the past (Baudrillard, 1981:10).

The mummy of Ramses II preserves a visible past and a continuum. It reassures us of our ends, and is purged of death to immortalise and make visible that exact order of history and of science. It condemns to death its hidden secrets, as ethnology protects to death the object it studies and confines. Baudrillard writes about a world completely catalogued, analysed and confined in reserves based in the precession of models, simulacra. Therein lies the mental destruction and current crises of a society that is completely centred on life and its (re)productivity, and the inherent problem of the strategies behind spaces where life becomes indistinguishable from death and the almost already dead.

Planet Post-collapses

With a similarly revitalising scepticism towards certain contested truths of Earth crises as Baudrillard, Timothy Morton emphasises that the discourse about limits is a discourse without limits: ‘and we need to notice that scarcity and limitation are not the only ecological concepts on the block. What if the problem were in fact one of a badly distributed and reified *surplus*?’ (Morton, 2007:109), he asks. First of all, it is a problem not solely based upon the limits of Earth resources, but above all based on the surpluses and

accumulation of all our waste and messy excess, and of discourses to save us from them.

For Morton and Baudrillard, the ecological discussion has given rise to a crisis of reason and of theory; mobilised by human-induced disaster, burdened by desires for salvation, and made urgent by fears of loss and of the incapacity of sustaining life systems on Earth, including ours. They suggest that as a consequence of the syndrome that has been going on since the beginning of the industrial revolution, ‘something far bigger and more threatening is now looming on our horizon – looming to abolish our horizon, or any horizon, in fact’ (Morton, 2011:98). For Morton, ‘the end of the world has already happened’ (ibid). Morton meets Baudrillard in claiming that the proliferation, repeatability and (re)producibility of death and of finitude signals that the world has already ended. In *The Illusion of the End* (1992) Baudrillard writes, ‘everything already happened. We are already beyond the end’ (Baudrillard, 1992:198). Here Baudrillard assigns the catastrophe to normality, perceiving it as an integral part of a system charged to manage the impending real catastrophe by means of employing and normalising a discourse of virtual catastrophe (with an emphasis on the real as tenacious and/or on the tenaciousness of the real).

This is a discourse that in wanting to counter the absence of hope for the future calls for an anticipation of the end to (infinitely) delay its arrival. Thus to confirm, it is a question, then, of tracking down the *katechon*: that is, to make it productive once again. At this point, the explosive force of the end has already penetrated things, assuming catastrophic dimensions and – as in previous and past confrontations with environmental crisis – ‘incorporated the eschatological consciousness of the Apocalypse’ (Scherpe, 1986:99). In his article *Dramatisation and De-dramatisation of the End: the Apocalyptic Consciousness of Modernity and Post-Modernity* (1986), Klaus Scherpe takes on Baudrillard’s position to confirm that ‘in the age of *posthistoire*, the end of the world can no longer be a topic, at least not a dramatic one’ (1986:95). He recalls Hans Magnus Enzensberger’s *Two Notes On The End of the World* (1982) to agree with Baudrillard about the exhaustion of the historical, philosophical and theological power of the apocalypse. Even epistemologically, the apocalypse concerns itself with an underlying truth about world history that is dramatically revealed, and means nothing more than the destructive threat of the end.

The proliferation of images and of perspectives coming to terms with the Earth crises and the ecological catastrophe they introduce, has confirmed the loss of any real end.

It has no other function than that of maintaining the illusion of real actions and objective facts. Populated by questionable images, institutions and identities, following a desire to restore the broken harmony between humanity and nature, ‘the novel feature of the impending end of the world is’, Scherpe agrees, ‘its producibility’: that is, ‘the producibility of the catastrophe is the catastrophe’ (1986:96). This is a particular aesthetic consciousness in which the abstract reality becomes the concrete, integral reality, exactly because of the fundamental sense of groundlessness conditioning it. It works like the strategy of nuclear deterrence³⁷, to which Baudrillard repeatedly returns in his analysis, appears to be directed towards prevention because in reality its purpose is to ensure the strength of the system and of control. The strategy of the social phenomena and discourses thus paralysing our fantasies and imaginations only preserve the very threat they want to combat. Or, more precisely, as this thesis contests, in fact, they leave the probability of threat in suspense or in reserve of potential (see Chapter III) to anchor reality itself in a stable set of familiar – rather than countenancing disruptive – coordinates.

Both Morton and Baudrillard’s radicalising ideas, especially those concerned with the aesthetic dimension of the consciousness of catastrophe in current Earth crises discourses, can be said to belong to the critique of civilisation and rationalisation put forward by authors such as Ernst Junger, Walter Benjamin, Frank Kafka and Thomas Mann, as well that of modernity’s redemptive programmes, of finality and of causality, like that of Karl Jaspers, Theodor Adorno and Martin Heidegger. However different the destructive energies in each of their historic contexts, according to their reasoning, all the catastrophic events of the first half of the century are implicated in, and predicated on, Western metaphysics and its exegesis. These authors have dramatised and de-dramatised forms of aesthetic objectification, transformed it into an aesthetic consciousness of indifference (Scherpe, 1986:117) and declared the catastrophe to be the historical norm (see in particular Benjamin, 1921 and 1940; Schmitt, 1927). In a way, they have also dismissed the apocalyptic metaphysics and the redemptive programmes modernity has attached to it, by insisting on the pure and self-sufficient logic of catastrophe that will alter the end of history, and on causality as *vicarious*. In the first place, we never can know the present situation. It does not underlie things but emerges from and around them as aesthetic

³⁷ Subject in Chapter III.

phenomena. Only its demise permits us to hail an end to the burden of moral agency, because, according to Maurice Blanchot, we can never understand the full scale of disaster, the catastrophe or the traumatic reality of historical events. The disaster leaves us speechless, ‘writing of the disaster is the penultimate impossibility [...] we are passive with respect to the disaster but the disaster is perhaps passivity’ (Blanchot, 1980:35).

The post-apocalyptic writings of Heidegger, Jaspers, Horkheimer, and Adorno in particular are defined by the figure of a no-longer redemptive history, marking an immutable *caesura* that holds modernity to be culpable for the catastrophe. In the horizon of such a decline, modernity remains conditioned by the erroneous ideal of truth. This resonates with Baudrillard and Morton’s strategy of presenting the catastrophic logic of a system through the suspension of the expectation of the death, and thereafter, one’s anxiety about it as the means to solve the crisis. The lesson to be fully endorsed is that humanity, contrary to Lovelock’s suggestion, has nowhere to retreat. The ethical task, for them, is to accept our utter groundlessness and envision a new subject who, metaphorically, survives its own death and the various forms of possible traumatic encounters, independently of their nature, scale and extent.

To this end, and unlike other political renderings, these authors agree that the politics attached to the Earth crises perform a canonical redemptive gesture whose foundation gives a principle of order to acts and architectures of reservation. According to Morton, it supports ‘images of the world that inhibits humans from grasping their places in an already historical nature’ (2007:140). The calls for a humanitarian ethics to make redemptive and restorative enclosures or nature reserves against human-induced stresses and pernicious impacts serves here as example. Far from a concern with the complete annihilation of nature and its capacity to sustain life on Earth, what these reserves (and those to hold other threats Earth crises) make visible is not a threatened nature, but the conditions that sustain a vulnerable humanity through the gymnastics of hope and exploitation. As we will see, the entrenched logic of many of these nature reserves seems to patch up one catastrophe only to exacerbate another, or to forge distinctions between one threatened spatial temporality and a previously undisturbed other, so as to preserve the first. They attempt to effect change and to withhold the catastrophe through the creation of, and partition of the planet into islands of stasis, legitimating them on the basis that such reservation arrangements offer a solution to alter the pattern of the future predicated and

predicted on the Earth crises.

In light of the crises, what else can we learn from these arrangements to elucidate this point? What do these reservation reservations contribute to political agency, and to what extent are these contributions to be considered efficacious solutions to the issues posed by the Earth crisis? How these solutions are enacted and how we might become interested in developing something different, or a different view, so as to activate all our doubts and reservations in a way other than by partitioning the planet, is the theme of the following chapters of this thesis. They expand from decisions taken to postpone the outbreak of certain catastrophes to examine a reluctance to accept momentous tragic events – both actual and those involving a possible or virtual disaster – that are involved in reservation reservations, and as ‘actants’ in the current crises.

CHAPTER III

CONTAINMENT RESULTS - ORIENTATION

In a world of increasingly refined plans and actions to ameliorate the effect of the threats of Earth crises, and to prevent the surprise of other possible negative upheavals or disasters, the defence of our home planet from hazardous, deep space objects on a collision course with Earth has become one of the most challenging opportunities for heading up a project to execute a globally coordinated threat-response. The entire planet is at risk in such a scenario, and the building up of sturdy reservation arrangements, and their capacity to support an emergency meteorite defence project have been at the basis of such global reaction for protecting the planet thus far.

Every day, tons of meteorites, consisting of fragments of dust and even big rocks, enter the Earth's atmosphere. Some of the meteorites that have fallen on Earth have also marked turning points in the public's sensitivity to the Earth's vulnerability to bombardments from outer space. In historical terms, this type of impact has long been regarded as a sign and portent: the herald of a great event and even the medium of utter extinction. Scientists argue that on several occasions in the Earth's 4.6 billion year history, a collision of a meteor or other Near-Earth Object (NEO)¹ has disrupted the environment and caused, or at least contributed to, massive devastation. The most well known of these, according to evidence produced by American scientists in 1980, was the Cretaceous-Palaeogene extinction event that led to the demise of (non-avian) dinosaurs about 65 million years ago, when a single and large meteorite struck the Earth, in the Yucatan Peninsula. The event resulted in a dramatic change of faunal composition and perhaps, according to the *panspermia hypothesis*, gave us the chance to evolve.

It is, in fact, by reason of these events that mass culture has been recently obsessed

¹ NEO are small solar system bodies that include a number of solar-orbiting spacecraft, asteroids and meteoroids.

with visions of comets and asteroids on collision paths with the planet², and that planetary defence initiatives are being devised. This interest has helped us advance our ideas about the physical structure and architecture of our planet and to strengthen our intellectual armoury in the solar system, in order to explore the possibility of a new dynamics of control and evasion. These types of events challenge our assumptions, in terms of our knowledge and forms of representation of the power of nature, as well as revealing the gaps in our strategic knowledge, technology and operational readiness to produce a capable and reliable system to protect Earth from meteors and other NEO impacts. For the purpose of this chapter, what is significant is not whether impacts are an extraordinary, improbable event or rather a typical ‘cause of extinction’ (Sagan, 1994:327), but how we render them (and their inevitabilities) calculable and controllable? How do we cope with, and exact control over that which defies the laws of probability (either by its nature or its force)? While recording, calculating and constructing hypotheses and probabilities, how are we to (re)shape the boundaries of the Earth so as to effectively engage and safeguard the planet, with(in) acts and architectures of reservation encompassing the excess of the power of nature?

1 RISK CONTROL

Between the development of radio astronomy and the end of 2012, 34,842 meteorites were recorded to have survived extreme temperatures upon entering the Earth’s atmosphere to strike the Earth’s crust, out of which only 3% were seen falling and/or caused considerable damage, according to the NASA³. This number has led to the scientific development of technologies and strategies able to fast-track NEO in space and to divert and prevent NEO falling to Earth, and thus defend our planet.

Since the 1980s, physicians – such as Edward Teller (the hydrogen-bomb developer) – and representatives of the Russian aerospace industry and NASA – such as the

² Such visions were employed in films such as *Deep Impact* (1998) and *Armageddon* (1998), popular books such as Chapman and Morrison’s *Cosmic Catastrophes*, 1998, and science fiction novels such as Arthur C. Clarke’s *Hammer of God* (1993) and others (ahead).

³ Amongst these stand the examples of the strong meteor showers over the same Chelyabinsk region in 1949 and the 1994 observations of an object comparable to one of Shoemaker-Levy 9’s fragment fireballs – the asteroid 1994 XMI – over the Pacific. Another, widely mentioned, is the famed Tunguska event, whose source of explanation is believed (after seven years of investigations) to have been a meteor or comet that exploded in the atmosphere and caused what is known as an air burst, about 8 kilometres above the remote and forested regions of Siberia in Russia around 1908.

astronomer David Morrison – have been lobbying for an orbital anti-asteroid/comet defence program for future generations to deal with NEO and the Earth’s outer limits. In addition, a number of organisations have been raising space-guarding funds and holding discussions to help build and launch a meteorite-impact avoidance and meteorite-hunting platform. Asteroid impactors and gravity tractors⁴ have been conceived and, even though their use has proven to be too complex and/or to incur too great a financial cost to be effective, the joint NASA-European Space Agency Asteroid Impact and Deflection Assessment (AIDA) is working to have them tested by 2020. Just recently, Charles Bolden, the current NASA chief, has warned that, for the moment, the US Space Agency’s best advice on how to handle a large meteorite heading towards us is to ‘pray’⁵ (Williams, 2013). But the prospect of crafting more agile global networks for observance, communication and threat-response motivates the world’s governments, as well as interests in the topic, to bestow upon ourselves the task of stewarding the planet.

Cosmic hazards and orbits of NEO Objects border on unpredictability. Their courses are part of the normal chaos of cosmic existence and partly a matter of vulnerable bodies caught up in random events, i.e. events whose ultimate origin evolves so chaotically that, NASA’s NEO Program Office states, ‘the intersection of their uncertainty region with the Earth creates the so-called ‘risk corridor’ across the surface of the Earth. The corridor wraps more than half way around the globe’ (NEO Program, 2015). Until now, the only strategy being devised for contending with the threat they pose has been one that minimises their significance with statistical statements anticipating the probability of a future impact (National Research Council, 2010). At the minimum, and in general, the further out (in both time and space) we can predict a collision, the more time we have to prepare and/or evacuate targeted areas. The odds of a major meteor impact are very small, but a collision with Earth in densely inhabited places would be a catastrophe.

World-in-Reserve

A powerful example of such a threat has occurred in the early morning of February 15, 2013, when a rogue meteorite – estimated at about 10 tons to be the largest ever recorded by the Comprehensive Nuclear Test Ban Treaty Organization's International Monitoring –

⁴ A gravity tractor is a NEO-chasing spacecraft that uses its gravitational pull to accelerate an asteroid towards it.

⁵ Curiously, a future-oriented attitude whose role, according to Minkowski’s *Lived Time* (1970), is to arrest time and either bring death closer or establish it as a constant; in fact just the type of worship performed by the reserve itself.

entered the Earth's atmosphere, streaked across the sky to explode 20 km above the Southern Ural Mountains – releasing 500 kilotons of energy - and fell to Earth over Chelyabinsk city, the administrative centre of the thinly populated area of the Chelyabinsk region in Central Russia. Its blast shattered windows, shook the ground, made loose objects fly through the air and injured thousands of people, alerting the world to the real possibility, at any time, of another similar event. The event renewed attention to the probable frequency of this type of impact event, and justified pursuing planetary defence strategies, and/or more concretely, investment in the development of ways of diverting and preventing NEO from falling to Earth.

The efforts to discover and study NEO, and attempts to deal with the threat they pose are aimed at finding more effective ways of dealing with the possibility of an impact through methods of shielding the Earth from NEO with an infrastructure to control cosmic time and space: in essence, an infrastructure that entails the world itself is to be constructed as a reserve. The event of February 15, 2013, 'sharpened public awareness of the dangers of NEO and led to an avalanche of press interest in the work of NEO shield' (European Commission, 2013), intended to shield the Earth.

Officials from Russia's Nuclear Agency and the Ministry of Civil Defence, Emergencies and Disaster Relief told a special conference at the Russian Federation Council (the Russian upper house), that Russia is embarking on a programme to combat threats from space with various possible measures, ranging from planting beacon transmitters on asteroids, to megaton-sized nuclear strikes, to reconnaissance satellites orbiting in a dense formation around our planet as earlier as 2018-2020. In addition, they are calling for a world-united meteor defence. Both the media and the pan-European NEOshield consortium have suggested that Russia's Space Agency, *Roscosmos*, is joining NASA's ambitious mission, as well as the European Space Agency⁶, in order to study ways to capture and change the orbits of incoming objects and enhance the Earth's current protection and civil defence programmes, through methods that 'impact directly on the target at high speed in its direction, or opposite to its direction, of motion' (National Research Council, 2010:4); that is, with rocket motors or nuclear explosive deflectors reaching beyond the Earth's bounding atmosphere: the aforementioned impactors. By doing

⁶ Even though NASA AIDA page does not mention it.

so, we are, it would seem, in the grip of a renewed desire to *spatially* expand our dominion and sovereignty, in both the geographic and cosmic senses of the world.

The methods being pursued look essentially to be an extension of territorial sovereignty and military tactics on a planetary-scale strategic level, aimed at defending and gaining global *Lebensraum* ('space for life'). Here, unlike with interplanetary expansionism, we are not looking to settle in space ourselves; there is no displacement of other beings or ethnic cleansing for gaining racial superiority, as in the old German expansionist national socialism; but to fulfil the necessity of defending our whole physical geography, habitat, as defined by the ethnographer and geographer Friedrich Ratzel in *The Law of the Spatial Growth of States* (1896)⁷. Such expansion entails developing the means of tracing a 'high frontier'⁸, an upper ceiling or sentry line of spacecraft circling the Earth above the Earth's atmosphere to look up at, and fight the (hostile) cosmic universe.

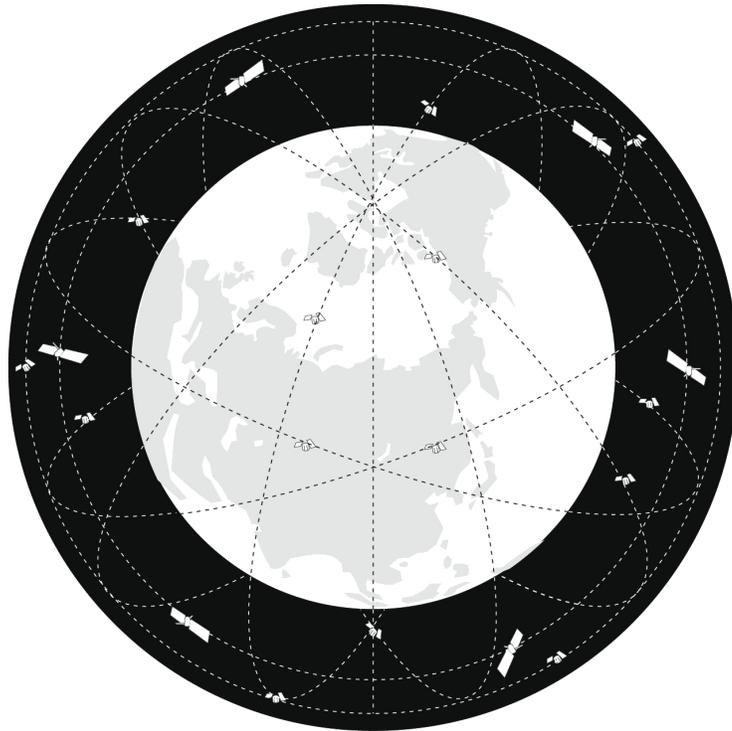


Figure 2 . NEOshield and NASA AIDA diagram

⁷ Ratzel used the concept *Lebensraum* to conceptualise an organic state theory that asserts that states as spatial organisms require room in which to grow. Using biology as a model, it asserts the idea that life is an infinite movement that is hemmed in by boundaries; and life-space a natural and necessary feature of dominant individuals, groups or species – which succeed by incorporating the life-space of others less powerful 'to the extent that the outside barrier does not rest externally but also internally' (Ratzel in Fall, 2005:18).

⁸ Also the title of Gerard K. O'Neill's 1976 well-known and pioneer speculative book about decisions and determinations, *Space development and colonisation represent for our overcrowded, exhausted and ecologically destroyed Earth*.

The ambition of the strategy is to build a sense-extended and defensive satellite-mounted peripheral organ or (en)closure that acts in accordance with, and employs, the concept of a common heritage of mankind as a strategy to maintain planetary integrity against cosmic impacts, by gaining influence above and beyond the Earth's bounding atmosphere and atmospheric limit and extending the 'natural' territory of the Earth. It is based on the idea that a dome-like grid or vast deflector-encasement structure could be self-sustaining, operating as an electronic and computational self-containment strategy, combining ground- and space-based systems, capable of reconnaissance and attack missions managed from command and control centres.

The operational and rational capability of such a planetary defence initiative depends on the refinement of programmed systems, electronics and computing, to be coordinated via incoming and constantly updated information from real-time mitigation technologies and various risk analyses. These are complementary activities with which the NEOshield and, now AIDA programmes need to engage in order to succeed (in material terms) so as to expand humanity's sphere of influence and military capacity to outer space, and thus preserve a particular construction of what life on Earth is supposed to be, instead of succumbing to the path and power of cosmic hazards. Motivated by, and operating within the 'natural state' tradition that counts human beings as one of the *greatest* interfering forces, the shared aim of these Russian officials, of the NEOshield consortium' and the AIDA partners' programme is to (p)reserve the world from multifarious and contingent processes so as to exclude (or indeed, prevent) disastrous meteorite impacts and the risk of their impact to Earth. It is, in a way, an initiative aimed at *perfecting* the architecture of Earth and its atmospheric insulation, with the help of machines. This includes, in architectural terms, the conception and construction of a 'sacred' precinct [*temenos*]: an autonomous world, set apart and held, in forced *stasis*, as a giant interior or dwelling place, no longer directly vulnerable to the material reality of outer space. Certainly, the risk of a civilisation-ending meteorite strike is considered sufficiently high for us to need such plans for an ultimate backup arrangement to freeze-frame and 'artificially' protect the whole Earth and all humanity within new technological limits.

The aim and character of this new limits recasts in acute form the kind of homeostasis, automated defence, technological challenge and insurance strategy (to be exercised through a super-weapon in space) addressed in President Ronald Reagan's

Strategic Defense Initiative (SDI or 'Star Wars'), but one that seems to propose that the whole Earth, not only the US, be held as a/in reserve. It recasts a conjectural proposition to defend the Earth from outer space, rather than, as previously, from within itself – and any human foe.

Past Futures Present

The construction of meteorites as a threat is compelling experts of the NEOshield and AIDA programmes to speak of humanity as endangered through a narrative imperative of technological salvation founded on a fear of possible impacts. The real possibility of destroying them must allow these programmes to be permitted. Despite these programmes increasing support and popularity, the implication of the use of militaristic means, such as the development of space-based weaponry, is reawakening doubts: doubts that had previously led to the 1967 Outer Space Treaty (and demise of SDI, as ahead). This treaty governs the activities, exploration and use of the territory beyond Earth's atmospheric limit that has been designated *res communis* (property of all); forbids the exercise of sovereign rights; and enforces an exclusionary peaceful legal regime. For this reason, the introduction of activities such as these nationally-sponsored programmes and infrastructures of global shielding, must seek both reconciliation with the treaty's legal foundations and consensus amongst the international political community. In order to eliminate as obstacles certain major global governance implications that the political community finds dangerous, uncomfortable or merely inconvenient, such as the detonation of nuclear weapons in space, these programmes are embedded in a moral framework legitimatising war in space, or at least making it more acceptable (see Mellon, 2007), and evoke the same technological ends and set of assumptions – about the role of technology and our place in space – as those promoting and underpinning SDI.

In 1983, President Reagan introduced the SDI as a new strategy to improve the United States' military stature and war-fighting capability. He proposed the creation of a layered defence system, composed of many space-based and computer-guided projectile, laser and subatomic particle beams, and high-powered microwaves fired by electromagnetic rail guns to replace an offensive posture. The strategy's aim, in proceeding with this new Manhattan Project, was to safely encompass the unpredictability and uncertainty of the threat of a nuclear strike – issuing primarily from the possibility of high-speed Soviet bombers penetrating American airspace, armed with nuclear weapons

and ballistic missiles – via multiple reserve schemes and scenarios, and technologies of permanent war.

Of a scope and scale matched only, at that time, by the Semi-Automated Ground Environment (SAGE) Air Defence system (1951), Reagan's SDI project would construct a countermeasure similar to that perceived as necessary to combat the threat of NEO as a solution to the stalemate of the Cold War, and 'preserve the free way of life in a sometimes dangerous world' (Reagan, 1983), albeit only nationwide. The similarity issues from the fact that, despite the differences between these threats, they posed equivalent technological challenges, requiring the logistical development of the capacity for readiness to spot and fire, with little warning, at closely-related sizes of surprise moving targets.

Like the chaotic nature of meteorite strikes against Earth, the potential for a nuclear strike at that time represented a totalising and fatal impact event, whose pace and power necessitated defence, defied (close) observation, and limited its accurate prediction. In a sense, it thus bordered on unpredictability and therefore presented a menace that forced the US administration to deploy plans and establish technological superiority over the Soviets. The accomplishment of such superiority involved the need to place defensive devices (or weapons that destroy other weapons) in orbit. To maintain the enemy in (its) space, has been the precondition for both the Soviet and American expansion to, and appropriation of the extra-atmospheric limit⁹; a cause for concern and force of creative energy for instances of military progress, imaginative apocalyptic, negative science or disaster fiction narratives as well as a significant number of political decisions, and attempts to rethink the Earth and human history within the context of impacts as threat.

Impact events, both those occurring naturally and those that might be, or have been, brought about by hostility, are conceptualised in terms of mastery, and act as eruptors of historicity; indeed, they are *of* history. In his essay *Cosmic Dancers in History's Stage? The Permanent Revolution in Earth History* (1996), the social historian Mike Davis makes the point that life on Earth is the result of all the impact events that created the universe and reorganised the global biosphere¹⁰, and that this knowledge has opened the door to a new

⁹ Take example the successful launch of the unmanned satellite Sputnik I by the Soviet Union, which led directly to the creation of the National Aeronautics and Space Administration (NASA) and the so-called (US-USSR) space race, showcasing national superiority.

¹⁰ His arguments are based on climatologists and paleontologies' speculations of the blast energy generated by meteorites, whose intensity (of thermal energy) immolated forests, infecting gigantic dust clouds into the atmosphere and served as exchange and transfer

vision (and knowledge) of the Earth, and perhaps of human history, ‘that recognizes the continuum between terrestrial and extraterrestrial dynamics’ (Davis, 1996:50). Each impact event, Davis writes, has designated a unique historical conjuncture, the knowledge of which has been an essential precondition for establishing a view of the history of terrestrial evolution as open to both limited and infinite possibilities ‘integrated into the solar system’s complex and unpredictable ecology of impacts and chemical exchanges’ (ibid:50). The very idea of an impact event has come to be identified with contingent events ‘and with time lines that had both beginnings and endings’ (Mellon, 2007:6).

Earth Orbit

Since the 1980s, scientists have been, repeatedly, warning of the threat of the uncontrollability of extra-terrestrial agents, comets and asteroids, and of the possible global destruction their impact with Earth could cause. With links to human histories and the histories of the processes put into play by humans, impact events of the kind have since then become a source of a specific (cosmic) anxiety that builds upon and displaces the anxiety of hazards determined by the social milieu to secure the task of stewardship and sovereignty of the globe. Some of the assumptions underlying the models developed to study the consequences of an impact event that have been used both as tools to promote particular stands within the anti-meteorite defence program, have also been used in the development of nuclear policy – in particular for the study of, and advocacy against the long-term effects of the use of nuclear weapons, such as severe atmospheric and climatic consequences, as portrayed in the hypothetical Nuclear Winter (NW) global climatic effect scenario defended by civilian scientists. In addition, research into the meteorite impact threat ‘drew on studies of bomb cratering to invoke the models and metaphors of total-war fighting’ (Mellon, 2007:7) and defence-shield-as-salvation as military defence scientists and, in particular, the SDI programme developers.

In *The Invention of Modern Science* (2000), an analysis of the nature of scientific knowledge, Isabelle Stengers writes: ‘those united around the theme of a NW were not first of all moral or responsible citizens, but scientists aroused by an event that was ‘produced’ by the encounter between a new possibility of science and the discovery of the unforeseen

vehicle for spreading biological material across the solar system to eventually start life on the planet, or so the panspermia hypothesis articulates.

threat contained in a possibility of history' (2000:144.4); more precisely, particular facts, events and experiments have legitimised knowledge and power politics. Since the 1950s and 1960s, nuclear ballistic and intercontinental missiles have been in service on a large scale. Together with the nuclear test explosions that preceded them, their arrival unleashed a wave of quietism and fear (Turner, 2006). Debate, scientific relations, popular and conceptual comparisons focused on different actual and potential effects of nuclear weapons, to cause awe and terror amongst the public: firstly about a nuclear war's immediate effects (of blast/heat/mass destruction), and then about the prospect of massive (human-caused) damage to the planet. The potential global atmospheric and climatic consequences were investigated by both civilian and defence scientists using models and computer observations previously developed to study the effects of meteorite showers and volcanic eruptions¹¹. They employed knowledge developed in space, on Earth and in atmospheric studies, to develop scenarios from the combined study of 'nuclear weapons, particle microphysics, atmospheric chemistry, fire and smoke research, volcanic eruptions, ozone depletion, planetary and dinosaur extinction studies' (Badash, 2009:45) to predict and simulate an atypical meteorological and climatic condition, as anticipated in an Impact Winter¹².

These potential effects of the dynamics of our nuclear civilisation were thus considered to be very similar to those provoked by the collision of an asteroid/meteorite with Earth, urging the adoption and development of strategies that internalise such events as externalities. These scenarios noted that 'significant hemispherical attenuations of solar radiation flux and subfreezing land temperatures may be caused by fine dust raised in high-yield nuclear surface burst and by smoke from city and forest fires ignited by airburst of all yields. [...] Large horizontal and vertical temperature gradients caused by absorption of sunlight in smoke and dust clouds may greatly accelerate transport of particles and radioactivity from the Northern Hemisphere to the Southern Hemisphere' to 'pose a serious threat to human survivors and to other species' (Turco, Ackerman and Sagan, 1983:1283). They noted that nuclear fallout could, after filling the stratosphere with enough smoke and dust, darken and cool the Earth's surface and heat the atmosphere at high elevations for

11 See Stengers, 2000 and Badash, 2009 but also the short films *On The 8th Day*, 1984 and *Breaking the Spell: US/Soviet Dialogue*, 1985.

12 A hypothetical period of prolonged cold weather due to the impact of a large meteorite on the Earth's surface.

extended periods of time, leading to biological, chemical and environmental changes and, the extinction of life on Earth.

Spurred by Paul Crutzen¹³ and John Birk's idea that nuclear fallout could block out sunlight, and a series of independent revelations concerning the destructive power of nuclear weapons, these scenarios triggered research that allowed the computer modelling of a decade-long NW hypothetical condition (Turco, Ackerman and Sagan, 1983:1990). This (NW) is an extremely complex hypothetical condition scientifically, because of a wide range of possible uncertainty in physical parameters, involving the physical architecture of the whole living Earth and world in it. The new data that this contingent process invents, Stengers remind us, 'also sustains new situations of controversy. Scientists, here, are no longer those who bring stable 'proofs' but uncertainties' (2000:144.4). But, despite being laced with major uncertainties, the receptiveness of a NW scenario burst upon the public's consciousness in the Reagan years, with considerable potential; so much so, that it was used as a political 'vehicle'; as an actual, epistemological as well as an hybrid (as related to its nature-culture composition) reservation, to be used as 'tool' to stress the uncertainties surrounding the threat of massive retaliation. Such predicted planetary catastrophe signalled, for some, that the threat of massive US retaliation may not be a great deterrent to strikes by some of the more unbalanced dictators (given the self-harm such a strike would thus cause), and that as such the only possible protection would be a defensive rather than aggressive act: to knock out the threat prior to impact by building a physical defence against missile attack, able to defeat any surprise ballistic missile. For others, the threat of the NW was used as advocacy for the advancement of technical cooperation between the superpowers in areas dealing with security and diplomatic relations, challenging both the role of the strategic experts and the preferences and supremacy of nuclear military policy.

The premise of the NW was that nuclear strikes and detonations were even more potent than previously feared. It was, effectively, a doomsday reserve scenario, capable not only of inflicting short-range but long-term ecological and environmental consequences, but also of obliterating all life on Earth. Thus, as a hypothetical condition, the NW scenario not only shocked the public with fear but enhanced the power of NW scientists and peace movement activists to influence the political question of nuclear arms-reduction, providing

¹³ also one of the proponents of the Anthropocene as new geological epoch. See chapter 1, of this work.

the Reagan administration with a major argument for taking action to limit the nuclear damage and undercut the NW possibility (Badash, 2009:309). These were important catalysts of the highly-charged debate over the nuclear technology and power industry, that from the 1950s and into the late 1960s, had been characterised by active objections to the nuclear, as the subject of mass popular protests which shared anger over the US war on Vietnam with aversions to the Bomb, its deployment and development, the nuclear race of the Cold War and the effects of fallout and radiation emissions from nuclear plants, as briefly mentioned in Chapter II.

At the basis of these protests there also stood other hypothetical scenarios and mediatic reservation arrangements, such as that of the China Syndrome, a term coined during the 1960s to describe a scenario of nuclear meltdown, an accident in which an overheated nuclear reactor melts through the bottom of a nuclear plant and the Earth's core itself, towards China on the other side of the globe, polluting the ground, the groundwater and releasing enough radioactivity into the atmosphere to render the entire region permanently uninhabitable. This scenario, also the focus of a 1979 American thriller film¹⁴, blighted the receptivity of local populations and popular culture to nuclear power and energy, strategic planning and goals of containment. Substantiated by the NW scenario expected to result from even a limited war, the commendable public desire to render nuclear weapons impotent and obsolete served to support the US administration in a conscious attempt to revise their assumptions, step up their efforts to resolve outstanding issues and engage in an elaborate set of technical and intellectual pursuits that could preclude the possibility of non-accidental alternative scenarios. This has led to a change of focus 'from avenging the dead to saving the living' (Edwards, 1996:292). That is, from Mutually Assured Destruction (MAD, to be described shortly) to *Mutually Assured Survival*¹⁵ (Lowry, 1983; Pournelle and Ing, 1984) with the additional and logical requirements, and focus, of planetary (and environmental) protection.

In this context, just as the environmental movement and a new ecological sensibility were galvanised into action by assumed perceptions of the toxicity and other environmental

14 James Bridge's *China Syndrome* (1979) motion picture addresses the weakness and uncertainties in computer analysis of nuclear power station performance and the requirements, criteria and margins of safety that licensees had to meet.

15 The title of a work that addressed the feasibility of the SDI and more generally the militarisation of near space, endorsed by President Reagan.

hazards produced as by-products of military activities and the production of nuclear weapons, not only their detonation, the scientific community of experts on atmospheric behaviour and world dynamics helped rationalise military efforts to prevent potential severe disasters and address the impacts of technological development on populations and the planetary environment through regaining control over military systems research and heavily investing in the development of alternatives. These efforts were mainly concerned with safeguarding the planet against long-lasting damage, world-scale environmental and Earth-threatening problems, through the institution of real-time control and the inspection of forces, military situations, chemical and nuclear arsenals and their many related reservation arrangements. In the process, our ideas of the future, and even our plans for terraforming¹⁶ (i.e. 'Earth shaping'), were scaled down to take account of this understanding and impose an ethos of vigilance and foresight intended not to eye the other suspiciously, anticipating the instant of an enemy attack, but rather to identify better outcomes and to steer reality towards them, so as to control the enemy's action.

This is basically Paul Edwards' thesis in *The Closed World* (1996), in which book Edwards demonstrates that *Computers and the Politics of Discourse in Cold War America* (being the second part of his title) followed the goal of advancing defence against pervasive military menaces. They supported a war of two-fold benefits: avoidance of devastating impacts and reduction of weapons of mass destruction, revealing a global environment as newly characterised by command, control and surveillance systems that encapsulated the Earth.

This technocultural/natural environment created a new understanding of the Earth and of the global biosphere as an integrated ecological space; in doing so, this environment evolved, both conceptually and practically, into a social setting and basis without which contemporary society could not function. It entailed a proposal of an entirely new prototype of the world (and of war) that continues to inform our vision of, and relation to the future. Henceforth, the future would be locked up in empirical predictions and equations, that basically simplify problems into models (of how *we* see things) in order to anticipate its uncontrollable extent; in sum, so as to mobilise and take charge over the great disturbances

¹⁶ The term 'terraforming' was coined by Jack Williamson in a science-fiction story published in 1942, to denote the idea that worlds or fractions of worlds can be deliberately changed by direct human action so as to make them more habitable, and that 'was further taken to mean the process by which a planet is made Earth-like, and by implication a world capable of supporting human life' (Beech, 2009:9).

and uncertainties of the real world, and the increased complexities perceivable (in the present) by the application of technical human and machinic languages. Edwards defines this as a world discursive and knowledge transformation, via the computer, into a rational closed system and vast reservation arrangement from which there is now no escape.

Enframing the Globe

In *The Closed World* (1996), Edwards sees the development of this vast reservation arrangement and closed system as deeply intertwined with a variety of interactions arising from the geopolitical context of post-World War II computer architecture, which extends the US' foreign policy of 'containment', and desire for a multidimensional form of global reach and influence to the sphere of the Earth itself, via 'the language, technologies and practices that together supported the visions of centrally controlled, automated global power at the heart of American Cold War politics' (Edwards, 1996:7). This architecture, he asserts, materialised in specific technological forms and methods, projecting US power across the globe in global governance campaigns, enabling centralised, real-time surveillance and control, and it has come to revolutionise the way we envision and inhabit the world.

Developed through a process he entitled 'mutual orientation', methods for global information-gathering (integrating global monitoring and predicting systems) aimed at capturing all the major elements of time, evolving world-scale environmental systems (such as the general atmospheric circulation and its impact on weather and climate, alongside global anthropogenic environmental and climate change, whilst also focusing in parallel upon the defence against and tracking of nuclear-armed bombers), the architecture of Edwards' Closed World refers to an ecological and physical unity, created as a product of military needs for making war appear both controllable and rational.

Edwards' Closed World is constituted by a closed socio-technical-environmental system, in which inputs and outputs are precisely defined and developed to improve global networks and centralise military capacity and command-control-communication-intelligence, and by a closed, spherical and 'inflexible' border, defined in terms of a fortress made of an imaginary and mute grid of spatialised data, which is constructed of large interactive systems confined to physical spaces and networks of international computer resources. Arguing that this combined power gained enormous traction to become an actual driver for the perpetuation of extraordinary and interdisciplinary research motivated by the

fear of technological disaster, Edwards attributes a totalitarian principle and ideology as both the closed world's source and consequence. This ideology, he says, has determined the direction in which our technological development and 'knowledge infrastructure' proceeded, across the intricate web-works and installations enframing the globe, leading to an interlocked system of data measurement, sharing, analysing and checking. The synthesis of this totalising logic and approach has come to envelop the world in electronic circuitry and the avalanche of information that structures experiences, ensuring control of the global battlefield as well as political control over the constructed models and simulations that now span the entire world.

Within its internal logic, Edwards maintains, this closed world is a realm of quantification that serves and upholds the illusion of anthropological control. Never deterred by its failures, and receiving continuing investment, this closed world transforms vagueness into precision by asserting the supremacy of the technological support, alliances, ideologies, material realm and boundaries from which it seeks its responses. Driven by the ideologies that founded it, this realm is, for Edwards, responsible for a special kind of dramatic space, in which concepts of global systems, problems and common interests are articulated. That is, it is responsible for the emergence of a bounded psychological and conceptual space that – as Edwards explains it, via Sherman Hawkins's interpretation of the Shakespearean theatre (1968) – has the globe as its stage. This dramatic space, he writes, is:

a radically bounded scene of conflict, an inescapable self-referential space where every thought, word and action is ultimately directed towards a central struggle. It is a world radically divided against itself. Turned inexorably inwards, without frontiers or escape, a closed world threatens to annihilate itself, to implode (Edwards, 1996:12).

It has, in his words, the siege as archetype (ibid:13): 'a close-run thing' (Hirst, 2005:83) that unlike the old medieval siege techniques – or infrastructural method – intends to strip an area bare¹⁷ (Virilio, 1977).

17 As Agamben (drawing on Schmitt) cautions, the space that this state of siege opens up corresponds to the original spatial order of the *nomos*, where every order entails a certain arrangement of space and owes its norm to the exceptional act of land appropriation and division, allowing the biopolitical binary of violent sovereignty and bare life to be foreclosed and the unlocalisable to be localised in a stable extra terrestrial political ground.

With the extension of human technological activity and surveillance technologies into outer space, the entire world is (or is meant to be) transformed into a giant artefact and everything into a mere resource for domineering power (confirming Heidegger, 1977); placed into a grand Panopticon, or space not that topologically distinct from the spaces of containment Foucault and Bentham describe as such. From the great Confinement to the ‘model prison’, the exemplary Panopticon reveals a rigorous partitioning of ‘contaminated’ space alongside the absolute power of total visibility (see also Zamyatin’s and then Orwell’s fiction), whose basic function is that of ‘support’ and ‘discipline’ (Foucault, 1975). Every move (human and non-human) is tracked by a global overseer that aims at improving the exercise of power by means of a permanent, exhaustive, omnipresent surveillance capable of making all visible, as long as itself remains invisible or unverifiable, while producing both power and the knowledge that reinforces it.

For Edwards, this siege owes its beginnings to the SAGE continental air defence system. SAGE was the first North American globally centralised computerised attempt to direct and control the North American Aerospace Defense Command response. It was a real-time radar system, as above, developed to contain world-scale conflict within a large digital computer network that linked vast quantities of data from its associated equipment (such as multiple distant radars) to maintain control around the US by producing a single unified image of the airspace over the US area, and performing the real-time processing necessary to produce targeting information for intercepting aircraft and missiles. Placing high technology in full control, it also helped prevent false alarms and the launch of an attack in a situation in which one was not warranted, and therefore made it easier to respond to, and live with, the chaos of modern warfare and the fear of nuclear weapons.

SAGE was programmed to ‘help create a sense of active defence that assuaged some of the helpless passivity of nuclear fear’ (Edwards, 1996:11), and to support and reserve the capacity for a retaliatory strike (in the event of a Soviet attack). As a system, it aimed to build external sea border surveillance and thereby both to surround and seal the US, and weaken the Soviet Union by American surveillance power. During and after the Cold War, the only possible response to international conflict and the threat of ballistic missiles was to concentrate and rely on, and admit an imperative need for such absolute weapons, in order to enhance a credible deterrent strategy of *Mutual Assured Destruction* (MAD). The Cold War environment was defined by such overly-powerful systems – the

atomic bomb and the politics of containment, from which the branches of MAD spurred out – that there was no large-scale fighting directly between the two sides. Instead, each armed heavily in preparation for a nuclear war.

In the MAD strategy, as exemplified in Stanley Kubrick's film *Dr. Strangelove* (1964), nuclear forces were designed not as counter-force but solely for a second, retaliatory strike against enemy forces. From its very outset, MAD contends that nations can deter aggression by having the ability to launch a nuclear attack that would lead to the total destruction of the attacker. The strategy followed a rationale in which states reserved the right to have and use an ever-expanding, ever-improving, ruinously expensive arsenal of high technology weaponry, constantly on the move (meaning composed of mobile forces) around large military reservation arrangements, as a legitimate way to assure minimal or 'limited' deterrence to Massive Retaliation; and, hence presenting experientially as a real self-defence for nations against armed attack threatening their vital security interests.

Only as long as the forces of each of the Cold War superpowers could pose a credible nuclear threat to the other, could they guarantee power and security to their respective blocs, and dissuade and deter the adversary's initiative to initiate conflict. MAD included, for that reason, a 'delicate balance of terror' whose model may be understood, in terms of mathematical games theory, as an example of the *Nash equilibrium*, which is a simple non-cooperative game designed for better understanding the fundamental nature of competition, negotiation and war - in order to balance the incentives for other nations to engage in certain kinds of military actions, and in particular not to initiate a nuclear war. The logic behind the MAD doctrine entails international offence-based restraint. In theory, MAD presupposed a game rationality and operated on a symmetrical axis of continual tension between two opposing parties, by means of holding in reserve and secreting more and more ever-improved tools and weapon systems, to maintain the threat of equal or greater retaliation force. The reserve thus played a decisive and critical role in this context.

Defensive Reserves

The reserve was the guarantor of order and the success of the MAD strategy, firstly because MAD is, in itself, a strategy of reserve force and/or capacity. It is a strategy largely dependent on the determination to preserve a state of mutual deterrence through investment in both real and virtual reserves of great potential and destructive force. Because of the

uncertainties inherent in accurately identifying the actuality of the enemy's stockpile of nuclear weapons, each side has contingency plans in the face of an attack, and maintains a 'reserve force' able to guarantee a retaliatory attack or advance strike. Then, the reserve is also involved in the dispersal of facilities for the production and assembly of weapons of mass destruction, as well as for promoting their invisibility and secrecy that includes the protection by concealment of the means of combat and control necessary to guaranteeing that 'reserve force'. These include the duplication of key systems and facilities constructed out of (airborne) sight, either to boost or maintain secrecy, as well as the viewing machines, based on the electronic surveillance system, that employ an architecture of data to construct 'virtual walls' of defence. The conflict was hence contained through the employment of the logic of the reserve both to back up forces and keep alive an epistemic illusion, thus maintaining the fragile techno-utopia of a knowable world.

Supported by the development of SAGE and its necessary command, control, communication and intelligence systems of telematic technologies along with its practices of knowledge, power and representation, the reserve made tangible the dominant strategic limit (located well to the North and off the coasts of the United States) understood to enclose, encircle and conserve the 'free world' against the Soviet order and the 'military-industrial complex', its economic, spatial and determinist structuring. The reserve exemplifies the overarching principles and power of the ruling Cold War imperative to make, adapt and reverse its all-encompassing political decisions within horizons of visibility and expectation, combining the atom and 'information' bombs (see Virilio, 1988) to define the perspectival depth limiting and delimiting the human environment. This perspectival depth defined the closed-world frontier and structure. Its power rested in the permanent presence of radars and satellites over territories, the frame of transmission and reception of real-time information and the analysis of the data transmitted by the all-seeing satellites, mounting a kaleidoscopic image against which works and activity on the ground could only have started to be of (reciprocal) invisibility, concealment and/or apparent inertia (see next chapter). In the process, the computer became the dominant, central and most important technology to host the theatre of war.

Both thought, and thus employed to help achieve full-spectrum awareness, computers were programmed to display and respond correctly to a virtually infinite set of contexts and situations in which possible Soviet (and other nations') weaponry could be

launched, to manipulate the environment, track the enemy, analyse the data (from remote sensors), pilot nuclear ballistic missiles and handle complicated, centralised command-control-communications within seconds. As such, computers were the drivers of an entirely new and autonomous workforce of long-distance display and respond machines, collectors and calculators of information, as well as the very weapons of the Cold War. They were the defining devices and channels of the technological development of a world-encompassing surveillance, communication and control system that has enabled us, since the Vietnam War to have a greater sense of security in relation to major technological, climatic and even geological surprises.

Due to their ability to respond to the speed and complexity of high-technology warfare and to process a multiplicity of uncertain and forever fluctuating information that would completely defy the capacities of unassisted human beings, computers stood at the centre of a fundamental transformation in knowledge systems (its production and transfer) and the technology of Western societies. They provided the possibility for real-world and analogue situations to be (theoretically) reduced to manageable data, and for the fields and programmes of research to be converted from observational and statistical science into orders of simulation, reliant on global data modelling, (re)analysis and (re)creation.

More than any other artifice in history, computers made possible the augmentation of the human being and eye. They provided the opportunity for humanity to transcend its limitations, to ‘emulate’ and ‘mimic’ its own abilities but with the greater speed, consistency and tirelessness of the machine. By the mid-1980s, due to this reason, they were the central features of the military, political and popular cultures and their imaginaries. Elements of the intellectual dialogue related with Norbert Wiener’s vision and achievements within the stream of this development have been absorbed to become part of conventional idioms and practices. At the beginning of the World War II, Wiener focused on the problem of predicting the flight path of an aircraft taking evasive action with a computational device, a piece of ‘black-box’ machinery called an ‘antiaircraft predictor’. This was designed to characterise an enemy’s flight, anticipate his future position and improve the accuracy of ground-based gunners.

Wiener’s ambition to use this technology as an anti-aircraft system was carried over into his 1948 book *Cybernetics or Control and Communication in the Animal and Machine*, which articulated a complex prototype of a human-machine hybrid system – i.e. a single,

closed and circular, causal human-airplane-radar-predictor-artillery (feedback) system or servomechanism. Wiener extended this model to the understanding of biological, and social systems. In this way, the model was expanded to become a science known as cybernetics, applied to nature and the universe. It provided us with a world-picture and reserve scenario within which to understand, according to the basic principles of systems, feedback and information transmission, everything that came to be embodied in computation, including within the space programme and the aforementioned (Chapter II, Section 1) holistic rhetoric that surrounded ecology in the 1960s and 1970s, including Margulis's and Lovelock's Gaia hypothesis, as well as in a vast array of war-related systems.

Wiener's predictor came to be theoretically represented by information, statistics and strategies applied to predictable and explanatory moves and countermoves, understood as forces by which to solve the problems entailing the regulation and accommodation of human beings as part of a larger and dynamic (eco)system: itself reactive and adaptive. In addition, it had a powerful direct influence on the interface studies conducted by the SAGE programme and for the implementation of a *Mutually Assured Survival* defence strategy above the atmosphere. In fact, the most advanced large-scale computer networks constructed, such as those developed by the military's development, would be integrated at the core of the SDI. They would be so integrated in order to explore the widest range of technical possibilities and to push forward a major modernisation program that included new types of sophisticated and farfetched non-nuclear capabilities for flexible response. In short, new types of defensive rather than offensive weapon-systems, both in nomenclature and also in practical terms.

The requirements of the *Mutually Assured Survival* strategy to global warfare included space-based lasers; directed-energy and projectile beams, exo-atmospheric kill vehicles and a range of other projects, including global non-lethal land-, sea-, and space-based installations or weapon systems, capable of complex, far-ranging reconnaissance and attack missions in the air and beyond the lower atmosphere, independent of human control. In other words, *fully* automated launch-on-warning and defensive systems, capable not only of tracking (optically and with radar), but also of targeting, propelling and guiding, intercepting and coordinating a comprehensive and instantaneous attack on incoming nuclear ballistic missiles, thus having the ability to surprise and defeat such threats. For that reason, artificial intelligence, artificial assistants and artificial intelligence systems for

battle management, put cyborg (short for 'cybernetic organism') theory and the (cyber)panoptic gaze into practice, massively intensifying the complexity of information in the closed-world enclosure of digital environments and advanced warfare.

Donna Haraway, a preeminent scholar in the field of science and technology studies, reinforces this point in her work, writing that, 'from one perspective, a cyborg world is about the final imposition of a grid of control on the planet, about the final abstraction embodied in a Star Wars apocalypse waged in the name of defence' (Haraway, 1985:154). For Haraway, this grid, now part of a permanently militarised science, has put in place a kind of new 'black-box' epistemology to police differences and deviations, and a new approach to knowledge that, due to the unknowns and uncertainties inherent in accurately identifying the actuality of an enemy's reserves and threat, is inevitably attached to dangerous methodological and ethical reservations, and this despite the change of nomenclature, and practical change from destructive and offensive to defensive weapons systems. Indeed, Reagan's ideas to tame MAD through an improvement of the basic readiness and staying power of the US forces, so as to be able to meet and therefore deter a crisis (Reagan, 1983) with the SDI, was met with serious suspicion by others as well as Haraway, about its use of a circular causal system, autonomous control mechanisms and information processing automation with built-in-autonomy.

Reserves of Threats

For its supporters, in the 1980s, these improvements and the displacement of humans by hybrid technology would augment US power by reserving more of its retaliatory force for action against pre-emptive strikes, consequently increasing the final ratio of U.S. to Soviet weapons able to reach the other side's territory, whilst also, and above all, compromising the Soviet Union's economic health via the financial strain of keeping pace with America's military capacity. The response times and sensory apparatuses of unaided humans were considered inadequate to the demands of space and nuclear missile combat. Thereby, the fusing of the organic and the technological in eerie military cyborgs would improve American militarism and supremacism and the chances of an American victory beyond any associated risk of undermining the MAD doctrine and the 1972 Anti-Ballistic Missile (ABM) Treaty. However, the attempts to encourage and launch the SDI failed to garner much support.

Several different experts recognised that neither in theory nor in practice, were the high-tech closed-world infrastructures and their means of action immune to catastrophic malfunction or breakdown. They were of the opinion that, as a strategic factor, both would have to work with 100 per cent reliability to be ‘invulnerable’ and credible. In addition, and despite the extent of, and investment in such research, they were deemed overambitious. Due to the physical and autonomous realities of the threats and weaponry developed to fight them, they were considered infeasible options for mounting an effective defence. The powerful chemicals, free electron lasers and charged-particle beams planned to support the Initiative and destroy the nuclear warheads, it was speculated, would create more problems than those they were designed to solve. Such weaponry was thought to contain enough concentrated energy to ignite combustible material on the ground and, further, cause not only short-range but long term physical damage to the environment, whilst also risking the possibility of initiating NW by non-nuclear means (see Badash, 2009:245), by creating an environment so alive in other energies and frequencies that nothing could be seen by SDI sensors and seekers. Over time, the project has become more elaborate, but it remains the case that despite and in fact *through* helping humanity overcome its disabilities, the prosthetic automatic response device that eliminates humans from the system in order to fire *on alarm*, would thus eliminate humans from command and ‘delegate the declaration of war to a machine’ (Virilio in Armitage, 2001:75).

Critics of the types of (automated) technological achievements proposed by the SDI were worried that, as a technology, it not only supplemented but also supplanted human agency in terms of planning, decision-making and execution. The automation of warfare and the displacement of humans by weapons that can ‘think’ for us, and that are ‘disturbingly lively’ (Haraway, 1985:152), created the spectre of ‘potent fusions and dangerous possibilities’ (ibid:154), such as the accidental firing of weapons at inappropriate targets and the revelation of a battlefield that does not have a role for humans. Or, in Wiener (1950)’s words¹⁸, ‘a moral discomfort with the power of cybernetics in the (Manichean) field of science-assisted warfare’. Because of this, Reagan’s SDI threatened fundamental boundaries and the dualisms integral to the Western worldview. Arguments

¹⁸ Particularly after the detonations of Hiroshima and Nagasaki, when his work began to express worries about decision-making machines and war-game machines that gather information about the world in order to learn, reprogramme and carry out decisions themselves. See Norbert Wiener’s *The Human Use of Human Beings: Cybernetics and Society* (1950).

propounded claimed that the automated and telematic technologies involved allowed neither any tactical distance between, nor choice of response to, our means of action and our political goals or decisions. Indeed, it reduced the soldier and humans in general to a minor part of a large servomechanism.

Amongst the most prolific of the critics doubtful of a war in which human power is replaced by technology (and techniques of power as defined in the work of Foucault), stands Paul Virilio. For him, such a war is the demiurge of technological growth, and an ultimate threat to humanity. It imposes on humanity a new spatio-temporal dimension and idealised sphere of virtual reality in which a visual and abstract worldwide panoptic transparency is substituted for the actual reality. Such actions, he says, encase and alienate all participants in a relentless acceleration and compression of the time involved in the transference of information, images, objects and people, that cancels any geopolitical perspective and geography itself to impose a chrono-politics – i.e. a politics of (real) time. This is a vertical and ‘thickened’ political geography, consolidating territories into logistical fields to enable a governance based on technologies capable of monitoring the enemy, but also of closing off humanity’s living space. By abolishing uncertainty, or Clausewitz’s famous ‘fog of war’, and the real-time encumbrances of friction in order to augment perception, technologies of virtual governance blind us to the consequences of our acts. Furthermore, the speed of dissemination of information deprives us of direct experience and contact with the enemy and the combatants, whilst asserting that whoever commands the means of instant information and communication becomes the dominant force.

Virilio’s work is focused squarely on the fusion of the techno-military imaginary with the practical operations of modes of governance, decision-making and social control. He is interested in autonomous governing forces over modes of production, such as the tripartite *logistics of perception*: military, telematic and techno-scientific, leading to a revolution in military and global affairs. This revolution has sought to replace the realm of probabilities with near-certainty, through surveillance devices continually tracking the enemy forces and almost instantaneously able to target them through the use of computer-assisted intelligence evaluation and automated fire. For Virilio, such victory depends upon, and is now virtually guaranteed, by the technical sight line. The more we become aware of this fact, however, the more that works of disguise and disappearance – and of other kinds

of reserve – are implicated and made imperative.

In the same way that the new automatic weaponry is augmenting and/or replacing human power, an automation of perception is winning over active and individual perception, interpretation and reaction, as another revolution in vision succeeds. Vision becomes no longer the possibility of seeing but the impossibility of not seeing, and is fought by remaining undetectable by the military and within the militarised landscape of the closed system of ideological conflict, both voluntarily and involuntarily. In order to police and/or order the new war machine, an electronic system encloses the Earth, influencing an increase in the number of enclosed spaces being built to secure the inter- and intra-spaces of states, or the alliances of states, even while it produces an intense blindness.

Virilio emphasises that this closed system widens the scope of Benjamin's *state of emergency* beyond a concept of history to a permanent and ultimate threat to humanity. It has come to totalise a *soft-siege* as a guarantor of security. As such, in agreement with Paul Edwards' thinking of the closed world, this condition has come to combine 'a double movement of implosion and explosion [...] a double disappearance: the disappearance of matter in nuclear disintegration and the disappearance of places in vehicular extermination' (Virilio, 1977:134) – a condition imposed by the technologies of information and communication (viewed and manipulated instantaneously on screen) and the shorter response times of reactions to threats detected by them. This is, for Virilio, a condition that increases rather than diminishes the terror. 'Unlike weapons which have to be publicised if they are to have a real deterrent effect', the deterrent of these all-embracing and siege technologies 'can only function if its existence is clouded with uncertainty' (ibid:4); a bizarre purposeful and total uncertainty whose unknown function crowds our awareness about reality and the very plausibility and presence of the means implemented. It is from this perspective that Paul Virilio writes in *War and Cinema* (1984) that, 'the core of the Strategic Defense Initiative is not so much, as Reagan claims, the deployment of new weapons in space as the indeterminacy or unfamiliarity of a weapons system whose credibility is no more assured than its visibility' (ibid:4).

Virilio sites and frames the SDI's developments to emphasise the inversion of the traditional opposition between the (offensive) *deterrence* principle and the (defensive) *self-defence* countermeasure through the parading of both speed and the logistics of perception – primarily cyber technology. The principal reason is that such technology has endlessly

expanded the precautionary principle to pre-emptive risk management interventions of anticipatory *self-defence*, configuring our perceptions, automatising our human associations and interfering with certain ways of knowing. This is sacrificed by growing amounts of intelligent images (see Farocki, 2001-3) and of information distributed at increasing speed, and at the risk of culminating in a bleak vision of what Virilio calls *integral accident*: an all-encompassing general catastrophe which awaits us all, as users of the information technologies and networks. In itself, this is an intrinsic element and form of warfare. That is to say, these are part of an ‘info war’ fought in the realm of knowledge and therefore of critical influence (Virilio and Lotringer, 1983:154):

After the first bomb, the *atom bomb*, which was capable of using the energy of radioactivity to smash matter, the spectre of a second bomb is looming at the end of this millennium. This is the *information bomb*, capable of using the interactivity of information to wreck the peace between nations (Virilio, 2000:108).

Following the expansion of the ‘field of battle’, which is now also the field of perception, into global realms (resulting from developments in mass transit and communications media), every war, according to Paul Virilio, becomes implicated in the ‘rotundity’ of the earth (the geosphere) and the infosphere (the sphere of information) which is imposed on the geosphere, to the point of the real world no longer being immediately apprehensible but standing inaccessible behind a newly composed, and reduced, electromagnetic world that privileges instantaneousness, simultaneity, and of course, ubiquity. The world’s reality, writes Virilio, is at once consumed and construed *ad infinitum* by the technological force – around the outputs of integrated systems – perpetuating endless experiences of the end and reducing the world to a small, confined environment rendered subject to social engineering. This is a multimedia realm in which the aid of tele-technologies and the power of the designers and transmitters of information to manipulate the real determines the conditions of meaning of any event in *a priori* and cybernetic terms.

Within this nexus, the closed world appears as a reserve of reserves, and of techno-epistemological images capable of moving the war machine to shape society’s imagination and fulfil its hopes of redemption, through vision and the recognition of risks. Virilio maintains the teleological view of modernity as characterised by the continuous perfection of structures towards particular ends and subordinated to an optimistic ideology of technological progress thought to reinvigorate our capacity to stave off the end of the world

with the forces likely to help create it. The closed circuit character of the closed world, for Virilio, increases the scale or number of threats and puts our lives at risk.

In many ways this closed world is a *reserve* of imminent, irreducible risks (and acts of violence) that logistics hopes to contain and mediate for us. Sponsored by security interests, this is a reserve set to control both military and civil targets through the performances of machines. Along with the threat and effect of their efficient use, these machines become a feared and fearsome reserve of threat. In this way, ‘everything suddenly happens as if each protagonists’ own arsenal become his (internal) enemy’ (Virilio, 1977:160). Reagan’s SDI is the perfect exemplification of this phenomenon. It has behind it a thoroughly concrete programme, one ‘in which the doctrine and delirium of production have gradually replaced the doctrine of battlefield use, and the element of surprise’ (Virilio, 1984:7) by appropriating the ‘immateriality’ of perceptual fields in order to dominate the knowable, create a climate of terror, and nullify and replace the long-standing doctrine of *Mutually Assured Destruction* with *Mutually Assured Survival*, reposing the threat in terms of the sophistication of means of combat and in the automation of the logistical manoeuvres.

Given the paranoia of the era, the idea of a purely defensive system able to neutralise the Soviet Union’s greatest threat had popular support in the US. This support enhanced the SDI’s potential to combat its critics through serving profoundly serious purposes such as ‘disorganizing opposition to nuclear weapons, promoting military-oriented programs and industrial policy’ (Edwards, 1996:303). In addition, it ‘has altered the entire arms control debate’ (Lowry, 1983:46). Ultimately, however, Reagan’s SDI was revealed to be an ideologically counter-productive and cybernetically (disin)corporated strategy, wherein humans were forced to keep within, and react to ever more reserve realities beyond MAD. As a strategy it revealed a deadly irony embedded in the potential of a network-centric warfare and world. Later reflections on Reagan’s SDI have regarded it as not only capable of escalating tensions, and of reinforcing fatal errors or tendencies to failure that could occur within its high-tech closed-world infrastructure and logistical development, but also of inciting more negative reserves. The basic conviction arrived at was that the growing threats of the SDI initiative, and the inclusion of automated battlefields and cyberwar machines, signalled a growing threat and were to be avoided.

As infrastructure, part of the SDI succeeded during the process of its being tested out; the technological insights part of its research and development have now been transferred to other¹⁹ antiballistic missile and planetary engineering systems, and even meteorological mastery programmes – conceptually linked elements and outcomes of the Cold War conflict (see Edwards, 2010); but as strategy, the SDI was not given the chance of becoming *fully* operational. Instead, it was dismissed and resisted by many, for reasons ranging from the reliability problems referred to previously, its conflict with other programmes, such as the ABM and the Outer Space treaties, through to a conjunction of budget constraints and its (high) expense. These conflicts and criticisms emphasised the problematics of the SDI’s direction and character as presenting serious disadvantages for the security of space-power itself and of humanity as a whole.

De Facto and Fictional Threats

The technological announcements and implications of the SDI affected social consciousness, not only through an instantaneous and ubiquitous media discourse that obliterated the line between the real and the construed, but through the influence of, at that time, very popular science fictions. Running parallel to the intensification of nuclear armament and the space race, these fictions manipulated perceptions to a great impact: in particular those regarding our relationship with materials and material threats, challenging certainties; the technological replacement of the human body and sensorium by machines that ‘think’; the politics of disinformation, or deception, intrinsic to the Cold War, exhorting psychological reactions of great importance; and also the power (and effectiveness) of human intervention in space. Science fiction had become a way of not just talking about or visualising, but also capturing attention and curiosity about experiments in science and technology. Indeed, such fictions contributed key terms and interesting paradigms to the ‘real’ world, such as that surrounding the figure of the cyborg, in which fiction and reality merge. In this regard, science fiction not only makes it possible to convey difficult and obscure issues to the public, as an important means of transmission, but also serves as a model and vehicle for instantiating (foreseeable) futures and oppositional (moral) positions. The medium may be thought of as having offered a means

¹⁹ These include the Strategic Air Command Control System, and the many computer systems built for the North Atlantic Air Defense Command), NATO Air Defense Ground Environment and the World Wide Military Command and Control System.

to project the world or the Earth as a reserve of fantasy and fiction, as resources within which the future would be articulated.

As a literary genre, science fiction questions knowledge; describes and fosters discussions, risk analysis and the systematic projection of utopias, and serves as a means for elaborating their demands or social interest. According to Stanislaw Lem, for example, ‘one of the cardinal signs of science fiction consists in the multiplication of *additional entities*, that is hypotheses without which science can manage very well’ (Lem, 1964-74:55). It has long been an innately hypothetical medium for the exploration of (other, evolutionary or shifting) figures and/or formations that are deserving of attention, but one which can also offer us a palpable alternative reality. As he explains in *On the Structural Analysis of Science Fiction* (1973), for Lem, it involves the art of putting hypothetical premises, images or *additional entities* into the very complicated stream of socio-psychological occurrences; that is, how these point out meaningful and indeed rational problems and that should in principle, as science-based knowledge, be interpreted empirically to describe that which lies in, or enslaves them. Additional entities serve the relationship between aesthetic intensity and scientific objectivity and are aimed at making explicit the central assumptions and structured contradictions of scientific and technological exploration. That is, to emphasise or reveal their basic ideas or to propose a discourse around the paths, solutions and outcomes such technologies may manifest, in order to make visible their potential, influence their further development, or prevent their coming into being, by warning the scientific community of ignored causes of facts, or forcing it to think of precautionary measures.

As a whole, science fiction has exerted (and still exerts) a decisive influence on our views of reality and our approaches to ideological ambiguities, not only those of utopian or dystopian worlds (Edwards, 1996; Jameson, 2005). In fact, some of the descriptions of President Reagan’s SDI seem apt to render this visible. According to Paul Edwards, SDI followed the idea that:

just as facts – about military computing, artificial intelligence, nuclear weapons and powerful machines – give credibility to fiction, so do fictions – visions of centralised remote control, automated war, global oversight and thinking machines – give credibility and coherence to the disparate elements that compromise the closed-world discourses (Edwards, 1996:26-27).

It drew attention to the historical situation, concerns and aspirations of that time but as well to its fictionalisation, both distilling and simplifying popular anxieties and imagination.

The overt strategy (of SDI) was born out of an American popular culture dominated, since the 1950s, by escapist fantasies of metaphysical disquiet (see Philip K. Dick), global conflicts and space adventure science-fiction films²⁰ like *Star Wars* (Lucas, 1977, 1980, 1983), which film title was used referred to and derided SDI in the mainstream media. *Star Wars* is the science-fiction film trilogy that ‘graphically represented a whole set of facts about the ongoing militarization of space’ (Edwards, 1996:303), the power of tractor beams and also introduced the *Death Star*²¹, the (fictional) planet-sized space station and super weapon, and the ultimate closed-world image.

Star Wars, the film, laid the psychological groundwork for President Reagan’s SDI, reflected it in the popular imagination and stimulated it as a strategy. Overall, it is reported, not only did science fiction aspire to a policy role but it has, indeed, partly shaped policy, according to David Seed in *Future Wars: The Anticipations and the Fears* (2012).

As Seed writes:

Reagan’s announcement was partly shaped by the *Citizen’s Advisory Council on National Space Policy*, founded in 1981 on the initiative of the SF author Jerry Pournelle, which was later described by Larry Niven, another co-founder and author of SF²², as having the purpose of attempting to write a space program for the Reagan Government (Seed, 2012:182).

The national space policy developed a rational plan to put the United States in a position to take full advantage of the resources of space. They favoured space defence strategies and the technologisation of space (see Butrica, 2003) with a view of technology as force for good (Mellon, 2007:18).

The Council, which included science fiction writers with connections to the military

20 Like Robert Wise’s *The Day the Earth Stood Still* (1951), Spielberg’s *Close Encounters of the Third Kind* (1977) and narratives well established in fiction - from novels like the anonymous *Man Abroad* (1887) and H. G. Wells’ novel 1868’s *The War of the Worlds* for example.

21 Best described in *On an Ungrounded Earth, Towards a New Geophilosophy* (2013) by Ben Woodward, who writes that: ‘the Death Star, through impossible energy expenditure, smooths out space since it is a war machine that replaces what it destroys, a sphere of complete militarisation, though its weaknesses are quickly exploited and the machine is destroyed’ (2013:39).

22 Interested in impact threats, as in *Lucifer’s Hammer* (1977), his novel with Pournelle emphasises.

or science, urged the United States to adopt a firm and strong space policy. They recognised that, as a result of increased international tensions, the United States would have to move to tap the resources available in space, by utilising existing talents. For them, space was vital to national interests. In addition to the Earth-to-orbit systems, Council members were enthusiasts of the potential of high-energy laser technology to redress the whole strategic balance, and eliminate the state of permanent fear ‘beyond out-gunning the adversary’ (Hey, 2006:73). Larry Niven’s *Ringworld* (1970), a novel that follows a team of deep-space explorers in their encounters with alien (laser and material) technology is often mentioned as being an overt influence on both President Reagan’s SDI and Edward Teller’s laser technology, which would be incorporated in SDI itself.

In the novel, Larry Niven’s fictitious space farers discover the ruins of an advanced (2850 A.D.) form of space-based solar power and hypothetical megastructure: a huge ringed sun-like star built by design beyond the reaches of Known Space, his fictional universe. Meant to encompass a star and capture most of its energy, this ring – ‘a solid band of considerable tensile strength’ (Niven, 1970:78) – rotates at a speed of 770 miles per second to provide artificial gravity through the action of centrifugal force. It was built by the Pak species in their search to be totally separate from the *Ringworld’s* outer environment and to achieve perfect safety. Even though it failed, the ring was thought to control ‘all’ possible dangers comprehended by the Paks, including a variety of threats such as aliens, radiation and meteors. In the novel, the hypothetical megastructure fires on any object whose projected path would cross its surface. It is an automated meteoroid defence system of the kind that Russian Officials, the NEOshield and AIDA partners are currently planning, and gathering consensus for in the wake of the Chelyabinsk strike, as a method of defending the Earth from the threat of meteorites.

In conceiving of the *Ringworld*, Larry Niven drew on current scientific research, in particular the idea of the Dyson sphere, a hypothetical object that had made frequent appearances in science fiction and which, as a technology, was conceived of in the 1960s to be a logical solution to secure the long-term survival and escalating energy needs of civilisation. Niven used the concept to map homeostatic mechanisms on a planetary scale, developing a hypothetical megastructure of his own, with a similarly impressive projection to that of President Reagan’s SDI, one that presents us with a possibility that embraces human imagination, technology and concerns about modernisation that, half a century later,

amidst vocal concerns of the destructive potential of (ecological and cosmic) impact events, resurfaces in our headlines. Indeed, we are now pouring vast resources into developing a similar defensive system to give us the necessary capabilities to cope with the totality of the Earth and the universe. That is, to tackle – and increase the detection rate of – cosmic and totally unpredictable threats, defend the entire planet Earth’s coexistence within the atmosphere and, as such, to further the old notion of ‘man conquering nature’ with actual and science-fictional speculations as means of salvation. The NEOshield’s and AIDA’s ability to favour an Earth separated from the solar system lends itself to an image of fiction, reframing and expanding the usefulness of SDI technologies.

Some may bemoan the uncertainties that surround the NEOshield and AIDA as strategies and the challenges both programmes represent, recalling Reagan’s SDI and/or the tenets of scepticism, or reflect on that narrative trope of science fiction²³ which concerns a human condition that exceeds our control, subsumed into a singularly, potentially destructive cosmic hazard. Others might instead expect those who have agency to be able to counteract undesirable effects by the use of technologies, which can repair any damage, maintaining and adjusting boundary conditions over time. Yet, as strategies, the NEOshield and AIDA are science fictional possibilities open to an infinity of disparate actualisations, and problematic because both programmes aspire to predict the future.

For these reasons, there is a sense in which the emergent requirement of, and payment of renewed attention to ways of diverting and preventing NEO, with a planetary shield, as detailed above, seeks to place the entire earth into a reserve to protect the feeling of – and call attention to – a ‘vulnerable humanity’. This connection is well-established upon the Russian territory where the meteorite fell in 2013. Fuelled by an expanding archive of histories and images, and visible ambiguities, the territory of Chelyabinsk can be taken as exemplar of a mechanistically-contained domain and ‘armature, albeit on a different scale and in Soviet terrain. The territory has participated in the crystallisation of Cold War imperatives and helped that of the technical (and conceptual) production of a

23 Several examples of this kind of plot exist in novels taking on the stir caused by Halley’s comet (the first extraterrestrial body to be observed in detail) in the eighteenth century and on the Tunguska event. These include Oliver Wendell Holmes’s *The Comet* (1832), Edgar Allan Poe’s *The Conversation of Eiros and Charmion* (1839), H. G. Wells’ *In the Days of the Comet* (1906), H. P. Lovecraft’s *The Colour Out of Space* (1927), the already mentioned Larry Niven and Jerry Pournelle’s *Lucifer’s Hammer* (1977) and apocalyptic drama films as mentioned.

nature reserve, regulated by conservation science and policy. However, it also contributes to the challenge we now face – if that is to establish and institutionalise means to resolve pending issues by reducing the probability of their impact, and perhaps to renounce militarism – by reason of presenting a reality (and history) which lays a heavy emphasis on contradiction, and which is giving rise to more problems than it can ever hope to solve.

2 BUILDING SUBTRACTION

The territory around Chelyabinsk city, where the rogue meteorite fell to Earth on February 15 2013, is remote and almost uninhabitable; removed from agriculture and industrial production, and separated, in terms of human relations, both with the past and the rest of the region, by a deepening crisis, one that exposes a dramatic case of (Soviet) nuclear and environmental mismanagement. The region coincides with the continental divide between Asia and Europe, and has been Russia's so-called industrial heartland since the seventeenth century. It hosted Russia's first metallurgic industries and, from 1948 on, the major tank factories, nuclear and chemical industry facilities in the country. These included a base for the storage and destruction of chemical weapons, a reprocessing facility for spent nuclear fuel and an atomic waste storage and treatment centre. Formerly known as Chelyabinsk-40 and later as Chelyabinsk-65, the town of Ozyorsk, codenamed City 40 (circa 90kms away from Chelyabinsk city), and these facilities were all part of the Mayak Chemical Combine, the first and secret site of the Soviet Union's nuclear weapons-grade plutonium production and isotope separation factory; also the Soviet equivalent (in both type and fate) to the Hanford Nuclear Reservation²⁴ near Richland, Washington, USA.

Maintained in a state of secrecy by the KGB²⁵ and Stalin's legacy of state security²⁶, the territory had been closed and under restricted access for forty years. No foreigners

24 The Hanford Nuclear Reservation was established in 1943, during World War II, for the first full-scale plutonium production in the world and was the site of a near-disaster, involving its underground waste tanks and the levels of contamination that reached the Columbia river, which served as an analogue case for understanding the possible causes of the Ural disaster, particularly as the USSR and the U.S. had embarked on essentially parallel paths to pursue nuclear reactions. See Brown, Kate *Plutopia*, Oxford University Press, New York: 2013.

25 The KGB would have had direct control over the thousands of German Prisoners of War and GULAG conscripts that worked for the South Ural Construction Trust, the geo-engineering trust working on/for Chelyabinsk (see Kutepova and Tsepilova, 2007).

26 In addition to Soviet foreign policy, under Stalin, state security was dominated by a belief in the inevitability of war between the Western and Eastern Bloc (Josephson, 2000).

could access the area, and Russians themselves needed special permission. The region was not even on the map until 1989 (Josephson, 2000:88), nor at all easy to inspect, but rather perfectly hidden in the huge expanses and rich proliferation of vegetation: thus reserved, in the full meaning of the term. It was selected for industrial development due to its geological features, being rich in various deposits, including iron and coal, and for chemical and nuclear weapon development mainly due to the natural topographic conditions of the region. With an abundance of rivers and lakes as sources of water for the cooling needs of the nuclear reactors, it was also selected to locate the industries close to their necessary resources; but its remote invisibility was key. Its extensive forests were excellent to settle and conceal 'closed administrative territorial establishments' and to minimise the potential effects of damage caused by hostile or accidental action, following the deterrence strategy's imperative provision (as above) to protect and hide military centres and the true destructive capacities of weapons' systems from the U.S. and/or Alliance. As such, it is an example of purely passive (strategic) defence policies and procedures, and of a culture of keeping quiet.

From the outset, the same features that enabled the military centre to settle, hidden and enclosed in the region, allowed this industrial heartland to become a secret source of massive contamination in a large portion of its surrounding territories. Despite overwhelming evidence, the sulphur gases, zinc and sulphuric acid (see Goldman, 1972:131) released by the metallurgic and chemical industries, the production, maintenance and disposal of weapons' systems, and a combination of atomic accidents – considered amongst the worst ecological disasters of the nuclear era – were neither officially acknowledged in the Soviet Union nor outside. As a result, the military centre heavily polluted the area for over thirty years, turning the region into a wasteland, risking the secrecy of the military centre due to the problems of detectable pollution, radioactive contamination and unfortunate leakages.

The detailed effects of these accidents remains unclear but, so far as their causes are concerned, they occurred following, a series of intentional discharges, between 1949 to 1956, of more than 123 million curies (MCi) of liquid radioactive waste into the Tcha-Iset-Tobol river system, a tributary of the Ob that flows north and directly into the Arctic Ocean, where radiation was detected, and thereafter into the open storage space and

treatment lagoon of Lake Karachay. These discharges were followed by an explosion²⁷ in one of the tanks that was added to the Mayak atomic facility in 1953, containing radioactive waste, which released a cloud of high-level radioactive dust into the atmosphere, and spread radioactivity through the region 300 to 350 kilometres from the accident. In addition to this dust cloud, works to augment the system of liquid nuclear waste storage and management (in buried high-level waste barrels) also facilitated the dispersion of toxic pollution. The Mayak facility subsequently also dumped liquid waste into Lake Karachay in 1967, and a few years later, a severe drought that caused the levels of the lake to drop allowed the exposure of radioactive materials on dry shores to be lifted into the air by a tornado.

Throughout the 1940s, 1950s and the 1960s, most of the highly active waste had to be deposited in liquid form. Its quantities were enormous and the shipping of it would have involved difficulties. The high level radioactive waste had to be kept stored in large concrete and steel tank-containers, stacked underground, and the low and medium-radioactive waste products were handled in reservoir dams (Medveded, 1979:148). This reality jeopardised the benefits that the military centre itself received from nature, and is responsible for the current state and ‘changing nature’ of the region. As such, it could be seen as one of the realities that helped shift the perceived scale and character of the global problems of defence and reservations, from those concerning external frontiers – i.e. planetary warfare between two global blocs – to internal ones, of local ecological trauma.

To help prevent lethal airborne contamination, Russian engineers took protective measures and adopted a number of procedures for managing the waste and reducing the spread of radioactive contamination, but serious problems remain. The reservoirs are considered to be the most serious and damaging source of environmental pollution by radionuclides in human history and are still regarded today as a place of suspicion, as a possible source of continuing discharges. The covering over of the dried-up, radioactively polluted Lake Karachay with hollow concrete blocks is treated as a controversial remedy, as it is failing to prevent the shifting of sediments (since the water levels have continued to

²⁷ On the morning of September 30, 1957, the cooling system of one of these tanks failed, resulting in a chemical (non-nuclear) explosion known outside Russia as the Kyshtym disaster. According to the International Nuclear Event Scale, this event – rated 6 and known outside Russia as the Kyshtym disaster – ranked as the third most serious nuclear accident ever recorded next to Chernobyl and the Fukushima Daiichi nuclear disaster, which were both ranked as Level 7.

shrink over the years), and the Techa system's cascade of water reservoirs, built with dams to separate them from the Techa-Iset-Tobol river system, has nonetheless let radioactivity contaminate the river, mud and sand, en route to the Arctic Ocean.

Together with the processes taking place in the ground, the decay of the containment strategies for high-level radioactive waste, it is now known that the seepage and lowering of water levels has caused extensive secondary contamination, confirming that the centre had falsely presented itself as properly as handling in-house its radioactive materials and accidents (Norris, Suokko and Cochran, 1993:525). In addition, complaints about the quality of work undertaken there in the use, storage and disposal of the radioactive waste have demonstrated that the centre had underestimated the characteristic features and spatiotemporal changes that occur in the dynamic processes of the land and water tanks. Indeed, such factors imposed a layer of complexity to the Soviet nuclear programme, and added expensive challenges that proved beyond the abilities of the highly regulated and hierarchical system of the socialist Soviet Union to meet.

East-Ural Reserves

The main public complaint, and public image of the nuclear accidents in the Chelyabinsk region was put forward in 1979 by Zhores Medvedev, a Russian biologist and dissident historian. His work opposed those nuclear experts who (until 1989) denied the atomic accidents, and catalogued the radioactive contamination, by measuring levels of strontium and cesium, in lakes, water, plants, trees, mammals, fish and birds. It denounced the spread of radioactivity to the Arctic Ocean and other countries, and exposed the policy of secrecy in Russia at that time, together with the curtailment of human rights that was inevitably attached. Medvedev's work claims that the real history of the disasters is recorded in the omissions, distortions, falsifications and anomalies that appeared in published sources of intelligence agencies such as the CIA, as well as ordinary scientific periodical magazines and newspapers. Overall, it exposed what the Soviet Union government had up until that point, prevented from reaching not only concerned parties outside Russia, but also the very inhabitants who were directly dependent on the land of that region, and were suffering from radiation poisoning, chronic illness and lowered life expectancy. A total of 437 000 residents of the Chelyabinsk region were exposed to lethal doses of radiation, and those who remain continue to be exposed to the exact same threat. Present reports suggest that the shores of Lake Karachay emit sufficient ionised radiation to guarantee a slow death.

After Medvedev, a number of studies have paid considerable attention to the territory and the sum of Soviet environmental damage, as the by-product of the industrialisation and militarisation inflicted during its seventy years of rule. The map of anthropogenic degradation prepared by the Institute of Geography of the Russian Academy of Science depicts a landscape encompassing relatively untouched natural expanses punctuated by highly degraded areas, constituting almost 16 per cent of the whole of the former Soviet Union, as a result of concentrated industry. Together with a massive outcry against its malign ecological legacy and a widespread dissatisfaction with the Soviet state's environmental management, the map helped analysts and policy makers to evaluate the seriousness of environmental conditions around the country, in particular in regions such as the southern Urals and Central Asia, in which the destructive activities of economic growth and maintaining its position as a military superpower have fouled both air and water, impoverished the region's farms and silently poisoned the region's land with toxic waste and radioactive fallout for years to come. It is generally agreed that the Soviet-planned economy resulted in severe ecological damage, as a result of which, recalling Mike Davis, 'the former Land of the Soviets is portrayed as a dystopia of polluted lakes, poisoned crops, toxic cities and sick children' (1993:52).

Since the end of the 1940s, the nuclear factor, an important aspect of the technology of war, of the world economy, and of the Soviet organisation of life for national strategic defence, has changed the territorial equilibrium of several regions. Around Chelyabinsk city this has included the change from green mountain belt to beleaguered strategic military centre. Thereafter, the area was repurposed as a radiological training ground for civil defence troops and was, from 1966, converted into an officially designated East Ural Nature Reserve (Brain, 2012:155). Administered and actively promoted as the Eastern Ural State sanctuary (Kutepola and Tsepolova, 2007:155), an off-limits post-military and/or post-nuclear territory, the reserve, with a total of 16 616 hectares of highly contaminated land, was set apart and maintained in the process of re/demilitarisation and natural deactivation in order not only to protect against and limit the spread of radioactivity but also to continue to disguise the negative impact of the East Urals Radioactive Trace (the former name of the institution responsible for managing the territory). For this reason, these protective measures also maintained it as a research site on radio-nuclide behaviour in natural conditions, i.e. the evaluation of the state of water and soil ecosystems under the

influence of ionised radiation (ibid:156). Isolated by barbed wire, it was thus placed to hold 'safe' and keep 'everything' quiet, and return the 'wasteland' to nature.

For that reason, the former Soviet Union employed the term of *zapovednik*, meaning 'a commandment, a sacred vow', used to denote a protected area, and protective architecture (Weiner, 1999:4). The *zapovedniks* are officially part of one of the undisputable territorial (and regional) achievements of the Soviet Union. They are a network of highly protected areas, or state nature reserves, largely aimed at improving the environment by setting aside and sealing spaces in independence from the outside world. For this reason, as these territories are off-limits to tourism and the general population, and exclude all productive forms of economic activities, except scientific research on ecological and evolutionary problems, these former-Soviet reserves (among which the East Ural Nature Reserve is included) are rated as examples of the highest category of nature conservation according to the International Union for Conservation of Nature.

The physical limits and partition of the territory as reserve, or sanctuary, are to be considered, as the term sanctuary suggests, as a *sanctum*: that 'which defends and fortifies man from injury' (Dumézil, 1966:131). What constitutes this *sanctum* as such is the decision of the state power, and the barbed wire laden with radiation warnings, not the territory stored and enclosed by them. Thus enclosed, the *sanctum* is said to be *sacer*, 'reserved and kept apart for the gods' (ibid:130). It becomes *sacer* by sovereign decision, banning or sanction. As Agamben defines it, *sacer* 'presents us with an enigma of a figure of the sacred that, before and beyond the religious, constitutes the first paradigm of the political realm of the West' (1998:12). It presents a limit-concept that Agamben traces throughout the history of Western political thought and situates as the fundamental element of sovereign power. For him, sovereignty is both sacred, and that which maintains the sacred order.

The life that is caught in the sovereign ban is the life that was to have been sacrificed, and that emerges in a 'zone of indistinction', between outside and inside, chaos and normal situation – the state of exception. This state of exception is, it seems, a reservation system in itself, for the sovereign is able to preserve the power of decision only by reserving to itself the power to suspend its own laws. Sovereignty thereby maintains the power to decide in favour of the existence of a state of exception or emergency, in which its power operates directly, without proceeding through the mediation of constituted laws: the

power to sacrifice something in order not to be sacrificed itself. Within this state, or regime, the application of law is held suspended: valid, but not applied, in order to protect the decision, the issues in place and the acts of sanction.

In *Storming the Gates of Paradise: Landscape for Politics* (2007), Rebecca Solnit explores the application of a similar ‘decision operation’, being the sovereign’s power to decide on the state of exception suspending the entire legal order of the Nevada Test Site, now called the Nevada National Security Site, a U.S. Department of Energy reservation. This is the site where more than one thousand nuclear bombs have been set off as part of the U.S. nuclear testing programme, a place that has been enclosed, through the justification of ‘national security’, so as to directly assume the care of biological life as one of its proper tasks. Having enclosed this portion of land, the U.S. has abandoned the desert and its inhabitants to live and die under the decree of biopolitical *caesura*: an objective violence, imposed by a sanctioned suspension of law, enacting a power outside of the law, yet which is included within the law itself. Like Agamben’s extermination camp, the site is excluded in a reservation structure in which law is (legally) suspended. It is thus included, through its own exclusion, in the juridical-political order, and without trial. This signals a belligerent double arrangement similar to that unleashed in/against the Chelyabinsk region, and other such regions involved in the proliferation of nuclear technology; the augmentation of biopolitics and the continued hostility involved in the use of it.

First, the sites were disposed into a state of reservation for reasons of military use and secrecy, and indeed conservatism; and then they were subjected to a restructuring of the ways in which these reasons were justified. Since the advent of the nuclear age, various states and scales of exception and emergency have inevitably suspended or disregarded protections and limits; such actions have consequently resulted in a tremendous increase in the destructive force and impact of nuclear warfare and energy facilities against the planet, all without direct conflict.

Russians authorities have, for example, very recently declared a state of emergency in the Chelyabinsk forests and parks of the region, due to a complicated fire hazard situation threatening the region and its nuclear waste facilities. The potential for a devastating radioactive smoke cloud threatening the East Ural Nature Reserve has been identified as significant. According to the proponents of the NW scenario, such a cloud could drift and encircle the north hemisphere for weeks before dropping back, or being

washed out of the atmosphere onto the ground. If this should occur, the jurisdictional boundaries and the lines of barbed wire would clearly be rendered precarious and helpless to prevent airborne toxicity, for all that they help to simplify and articulate the process and architecture involved in the large-scale spatial organisation of the politics of exception.

Barbed wire has been repeatedly utilised, as the most economical method, tool or device to enhance separation: to control, exclude and include; both to keep out *and* keep in. It is for this quality that it would come to feature in some of the great conflicts of the late nineteenth century and early twentieth century: ‘to define space and to establish territorial boundaries’ (Razac, 2002:x), cutting across geographies of human repression to control motion and delimit dominions as well as places that would otherwise have been left unmarked. Since its invention in 1874, barbed wire has come to be used to enclose all types of assets: private and game farms, refuge camps and quarantine areas (i.e. areas of health crisis or of land devastation), and as a supplementary element in protecting fields, defending trenches (in World War II, for example), and in acts of imprisonment, control and containment. It may be used to build walls that are not walls, and remains a central element of almost every detention facility. Its image is closely aligned with extreme and/or long term confinement, such as the efforts to exterminate Jews and others deemed undesirable by the Third Reich during World War II, as well as other concentration and labour camp systems, for it localises control in a clearly marked ‘inside’ (Netz, 2004:145).

Barbed wire serves authority with the expenditure of ‘the smallest amount of energy possible’ (Razac, 2002:x). It is a ‘cheap and supple tool, adaptable to all kinds of use’ (ibid:x). As a technology, it was first patented by an Illinois farmer, in response to decades of regular American colonisation of the (Middle) West and the establishment of the Homestead Act, the U.S. federal laws that gave an applicant ownership of land at little or no cost. Under this law, there was a system whereby land parcels were *deeded*, *entitled* and fenced (*enclosed*), and several technical innovations were made available, in land reservation arrangements, to protect their occupation and exploration from incursions by wild animals, Indians and wandering cowboys.

While the translation of barbed wire usage, from its original purpose and context of the colonial and rural US economy to its role in enforcing the forms of organisation of political and military modern space has changed its symbolic meaning irrevocably, its relation to law and to defensive architecture remains largely unchanged. Barbed wire’s

intrinsic function to control and divide has been essential to several configurations and forms of rational government, in the way it produces space: to enforce land protection, and the form and extent of the reserve as a (bio)political instrument. Founded upon toxicity as potential threat, the East Ural Trace, now the East Ural Nature Reserve, sustains a fidelity to this idea to prevent humans and animals from crossing the fence and encountering hazardous materials, and to impede outsiders from knowing what is really concealed within the area.

Since the beginning of the Soviet Union's involvement with military and civil nuclear power in the 1940s, only a very limited and powerless basic record of radioactive hot spots and releases into the environment has been made public. In general, any information on the subject has been highly classified as an issue of national security, mainly for reasons of passive defence and strategies of control and containment. Those reasons have involved both the control (and bolstering) of public order and opinion, and in preventing the expansion of accidental and long-term routine releases from the formerly closed region. Such actions worry scientists and environmentalists concerned with the efforts to clean up existing contamination and limit further releases, as the weapons-grade plutonium processing and waste facility undergoes a process of natural deactivation, and the large scores of contaminants settled in reservoirs and waste storage facilities, as well as in the forested land, pose a continuing risk as future contamination sources; a risk which is not contained except in a reservation arrangement, which is necessarily provisory.

Natural Ground Order

The scientists and environmentalists who are worried about the region treat it as one of the most closed and carefully monitored sites of environmental pollution; that is, as a *specially* protected area in the fullest sense of the word – including the extent of the radiation levels there, and the territories destroyed by it – and as one of the most striking symbols of the 'rational' socialist exploitation of nature (Shtilmark, 2003:3). They charge the USSR and the Russian Federation with limiting access to reliable information, at national and local levels, and have since the 1980s been forcing the development of more effective framing strategies that seek to destroy the secretiveness surrounding such enclosures and engage with the concerns of the public and issues of radioactive contamination. They seek to improve environmental protection and correct attitudinal barriers to environmental reform and the management of Cold War-generated radioactive waste, not only in the Chelyabinsk

region, but in other sites of nuclear catastrophe, through exposing all that inevitably leaks out of the physical limits and partitions of the territory that is held in reserve.

The creation of a *zapovednik* in the Southern Urals to be kept as ‘pure’ wilderness, even atomically so, in ways compatible with environmental protection, does not satisfy environmentalists. They see it as an initiative to remediate, relabel and manage chemical and radiotoxic hazards through concealment, rather than as an initiative (and incentive) to safely handle, store and ultimately dispose of toxic industrial and military waste. In a way, the conversion from a military to a nature reserve reflects a strategy of negation and/or process of disavowal. That is, an effort to escape being trapped by the gaze, exactly as with techniques of camouflage. In the strictly technical sense, in which Lacan (1977) describes it, drawing on Sartre’s concept of the gaze and Roger Callois’ observations of mimicking animals, camouflage is the effect of mimicry. Camouflage shares the same characteristics, effects and qualities as mimicry, as a mode of disappearance via a process of inscription and/or assimilation to the environment – the *almost* the same, but not quite. Mimicry is not a question of harmonising with the background, but *becoming* background, visible and invisible simultaneously; that is, not unseen, but seen to be the same, and as such barely recognised as being at odds with, but rather blending in with the surroundings. Mimicry rearticulates presence in terms of ‘otherness’, the otherness that it disavows.

In the East Ural Nature Reserve, this technique uses nature to obscure the profound and ongoing (re/de)materialisation of processes and material transformations. The decision to convert the military-poisoned land to a nature reserve relied upon the appearance and production of natural landscapes to advocate and guarantee the protection (and even remediation) of the toxically assaulted lands – both ideologically and materially. In this way, the biopolitical organisation following the accidents has delimited spaces and relationships with materials to control the material threat, normalising the exceptional conditions of the place for the protection and security of the population, as a standard *zapovednik*, and thus ‘naturalised’ the massive contamination in the Ural wilderness. This is a form of social management, but one that, to a certain and critical extent, denies the existence of any threat. This type of conversion, from military centre to nature reserve, couples military protection with nature conservation and assumes that the purity of nature can obscure and indeed *fix* the actual and ongoing contamination of the site, the residual negative impacts and extensive harm inflicted by the military industrial complex to the

health, safety and the environment of the region (and the country) and its inhabitants. It uses nature to camouflage toxicity.

Designed to maintain and increase the appearance of responsibility, the reserve blurs the boundaries between the representation and the presentation of nature as natural, and appears as an instrumental mode and model (*etalon*) for ordering zones and reversing the anthropogenic processes evolving inside its boundaries. In one sense, the reserve shields and provides with protection by making use of the same condition that has hidden the source of the danger in the first place, and as such it ensures a void-space in public records and public subjectivity. It produces nature, separate from and controlled by humans within limits, to protect both the environmental remedies from humans and humans from the remedies. According to several studies²⁸, the way they are being covered-up and eclipsed by (and within) the establishment of nature refuges and enclosures designed to improve living conditions, at a (psychological and) geographical distance, has been indeed one of the 'preferred' ways to settle and dispose of military arsenals and strategic defence facilities worldwide. In brief, such nature reserves have often provided both the means to treat nature as a waste container, and an instrument for controlling that same gesture.

In *Toxic Tourism, Rhetorics of Pollution, Travel and Environmental Justice* (2007), Pezzulo writes that 'the creation of these separate areas of existence, enable culture more readily to dismiss the costs of toxic pollution because the waste and the people most affected by the waste appear hidden within their proper place' (Pezzulo, 2007:5). The logic of this proper place affixes subjects and the lethal instability of the threat to a division of space and, to use Schmitt's terms, provides a *Katechonic* framework to ground order, or as a ground for order. The *Katechon*, as discussed in both the glossary and in previous chapters, protects from risk and threat only the state whose existence it preserves. It holds at bay the risks inherent to the instability of a place. Paolo Virno uses the political figure of the *Katechon* as a radical anti-eschatological theologico-political aspect of ritual practices, writing in agreement with Roberto Esposito (2009, Chapter II, Section 2) that it:

does not eradicate evil, but it does limit it, and it wards off repeatedly every blow that evil presents. It does not save us from destruction, but it restrains destruction and, in order to restrain it, it conforms to the

²⁸ Including research on problems of demilitarization and toxic legacies such as developed by Pederson, Brain, Weiner, Solnit, Galison, Krupar and many others.

innumerable occasions when destruction can manifest itself (Virno, 2007:56).

The *Katechon* resists the pressure of chaos by adhering to it and is for Virno ‘the institution best suited to the state of exception’ (Virno, 2007:62), and one that reigns strongly in the sanctuary.

Called upon to deal with the presence of the *eschaton*, the *Katechon* is ultimately a ‘force of order’ (Esposito, 2011:63) tied to questions and operations of security and sovereignty, performed to with-hold, that is to say, to hold and keep *with/in* that which cannot or should not be imagined nor thought, but that must still be envisioned in order to cordon off the sacred domain and order (Esposito, 2011:63). It is the *Katechon* that, as Carl Schmitt argues, secures the sovereign construction of the sacred and makes it impenetrable from the outside, preserved, protected: a domain *of* and *for* security. Security functions as the defensive embodiment of this construction. It operates at the limits and in the borders that hold back, preserve, protect and react to the catastrophic threat of the destruction of the order of things. For the *zapovedniks*, too, the attainment of secure and recognised boundaries guarantees the system of protected lands.

As a concept, the *zapovedniks*’ emergence in the late nineteenth century bore a relation to an idea that human beings are a violent new geological force, as advanced by Charles Lyell²⁹ and George Perkins Marsh³⁰. According to Douglas Weiner, the most influential historian of Soviet environmental politics, this interest, together with the Soviet love of nature, focused on the cultural, aesthetic and ethical aspects of landscape protection (*Landschaftspflege*) that, together with the emerging development and implementation of a modern scientific environmental position, was only successfully translated into practice as ‘a means of registering opposition to aspects of industrial policy and pollution’ (ibid:4). The *zapovedniks* were originally established according to a holistic doctrine, asserted to limit the human ability to transform nature, in order to keep it ‘forever wild’. For this reason, the equipment of these reserves with scientific research stations, and the creation of

29 Charles Lyell (1930) countered Cuvier’s anarchic ‘catastrophism’ and theory of impact crises with ‘uniformitarianism’, which ‘refers to a time honoured but vaguely defined view that the present is the key to the past and that explanations of Earth history by gradual processes are preferable to explanations involving sudden, and typically violent, processes’ (Alvarez, 1988:15).

30 George Perkins Marsh published *Man and Nature: Physical Geography as Modified by Human Action* (1864) and it helped to launch the modern conservation movement.

a conservation, research and environmental education body to serve their separateness³¹ and own laws, would in one sense guarantee the proliferation and productivity of the *zapovedniks* or the nature reserves as *etalons*, models of nature.

Each was individually designed to be absolutely inviolable and devoted exclusively to the output of a single and specific study of ecological function and impact. This was no longer only aimed at preserving all or part of these especially valued natural sites, but also to advance scientific and ecological research on natural and biological diversity and evolutionary problems, with a view to protecting other high moral ideals than those laid down at their inception, in order to enhance the well-being of the entire Russian state. That is, by putting nature to work. From a certain mechanistic (algorithmic and/or stochastic) standpoint of ecological processes, nature is able to self-balance and self-heal. Because, and ultimately, as Hezelrigg writes in *Cultures of Nature: An Essay on the Protection of Nature* (1995):

Had nature been working alone, there would have been no failure. It was artifice that produced the need for preservation, and it was artifice that produced failure and the conditions of failure. Where nature natures undisturbed neither preservation nor failure can occur. The difference is a matter of distance – distance at the hinge where nature is tied to culture (Hazelrigg, 1995:294).

Regime of Inviolability

At this stage, and in the blueprint of the *zapovednik*, the regime of inviolability was the single and most important of the organisational features. It reinforced the borders, barbed wire and architecture of the nature reserve to exclude, isolate and defend the sacred realm and ideal of purity, normalising the techno-scientific reproduction of nature in the Chelyabinsk region. This regime also naturalised the massive contamination in the Ural wilderness with the promise of transforming the polluted territory into a seemingly benign wilderness, without reference to the hazards and unpredictable natures evolving inside. Applied to help prevent and minimise the impacts of contamination on the surrounding environments and to isolate, protect and shield the reality installed inside, the regime of inviolability enabled a more imprecise official task for the *zapovedniks*, one that was in fact included in the national plan for economic construction, and that allowed the co-existence

³¹ Eliminated by Vladimir Putin in 2007.

of conservationist principles with exploitative and destructive actions.

According to D.J. Peterson (1993), under the Soviet regime, the military was *allowed* to pollute the environment by appealing to the imperative of national security. The Ministry of Defence could and would dare to build nuclear plants without studying the potential impact on the environment and without the public's consent or critical inspection. For this reason, from the time of *perestroika* and *eco-glasnost* onwards, there have, in fact, been widespread reports about the vagueness of the military-to-wilderness refuge *fixing* of places, and also about the role that military and strategic factors played in the Soviet *construction* of nature, not only in its destruction. Several studies have examined the techno-scientific problems intimately connected with the control measures developed within the Soviet bureaucratic framework for the maintenance of, and remedial actions taken by the Soviet government in the pre-Gorbachev era to close off polluted places. The most influential were made public by figures such as Marshal I. Goldman, Boris Kamarov, D. J. Pederson and Douglas Weiner, in publications that, by doubting the possibility of effective environmental protection, uncovered the repercussions obscured by the triumphs of Soviet development and military systems, and highlighted scores of accumulated slights and injustices that portray the ex-USSR as an environmental disaster area³². They describe the resolutions and laws mandating specific conservation projects in the ex-USSR, the appearance of safety and institutional control (on limited means) created to limit exposure, reverse spoliation and ensure the protection of human health and the environment from the contamination left following the completion of clean-up and stabilisation at the sites and relying on technical land-use control and containment.

In this context, institutional credentials and organisational name changes are key, as these assert the character and articulate the status imposed over the places, thus using semiotics as a form of non-interventional management but essentially letting the damage continue, both in and beyond the physical barriers and legal restrictions of the contained sites, with consequences for the whole environment. As a result, their work suggests, the ex-USSR's great strides – known for producing many of the sophisticated high-technology goods and infrastructures of an advanced society – had failed to develop a suitable and

³² These include, amongst others, Goldman's *The Spoils of Progress* (1972); Kamarov's *Destruction of Nature in the Soviet Union* (1980), Pederson's *Troubled Lands* (1993) and Weiner's *A Little Corner of Freedom* (1999), as in bibliography.

environmentally-friendly means to dispose of its lands and associated high-tech, nuclear and chemical by-products. These are, for many, and the *zapovedniki* in particular, ‘a sociological phenomena demanding study and evaluation’ (Shtilmark, 2003:7).

According to D. J. Pederson (1993:14), the most recent research on the Soviet environmental history shows that the Chelyabinsk region epitomises these phenomena and the problem of handling nuclear waste. From the outset, and along with the resolutions and laws mandating specific areas involved in scientific, conservation and environmental organisation strategies and projects, Pederson argues that the Soviet Union simultaneously pursued astonishingly progressive and cataclysmically-destructive politics, intended to integrate the desire for prosperity and the imperative to protect environmental quality (see Pederson, 1993:146); ‘a mixture of remarkable achievements and distressing dysfunction’ (Brain, 2012:234) extending far beyond the innovation of the unprecedented, preservationist origins of the *zapovedniki* to the solutions applied to nuclear waste disposal.

The secretive and closed nature of the USSR’s control and containment strategies, followed not only the uncertainty imperative, i.e. to deter the enemy through secrecy, but also the uncertainty principle, which articulates the limits of knowledge vis-à-vis the nature of the world and nuclear materials, and points to the fact that to secure radioactivity is ultimately impossible. Radioactivity is part and parcel of the destructiveness of the nuclear delivery militarisation systems. It transcends national borders, disputes and ideologies (see Bohr, 1950) and eludes all reserve conditions concerning the clean-up and stabilisation of sites, and the secrecy of what they hide. The vast temporal and spatial dimension of radioactivity defeats traditional ideas about what it is, as thing, in the first place. It always exceeds our calculative and referential capture. In *Hyperobjects, Philosophy and Ecology After the End of the World* (2013), a book dedicated to the ecology of similar entities, Timothy Morton writes:

The future of plutonium exerts a causal influence on the present, casting its shadows backward through time. (...) to wish this thought away is tantamount to the clean-up operations that simply sweep the contaminated dust, garbage and equipment away to some less politically powerful constituency (Morton, 203:120).

Storing radioactive materials in containers on the surface of the South Ural Mountains and

in lakes there, or in holes dug underground, has resulted in their environmental devastation; the ruination of the air and the soil quality, and also of the ground water. Around Lake Karachay, for example, soil and groundwater down to a depth of one hundred metres seems to have been contaminated, and the area of contamination is threatening a reservoir supplying the city of Chelyabinsk. This actuality provides conditions in which to understand the reserve as an implausible act, and to dismiss it as illusion. While the idea of isolating and setting boundaries for nature reserves masquerades as protection and as a restorer of 'natural' purity, is only but a conjuration of appearances, remystifying the idea of intact and distantiated nature, and implicitly accepting a divided world between natural and human, or artificial parts. All in all, it is a puzzling aspect and construction of the modern environmentalist ethos, showing the enduringly problematic nature of some of our acts of redemption for environmental destruction.

Inviolable Violability

Tied to their foundational principle wherein uncertainty operates, and to the fragmented, classified data exacerbating this uncertainty, from the *zapovedniki*'s nature reserve, to the underground storage spaces and the state of exception that embraces the zone, the reserves that were established in the southern Urals are threatening to have another direct effect on the health of many generations of plants, animals and persons still inhabiting the surrounding territories of the former Mayak Chemical Combine. There have been no direct charges made against Russia concerning the sequence of incidents that occurred in the Chelyabinsk region, apart from the growing coverage of its military-industrial legacy by Russian scientists (from Moscow and Chelyabinsk), ecologists, Tartarstan activists – such as Fauziyo Bayramova, who chairs the Tartar National Independence Party – and other environmental organisations and NGOs working in and for the region. The political impact of their interests has been augmented by the demise of centralised Soviet authority (see Pederson, 1993:193), the removal of travel restrictions to the region, a growing societal interest in environmental justice and in how to solve (and mitigate) the toxic problems of the world. This is a society increasingly engaged with the whole course of socio-historical developments, political events and upheavals with which our century has been endowed, including the dramatic features and unprecedented scales of damage in territories similar to Chelyabinsk, as demonstrated in the practices of toxic tourism, embodying a tactics of resistance.

Examples of this interest appear in Slawomir Grunberg's *The Most Contaminated Spot on the Planet* (2005), Sebastian Mez's *Metamorphosen* (2013) and the recent documentary film by Samira Goetschel, *Code 40* (2016). These are cinematic representations of the contamination of toxic landscapes, and the absence of any governmental infrastructure with which people can negotiate the conditions of their survival. They are intended to foster public sentiment and dissent, in the context of the spatial and temporal co-presence of subjects previously separated by geographical and historical disjuncture. The films enable a contact zone between various publics and warrant viewers' attention to the way the region's environment has been wasted and degraded. They turn a cinematographic gaze on the territory to witness the self-defeating pattern of toxic pollution in the region, to denounce the region as post-apocalyptic, and as an artificial and forgotten scenario, seemingly devoid of ordinary life, defined and oriented inwards and toward oblivion; indeed, to portray a region in crisis and depict the gradual invisible decay haunting the inhabitants of the Southern Ural Mountains. As result, the films denounce the hidden nuclear archipelago and the dangers of allowing a cultural-political form of alliance to put military secrets above the populace.

To this end, they map the institutional ethics and logic guiding the treatment of the site as representing *thanatos* (Greek 'death'), the condition and the effect that the subtraction of Chelyabinsk territory had, and still has, on its inhabitants, together with the use of a sensibility akin to that which Philippe Ariès (1974) describes the 'cult of the beautiful dead' (inclined to hide or deny mortality or decay, and the sense of separation or loss) to set the agenda and suggest our vulnerability to the site, while also signalling the possibility of recuperating some originally natural state of the site through a proper guarding, removal and in-house handling of contamination. That is to say, they offer hope of an end other than the increase of mortality rates, despite being negative towards (the solutions imposed thus far upon) the region.

The character of Grunberg's, Mez's and Goetschel's films reside in the tragic. They work with the effects and the evidences of the disaster to highlight issues that concern the implications and problems having to do with a lax attitude towards the handling of nuclear wastes and sites. Although different in genre and approach, the films are intensely evocative pieces about contamination, environmental destruction and the consequences of a cruel and oppressive rule. The result of their interest in, and conceptual interpretation of the

region brings about a state of mind, properly designated, as deeply disordered or ‘desolated’, as the laid-to-waste landscape portrayed in the films. Embodying a rhetorics and tactics of resistance, they reframe our understanding of justice and agency through an almost ironic reprise, that of a tourist resistant to toxicity. That is, through a scopic regime³³ that has, according to many activists, testified to the value of external accounts (see Pezzulo, 2007) but that could as well enable the spectator to evade or dismiss the human causal chain in nuclear warfare and to replace it with a sort of passive acceptance of a certain power structure, rationality and social model at play and anchored to the existing system in the region.

Together with the broader social movement for environmental justice at work in the region, both films warn about the fate of one’s home and way of living under the violent impact of the nuclear and all it condemns to death by radioactive poisoning. They are successful in creating an up-close and personal (but professional) view and ‘contact zone’, using media technologies to elucidate the way the Chelyabinsk region has been programmed under and as a form of reserve. Mary Louise Pratt defines a contact zone as:

an attempt to invoke the spatial and temporal co-presence of subjects previously separated by geographical and historical disjunctures, and whose trajectories now intersect [...] a contact perspective emphasises how subjects are constituted in and by their relations to each other [...] [it stresses] co-presence, interaction, interlocking understandings and practices, often within radically asymmetrical relations of power (Pratt in Pelluzo, 2009:183).

This bringing together of differences enables the juxtaposition of uneven relations and formations. It reminds us about affective feelings for and the biological necessity of specific places, together with the cultural politics that shape and are shaped by these (ibid:175) and in turn determine specific ways of seeing.

From this point, the violence of the Chelyabinsk meteorite not only punctuated a chronic and arguably worse pattern of cataclysmic events in the region, but has put the Chelyabinsk region and maybe the East Ural Nature Reserve back on the world map of toxic

33 Scopic regime or field, which according to Lacan (and Merleau Ponty) identifies the eye as the ‘guide’ in an examination of ideas and also points out to a fundamental obstacle – i.e. the fact that it indicates all visual angles to a single and limited subject’s view. Scopic regimes or fields add another layer that of the gaze that belongs to the object and that reinforces the limits of the subject as a reminder of the impossibility to see.

pilgrimages. In addition to the weaponisation project, or technology of combat discussed in the previous chapter, the rogue meteorite that entered the Earth's atmosphere, streaked across the sky to explode above the Southern Ural Mountains and fell to Earth over Chelyabinsk city, enabled the Chelyabinsk region to recuperate itself from such privileged circuits and (mainstream or dominant cultural) oblivion. Given the curious phenomena of meteorites, and the heavy coverage by the international social media, a regional office told Bloomberg TV that the Russian town is looking to use the impact event (and amateur footage capturing the fireball) to capitalise on international fascination and to boost its tourist industry. The office reports that the Chelyabinsk meteorite harbours the potential to help the country to overcome the region's long held stigma of being the 'most contaminated place on Earth' (Mironova, Tysiachniouk and Reisman, 2007; Grunberg, 2005), prompting private tours and sightseeing excursions to the crash site and, by extension, changing the force of the rogue meteorite into that of an image capable of, in fact, altering the region's history. Plenty of meteorite pieces are for sale on online auction and shopping websites, and its major fragment, six metres wide, was put on display at the Chelyabinsk museum of local lore.

To many, the destruction of nature in the southern Urals epitomised everything that was wrong with the Soviet economy and Soviet military-industrial development: its polluting factories, nuclear power stations, noxious chemical plants and hazardous waste disposal sites. Chelyabinsk exemplifies the functions performed by the defence industry during Cold War competition with the U.S and the complexity of the waste legacy it has left behind in one place, as well as the protective measures aimed at dealing with the products of disasters and their ongoing contamination, the source of illnesses and of a deepening crisis, through an architecture that refrains from disposing of that which it retains or holds. That is, through a spatial and cultural classification, division and scenario that has come to designate special protected areas and restricted territories by their appropriateness for the preservation and presentation of nature, but in the end, spatialises a reality divorced of life. To others, as the Lonely Planet travel guide advertises, Chelyabinsk has become a place 'best visited as a springboards'.

It remains to be seen if the impact of the rogue meteorite is to be more significant as a catalyst for a new infrastructure for protecting the Earth from cosmic hazards, as a lens through which to re-think the nature of impious combinations of nature reserves and

nuclear wastelands, and their often invisible environmental problems, or as a place to redress the harm we have already allowed to occur, by challenging the ideas that make the region less captivating. After all, places such as Chelyabinsk region have long ago joined the ranks of cliffs and ravines, wrecks and other bleak landscapes by which the romantic aesthetics of fragmentation, failure and their picturesque decline manifests and haunts us, with its incommensurable and sublime tropes. It could be that, for this very reason, this event introduces magnitudes we hardly know how to deal with or realities that, as described, are incommensurable with our scales of reason, meaning and thought but which alone show our perseverance. And perhaps suggests that processes to produce an infrastructure for protecting Earth from these realities, other than an architecture of enclosure, division and separation, might yet be possible.

CHAPTER IV

MATERIAL-CONTAINMENT

The previous chapter presented a global orientation which is involved in efforts to guard and defend our home planet from the threat of (mass) destruction that Near-Earth Objects pose, and as one of the most challenging opportunities for heading up a project to execute a coordinated threat-response through acts and architectures of reservation. However, to protect us against the spread of radioactivity in the environment, or to stop radiation pollution continuing is amongst the most important priorities for building architectures here summed up as of reservation. The poisonous effect and destructive capacity of radioactivity stands as the most extreme threat to humanity's survival posed by a single physical substance/process. It is a hazard that cannot be figured nor sensed; it is a potential threat to the integrity of the genetic codes that defines a species; and can render entire areas uninhabitable, at least for humans. Its immense destructive power lies in its ability to pass through materials, penetrating and ionising the tissues through which it passes, but also to spread through – while decaying – over immense lengths of time, according to the type of radiation. Its clean-up and containment stretches the capabilities of architecture and engineering, as the tools to deal with and defend against both natural and technically-wrought hazards, to their limits. Despite knowing that radiation creates physical damage, we are still very much ignorant of the exact answers as to how bad radioactivity is, what effect it has, how long it will affect us, and how to prevent its damage.

The most current example of this argument is at play in Fukushima. Since the 2011 Tohoku earthquake triggered a destructive tsunami that killed thousands and caused the partial meltdown of the Fukushima Daiichi nuclear power plant on the east coast of Japan, a series of states of emergency related to the difficult containment of radioactivity, i.e. technical contamination, have been declared. The event has critically exacerbated weaknesses in one of the main Japanese nuclear power stations and hindered the Japanese use of exothermic nuclear processes to generate useful heat and electricity. Amongst the most recent of the related difficulties to occur is due to tainted water reaching (once again)

the Pacific Ocean. Apparently, the underground barrier created by injecting chemicals to solidify or harden the ground along the shoreline of the No.1 reactor building are proving to be inefficient. The media have declared the reactors continue to bleed radiation into the ground water, exposing the Pacific Ocean to radiation, adding that it has been exceedingly difficult to design suitable reservation techniques to contain the magnitude of contamination.

The series of states of emergency in Fukushima (along with those in other nuclear power stations) is causing widespread public doubt about the safety of nuclear power to resurface in the media and, thankfully, bringing about global changes in the assessment of environmental impact, siting and containment decisions. These are causing nuclear regulators to reconsider safety requirements, in particular, those specifying *which* plants must be designed to withstand accidents. With few exceptions, the methods of assessment have long taken into consideration the probabilities of failure having to do with the siting of nuclear power plants close to areas of seismic and flood activity, and taken care to ensure the design of plants and their levels of containment reflect up-to-date information. Now, however, it is looking increasingly likely that regulators might call for the sacrifice of the competitive economic aspects of nuclear power provision, in order to get beyond the potentially dangerous restrictions these constitute, in terms of safety, construction costs and feasibility, and so to recover public trust.

In southern France, a very complex machine called the International Experimental Reactor or ITER, is being built to demonstrate the principle of producing more energy from the fusion process than is used to initiate it.

At its core, densely packed high-precision equipment will encase a cavernous vacuum chamber, in which a super hot cloud of heavy hydrogen will rotate faster than the speed of sound [...] the cloud will be scorched by electric current, and bombarded by concentrated waves of radiation [...] In this way, the circulating hydrogen will become ionised and achieve temperatures two hundred million degrees Celsius – more than ten times as hot as the sun at its blazing core (Khatchadourian, 2014).

The cloud will go nuclear in a ‘magnetic bottle’, using the largest systems of superconducting magnets in the world, because no other material or physical substance could contain such a thing. The technology is Soviet, sketched out in the 1960s; its

realisation was first proposed in 1985, during a summit in Geneva between Reagan and Gorbachev, who agreed to collaborate in obtaining an essentially inexhaustible source of energy, fusion rather than fission, for the benefit of humankind. Its safety is a vital part of national security and wellbeing; it is the most expensive scientific instrument on Earth, according to Khatchadourian (1014), and is thought to help solve many of the problems of past and current nuclear technology. As he explains,

The building has a safety function, a confinement function and one of the main requirements is that it has no cracks through which radioactivity can migrate or escape (Khatchadourian, 2014).

The instrument is being developed as the solution to the problems encountered with nuclear fission systems, with many safety and security reserves and regulations, huge international cooperation efforts and no room for error: exactly as any other, existing reactor was. This chapter concerns the naivety in believing that the negative (social and environmental) impacts of nuclear fission power stations can be contained through isolation and the construction of increasing boundaries to shield and control the radioactively contaminated area. To this end, it investigates a small number of such actual material-containment reservations, and the consequences dependent upon, and accounted for by the nuclear debate so far. The aim is to forcefully reiterate the epistemological, pedagogical and political significance of the acts of reservation similar to those addressed in the previous chapter, and to develop the unexpected and unpleasant occurrences brought about by them. Ultimately, these are related to a series of decisions and different forms of protective architectures, rational within certain bounds and limits, which have mobilised resources toward the ends of legitimate social order, but which now pose threats to the stability of our present and future environment. The construction of the hypothesis upon which these works proceed, as follows, remains a dominant concern and an intriguing topic.

1 SAFETY-DISTANCE SAFETY

A range of acts and architectures of reservation could serve as testing grounds for experiencing the investment and implications of practices seeking an ever-tightening environmental control as well as the limits of their rationality. However, haunting them are anxieties about architecture's capacity to serve as an instrument to contain and condition

environments, and to modify or redirect systems to particular ends. The philosopher, Jean Baudrillard, has noted it is impossible to establish successful plans for acting, in the contexts of risk, uncertainty and emergency, in the absence of a clear diagnosis of certain threats, and their causes and effects. One disaster will set the pace for other disasters, undermining our capacity to learn from, and act upon the first. In *The Transparency of Evil: Essays on Extreme Phenomena*, he writes:

we have had few spectacular demonstrations of the consequences of the liberation of nuclear energy (Hiroshima, Chernobyl), but it must be remembered that any chain reaction at all, has catastrophic potential. Our degree of protection from pandemics is epitomized by the utterly useless glacis that often surround nuclear power stations (Baudrillard, 1990:101).

Baudrillard's intention is to highlight the alarming dynamics of disequilibrium, uncontrollability and the 'flood of effects' of the nuclear power and energy system, as one of the extreme phenomena that assumes a dimension of global catastrophe, and of an idea of Evil. For him, the technologies and ideas with which such power systems try to master the nuclear, with its threatening, unpredictable and mysterious order, are desperate attempts, only incompletely defining the possibilities for avoiding something worse happening.

Baudrillard argues that in a broad and metaphorical sense:

the real danger nuclear power stations pose is not lack of security, pollution, explosion, but a system of maximum security that radiates around them, the protective zone of control and deterrence that extends, slowly but surely, over the territory (Baudrillard, 1981:61).

This system projects an ideality, a sophisticated solution to specific threats, but brings about the same effects and consequences it aims to forestall. This is because it becomes virtual, a universal lock-up and control system whose deterrent effect is not aimed at saving us from catastrophe, but rather from any real event that would upset the general system and its balance – be these rumours in the sphere of information or actual disasters.

In these terms, Baudrillard calls our attention to the *glacis*, the clearing or buffer zone consisting of an artificial slope of earth, constructed to screen the bastions and curtain walls of fortifications from hostile artillery fire and provide an advantage over assailants, that is used in (practices of) *architectura militaris* (modern military architecture) to operate

as an outer-defence and reservation limit structure. This type of zone is nothing more than a protective area, built to strengthen the limits of a place and to protect it against any incursion by enemy powers. In its architectural sense, it provides Baudrillard with an analogous name for the Exclusion Zone (EZ)¹, the broad, off-limits barrier and buffer zone which the public is forbidden to access, and that must be provided and maintained in the siting of any nuclear power station, for reasons of the control of populations, the stations' safety and for military passive defence purposes.

Nuclear Exclusion Zones - Challenges

The EZ defines the fenced-in plant areas and the authority of the nuclear licensees, and responds to the differing pressures and needs of inside and outside. It serves to guarantee that inadvertent releases and excursions of radioactivity during abnormal conditions can be controlled and contained within its limits exactly by keeping them in reserve and distanced. In its basic form, as we have seen in the previous chapter, the EZ combines space for fault clearance with the distance safety requirement, designed to regulate and limit land-use and access; as such, the EZ is key to the combined protection of the (nuclear) system, its myths and realities.

In general, the EZ adjacent to any nuclear power plant perimeter is subject to particular structural restrictions aimed at the maintenance of a limit-distance between radiation and the risk of environmental contamination and/or of human exposure, ensuring that such risks are appropriately managed within physical limits. This EZ involves considerations dependent on radiological monitoring data, radionuclide contents' simulations and population characteristics – low-density is generally preferred – as well as plant designs. It includes site control procedures to reduce all activities within the area, including the exclusion, prohibition and removal of personnel and property from sea, land and airspace within an EZ's range, leaving only regulated transportation corridors (such as railroads and waterways), regulated flows of information and non-radioactive discharges being permitted to transverse the Zone. This is the very place where anomalous radiation arising from the plant's activities makes its first appearance and, for this reason, EZ are recognised as a problem in the design of Nuclear Power Plants. They require a very high

¹ Apart from the EZ, there are two other zones defined for control of population: an annulus around the EZ defined as the Sterilized Zone or Low-Population Zone, and the Outer-most Zone defined by a minimum distance to a high population centre.

degree of attention and of protection and there is an implied danger of relying too heavily on traditional architectural bounded or fenced-in areas.

At present, either because operators have failed to provide the required and adequate protection, or precisely to legitimate such provision, Exclusion Zones are becoming increasingly burdensome to establish and enforce. They have to be constantly monitored and decontaminated in order to guarantee safety standards. The causes for this difficulty are many; they include a history of past accidental fallouts and/or discharges, of exposures of unauthorized and unprotected people to site hazards, theft of uranium fuel rods and claims of Public Right of Way or Passage, as exemplified by the Bradwell nuclear power station (closed in 2002).

At Bradwell, between the station and the Bradwell Site Barrier (Wing) Wall – standing approximately 400 metres high, 7 metres deep, sited off-shore to demark the Bradwell EZ and prevent the cold ‘inlet’ water (water used to cool a nuclear power station’s fuel rods) from mixing with the warmer ‘outlet’ water pumped out on the landward side – there is a public right of way. This runs along the edge of the coast and *through* the 20-hectare defence area covered by the EZ around the now-decommissioned power station over the Blackwater Estuary. By crossing the restricted Zone, this pathway signals the EZ artificiality, while at the same time expanding it. The Estuary houses several environmentally-protected areas that support maritime species, leisure sites and activities, such as the cultivation of oysters. It the site of an old RAF station and it is fringed by common reeds, used as a natural sewage purification system and method of removing pollution from wastewaters. These areas follow similar protective regimes as the EZ, insofar as they are areas sanctioned for the protection of particular practices and reserve formations. For this reason, they lend themselves to the EZ system; they work as limit structures and trusted zones for radiological containment. They also distribute the necessary controls to manage the exclusion and access to the area, but they also complicate its closure and guaranteed safety standards.

As the term ‘exclusion’ emphasises, Exclusion Zones follow official standards, maintenance protocols, and are drawn up in the light of research and risk-based processes, and legal techno-scientific paradigms that impose security regimes to manage hazards and shut down any and all sites that do not belong to the Nuclear Power Station. Their real meaning is part of a bureaucratic, political formation, meant to minimise (and not to

prevent) the magnitude of the error dimension built into the nuclear power technical machine. Analogous to the development of the *glacis*, or sequence of ramparts and ditches, which illustrates the gradual improvement and development of siege warfare, these Zones encompass the language, works and presumed logic of architecture concerned with an apparent stability and assertion of order based on a statistical reality, as mentioned in previous chapters.

For Baudrillard, this is the logic that appeals to the foundational aspirations of Western thought guiding conceptions of science and technology, their systems of apprehending the world and of devouring the reality principle. The persistence with which generations of masters of the art of military architecture have developed fortifications to meet defence needs, provides an inherent weakness that enables Baudrillard to construct and locate his opinions and concept of 'impossible exchange'. For, the trouble with these buildings, as W. G. Sebald, in his novel *Austerlitz* also remarks, is that, as with fortresses, 'the more you entrench yourself the more you must remain on the defensive' (Sebald, 2001:19). Whereas it serves as a precaution against incursion by enemy powers, the pretensions to protect populations and to control radioactive releases with this type of barrier open up a conceptual abyss beneath the certitudes and temporal perspectives informing these forbidden, exclusionary Zones. This conceptual abyss is, for Baudrillard, fundamentally a model of deterrence; the same that controls us globally, under the sign of peaceful coexistence and the simulation of nuclear doom, and one that lies in the improbability of destruction, wherein the *glacis* plays an important technical role.

The specific characteristics of the *glacis* as a protective architecture, captured at an idealised moment laid out by the form of an immutable authority, designed to enforce the divide between the outside and the inside, and existing over, and enduring the dynamic forces of time, enables Baudrillard to question the feasibility of forbidden, exclusionary Zones as limit-structure. It also helps to frame an interesting approach-vector towards the material structures called upon to guard and defend against threats of radioactive contamination. He argues that they operate at the limit of their utility, and that beyond them there is always an unrestricted passage linking the inside with the outside, the regulated with the whole space. This, for Baudrillard, is how it is with any programmed system where nothing is to be left to 'chance'. If reason seeks control over the metamorphosis of things, to make flow and becoming impossible, it does it through manipulation, simulation

and/or modelling as a way of encouraging abstraction, reduction and exclusion. It is, therefore, associated with deterrence, the simulated conflict, which exists to preclude a conflict in advance, and that, creates an illusory reality, or winning scenario, due to its capacity to absorb anything that can be anticipated as a threat, as we have seen in Chapter III, Section 1. However, as it is impossible to verify but only to make sense of within a limited frame of reference, every attempt to impress this meaning and this capacity upon the world, writes Baudrillard, is confronted with the ultimate reality of ‘impossible exchange’ in fundamental uncertainty. It is this fundamental uncertainty, and the failure to understand it that haunts systems, and that, in some sense, leads them to fall into ruin. He writes:

The uncertainty of the world lies in the fact that it has no equivalent anywhere; it cannot be exchanged for anything [...] Whatever can be verified locally, the uncertainty of the world, taken overall, is not open to debate. There is no integral calculus of the universe (Baudrillard, 1999:3).

Baudrillard speaks of an uncertainty that emerges from the incapacity to determine the probable distribution of things, and that seems to reserve the opacity of knowledge in itself. This uncertainty haunts the system’s possibilities and equivalents, for it places possibilities in the limit; and at the limit of any possibility there is always another possibility opening and/or opened up. New, more extensive, varied, multiple, shifting and inclusive possibilities, hypotheses and/or things are made available by any certitude (and equation) that programmes and divides relations in (endless) calculations of futural and determined responses. This is the fragility of any system of thought, as Taleb’s *Black Swan* (2007) theory also emphasises. Contrary to Western thought, with its models and propositions oriented towards known quantities or constants, possibilities are irreducible to any rigid or finite schema of intelligibility. The knowledge we produce about them, as Isabelle Stengers argues, can add reality *to*, and not subtract reality *from*, the urgency to think them. Consequently, the possibility of establishing order over and above the nuclear ‘flood of effects’ is a radical, pataphysical² illusion, as Baudrillard refers to it. To achieve such order, one has first to eliminate the nuclear material order, but this can never be fully erased.

² This refers to ‘the science of imaginary solutions, which symbolically attributes the properties of objects, and describes their virtuality’, as coined by Alfred Jarry.

Radioactivity (anthropogenic and natural) is part of our environment; it rules in mysterious ways and affects the environment and people differently.

To explain this, Baudrillard defines the dangers threatening the human species as being less about *default* (the exhaustion of natural resources, the dilapidation of the environment, etc.) than about *excess* (chain reactions, or frenzied autonomous developments and activity concentrations). For Baudrillard, while the risks of *default* can be addressed (as by Political Ecology³), the risks of *excess* are irretrievably out of balance and ‘will inevitably absorb all transcendence and devour all agents thereof’ (Baudrillard, 1990:104). In *The Transparency of Evil*, he writes of the ‘fate of energy’, or more precisely that of catastrophes as comprising ‘an energy that economic calculations can never take into account’ (ibid:103).

Bearing a remarkable similarity to Virilio’s perspective⁴, although with a less fatalistic and ultimately nihilistic tone, Baudrillard’s view is that, ‘we should entertain no illusion about the effectiveness of any kind of rational intervention’ (ibid:105). He sees the world as increasingly devoid of control and lost in excess, in uncontained things – the ‘accursed share’, a general economy that accomplishes the reverse of things – in a manner that threatens the prevailing systems, as defined by Bataille⁵. The world is neither simple, the limit-condition of architecture, or simply defined by the limits of architecture and its calculated and restricted economy. In his writings, Baudrillard does not refer to Bataille directly, but uses and integrates Bataille’s aphorism in a theorem that affirms the ‘naturalisation’ of ‘the accursed share’ in the mechanisms of defence, exclusion, division and sacrifice, as analogous to reserves which express ‘unproductive expenditure’ and end by occluding the programmed.

For Bataille, the accursed share is the ruin (and destruction) of, and an excess incurring in every system, including that which rejects it. Bataille reads it, and the problem of the limit, as one of an infinite ‘play of forces’ always opening the limits traced; and here architecture itself enters his field of interests. He writes, ‘great monuments are erected like dykes opposing the logic and majesty of authority against all disturbing elements’ (Bataille

3 Which, as seen in previous chapters, no matter how right or effective, implies that the restoration of ecological equilibrium is (still) possible.

4 As in Chapter III, Section 1.

5 In Denis Hollier’s *Against Architecture: The Writings of George Bataille* (1989).

in Hollier, 1989:47). What happens within these dykes is a delusion: they give the impression of protection, an ultimate fragile security.

Bataille's target is utility, an apparently positive principle of all (technologies and) economies. Form suppresses material and tends to either idealise architectural materials or dematerialise architecture altogether. Baudrillard, however, takes issue with this. He underlines 'the uninterrupted production of positivity' (Baudrillard, 1990:106) because for him, 'anything that purges the accursed share in itself signs its own death warrant' (ibid:106). It is in the nature of the accursed share that catastrophe regenerates in proportion as it is extended. In such circumstances, Baudrillard positions architecture within its metaphysical essences – principles, a set of axioms or presuppositions – only to demonstrate that it constitutes an anticipatory illusion. That which gives architecture its power is a form of extreme anticipation, and an anticipation that puts into order (Le Corbusier, 1931:68) and moves the development machine forward. Architecture tends to arrest itself in complete forms to block the transparent ideal⁶, but the illusion of architecture is such, both Baudrillard and Bataille state, that it fools itself and only anticipates its own reverse. They use architecture primarily as a vehicle for talking about how spatial control (and politics) shapes the entire social arena and organises all the activities around itself.

For this work, as for both Bataille and Baudrillard, architecture offers both metaphorical possibilities and a rich and potent field for the analysis of the manifestation of the existing order. Bataille and Baudrillard both therefore instrumentalise architecture in this way to explore social structuralism and the way it cements the existing order as a fiction. The implication is that architecture anticipates what is to come, but in a way that only allows it to keep the defence system of the reserve *in reserve*, and to face the present in anticipative acts, practices and techniques of reservation, as described in Chapter I.

Chernobyl

Within our cultural apparatus, the Chernobyl, rather than the Mayak Nuclear Power station (the focus of the previous chapter) remains the key reference point to reflect on the above ideas. It is a construed-as-closed reality that owes to an architecture used first in the process of settling and managing space for nuclear power production, and thereafter, as a scare

⁶ This ideal refers to the perfect transparency that renders every object and system legible and classified, and that forces architecture to answer and assimilate difficult questions such as what if? what now? what next?

tactic to delimit the issues advanced by an actual toxic catastrophe that has had a devastating impact to the environment. Chernobyl has become the cultural icon of the bankruptcy of (Soviet) nuclear energetics and of Soviet political leadership (Josephson, 2000:88). Not only because its whole *raison d'être* has been called into question by its providing us with an image of major disaster, but also in how it succeeded, after the disaster, in sustaining an illusion of safety.

The various proper attempts to mitigate the accident and to monitor the short and long-term material effects and consequences of the Chernobyl fallout that were undertaken have enabled us to consider the different ways in which the accidental releases of radioactivity into the environment, and attempts at its containment, have impacted upon populations, specific areas and the planet. This goes some way to explain how Chernobyl has been significant, and how its significance was somehow impeded through silence and secrecy, and by epidemiological and scientific studies negating the accident. Such an impediment forecloses the authority's maintenance of tight control over the Chernobyl EZ and health data, their main reservation. For this action, Chernobyl has received a critical review aimed at several aspects of the nuclear programme in the USSR in general, regarding the construction, containment and eventual decommissioning of plants; attention that has raised serious radiological concerns over its architecture as a reserve formation.

It is agreed that the accident was due to a power output that rose to 100 times the normal, leading to an explosion and the burning out of Reactor Four core, releasing radioactive materials over much of Europe and, due to the prevailing winds, contaminating large areas of Belarus, Ukraine and Russia. In addition, the disaster was exacerbated due to the (poor) quality of the work undertaken in the decommissioning of the plant, clean-up and disposal of radioactive residues and by-products of the disaster. These have impacted beyond the economic, social and health parameters of the Chernobyl area, and upon public perceptions and concern worldwide as an environmental issue of Earth crisis and planetary safety.

As warranted by its significance and extent, the Chernobyl disaster has come to frame a clear counter-argument to the claim that nuclear power, and the area separated out for its production, according to regimes of threat, is an environmentally safe, well-contained and satisfactory solution. These regimes have pressed issues of urgency related to people who suffered from the disaster, but also had the effect of upending its causes and

effects. In this way (as detailed by those paying close attention to the zone), ‘the very word ‘Chernobyl’ has become a synonym for ‘horrific disaster’, conjuring up the frightful radioactive deserts that are the landscape of Atomic Age science fiction and resonate deeply in modern imaginations haunted by the specter of nuclear war’ (Mycio, 2005:1). The name summons up a dead zone combining fears of radiation with catastrophic dread: a cautionary story about ‘how the desire to change the world for better sent a nation stumbling headlong into calamity’ (Josephson, 2005:2). In this respect, the disaster marks the decisive event in modern Soviet history, in that it challenged the USSR’s traditional secrecy, its nuclear power programme, and renowned ability to master nuclear security and safety – their propaganda coup and engineering hubris – endowing the USSR with a deadly legacy that even Gorbachev’s *glasnost* policy could not initially overcome. It created a break between an (at risk) *before* and a (not quite contained) *after* insurance-related protection against the new risks and uncontrollable effects of a nuclear disaster.

The Soviet Union Atomic Energy establishment intended the (Lenin) Chernobyl Nuclear Power Station to be a paragon of nuclear energetics. This was planned with the hope of its becoming the Soviets, and indeed Europe’s, largest nuclear power station. Altogether, this was intended to demonstrate the ‘technological infallibility’ of the nuclear energy source, and promote an atomic-powered myth of ‘absolute safety’ (Medvedev, 1989). Inside its security perimeter or EZ was established the *Atomograd* (‘atom city’ of Pripyat,⁷ one of the Soviets’ highly restricted closed administrative territorial establishments (or ZATO, after the Russian acronym) presented as being harnessed to their nuclear technological mastery. Achievements in nuclear engineering were, at that time and globally, completely reliant upon and subservient to an ideology of progress and the potential for orderly prosperity. The *Atomograd* were exclusive, ‘rare modern cities of urban conveniences in an otherwise poor, rural landscape’ (Brown, 2013:4), built with fences, gates, guards and pass systems to enclose the plant’s plutonium production, and uphold the authoritarian qualities of the secretive nuclear security measures. The *Atomograd* housed well-trained employees to run the plants and promote them as safe. The

⁷ Pripyat was founded in 1970, less than 3 kilometers away from the reactor. It took the name of the adjacent river to the station – the one that has supplied water to cool the reactor’s fuel rods, and that connects the site through the Dnieper river to the Black sea. The city is today one of the ‘ghost cities’; a vacant city that exists, decaying inside the Chernobyl EZ as testament of its abrupt end. See Geyrhalter’s *Pripyat* (1999) and Jane and Louise Wilson’s *The Toxic Camera* (2012).

cities were established according to a regime that equated security and safety with permissible radiation exposure doses, controlled through the use of proper techniques, radiation surveys and monitoring procedures, as supplementary to other practical design features. For this reason, it was a reserve regime.

Following the disaster, large quantities of radioactive fuel and core materials were released into the atmosphere around the globe, in the northern hemisphere to a distinctly greater extent, and above all in the extensive geographic area adjacent to the reactor. This exposed the Pripyat residents, farming neighbours who lived in and near Chernobyl, as well as much of the Western USSR and Europe, to a public health disaster and the decades of poisoning of landscapes. The extent of the exposure was not only down to a combination of a design flaw involving the control rods that regulate reactor power levels, poorly trained engineering crew and a test that required voluntary disconnection of several safety systems, but also to a Soviet reluctance to believe such an accident could have happened: that is, to a combination of human error and a sort of optimistic approach to issues of safety. This exposure to contamination greatly exceeded the calculated area guaranteed in risk assessments as within the limits of its EZ. In fact, it breached the limits of feasibility of its safety structures, killed thirty-one people outright, and caused the premature deaths of thousands of people. In addition, it exposed the world's population to radioisotopes of iodine, strontium and cesium, destroyed the homes of circa 116,000 regional inhabitants (who were evacuated and resettled), ruined the surrounding productive farms and forestlands. The accident rendered the territory economically obsolete and environmentally ill, leading local farmers, journalists and activists, both regionally and worldwide, to demand accident records and environmental health studies so that we might begin to learn from nuclear security, atomic intelligence and radioactive hazards.

Cleansing Ecotones

To handle the disaster, widely considered the greatest technological accident in history so far, the former USSR mobilised between 600,000 and one million recovery workers and liquidators, both military and civil, to move the inhabitants away and clean up the severely contaminated areas of Belarus, Russia and Ukraine. Beginning two days after the disaster,

and after radiation from Chernobyl was detected at the Forsmark power station in Sweden,⁸ the implementation of an official three-day evacuation plan was extended from the 10 kilometres of the former EZ to a much larger area, totalling approximately 5000 square kilometres around the focus of the disaster. Borders were drawn and then redrawn by means of geo-statistical methods based on prevailing winds and rains. As per an understanding of the impact common to all architectural coping strategies, borders were drawn in order to set aside the contaminated locations, to contain the radionuclides released in the surrounding environment and to prevent people from re-entering the highly-contaminated territory. The Soviet government sanctioned the exclusionary perimeter created to surround Chernobyl. Ukraine created a single administrative unit called the Zone of Exclusion and the Zone of Unconditional (Mandatory) Resettlement. Belarus set aside the contaminated lands in the Polissia State Radiological and Ecological Reserve. The territory comprising these lands was then declared unfit for human habitation for untold years to come. It was restricted and thus subtracted to serve the joint protocol for the control and sealing of the rights of access to the contaminated area; to date, without change. Two lines of barbed wire, paramilitary checkpoints and special police units currently control it.

For the clean-up of the contaminated area, the Soviet government deployed a convoy of thousands of liquidators and other workers, along with a total of one thousand buses, plus helicopters, bulldozers, lunar and bio robots, in a mission never before realised on this scale. This forced improvements and cooperation, both to deal with the impact of the accident and to enhance safety on the site, also compounded technological problems and led to the establishment of more reservation arrangements. With the exception of a few villages in the contaminated areas of Belarus and the Russian Republic that were largely left alone, the clean-up matched the disaster in its magnitude and impact. The clean-up campaign involved the removal of a layer of topsoil for miles around the site, the laying of fresh asphalt and concrete roads and pavements together with hundreds of trees planted to bind the ground and reduce the spread of radioactive dust; the blasting of buildings with sand, and then their washing and spraying with liquid glass to fix what radioactivity was

⁸ When personnel from the morning shift measured increasing amounts of radioactivity on personnel passing the station's portal monitor, a check of surface contamination on the ground by the station showed that the source of the release was not an atmospheric nuclear bomb but rather a nuclear reactor accident.

left; the building of dykes and dams to keep radionuclides from spilling into the Pripjat river; and the erection of a 20-to-30-year old durational concrete and steel shelter object, called the Sarcophagus, to contain the invisible clouds measuring hundreds of roentgens that hovered over the cratered areas of the ruined reactor. This work was carried out according to an ideal remediation reserve programme able to surround (and contain the radioactivity from) the Chernobyl reactor and ‘shelter’ people outside it, wherein they(we) hope to be safe. Yet, as a group of UN agencies report, these were works done under extreme radioactive conditions and time constraints, leading to imperfections.

Despite the clean-up’s becoming a symbol of triumph over the accident, and the cheerful optimistic assertion of complete safety and control of the radiation situation to be within normal limits, several public health professionals voiced concerns about the spread of radiation beyond the limits and infrastructures proposed for the clean-up of the Chernobyl disaster area, namely into the waterways and reservoirs. It is said that, from the estimated 160 to 180 tons of fuel (of the 200 tons there at the time of the accident) left locked inside the damaged reactor, water was detected leaking through the Sarcophagus (built to encase the damaged reactor) via (ventilation) holes in its roof, becoming radioactive and then seeping through the reactor’s floor into the soil. A decision was taken to replace the Sarcophagus with an arch-shaped ‘second coffin’ or structure, called New Safe Confinement (NSC),⁹ the central element of the dome Shelter Implementation Plan to finalise the encasement, prevent the release of radiation into the air, protect the structure from external impacts – such as extreme weather – and transform Chernobyl into a safe and secure state, now in place.

In addition, experts working in the area stated that beyond the large amounts of radiation added to the ecosystem and the spread of radioactivity through the reactor’s floor, the remedial operation and attempts to re-territorialise and reinvent the boundaries that delimited the catastrophe itself, contributed to hazards decaying untreated after being placed in temporary, near-surface waste storage and disposal facilities inside the EZ. These facilities, they report, were established without proper design documentation, engineered barriers, or hydro-geological investigations and their situation has resulted in new large-scale uncertainties about their impact, not only over the safety assessments and

⁹ The structure rising near the remains of the reactor 4, expected to be completed by 2017 and to last a minimum of 100 years.

environmental analyses but also on the remedial actions and criteria for new facilities (UN Chernobyl Forum, 2005), because they cannot be retrieved easily for treatment. Plans for the retrieval of the radioactive waste stored in these facilities are currently under study, but there is no precise information about their location, nor has a comprehensible programme for radioactive waste management been established, to date, for any further clean-up of the contaminated areas or temporary radioactive waste facilities. The potential for toxic release from the EZ continues, and it depends on the total of radioactivity stored; the waste form, the retention and absorption capacity of the substratum, and the location of the sites in relation to the hydro-geological settings being constantly monitored by the vast machine and team of experts. This potential threatens the architecture of the Chernobyl reserves (see Nuclear Waste Challenges, ahead).

The UN General Assembly has proclaimed 2006–2016 a ‘Decade of Recovery and Sustainable Development’ for the affected regions of the Chernobyl disaster. Their reports, informed by the UN Chernobyl Forum¹⁰, say that radioactive particles, mainly cesium 137 and strontium 90, by-products of uranium fission, have within the past thirty years fallen to the half-life of their original value, but that longer-living radioisotopes remain dispersed together with them, and continue to, to this day, at lower levels. A great deal of radioactivity, they state, is either locked up in the wild, heightening the alarm over wildfire (as in the East Ural Nature Reserve), or is leaking from waste containers and the damaged No. 4 reactor, down into the soil. In addition, they add that even though:

due to wind and rain and human activities, including traffic, street washing and clean-up, surface contamination by radioactive material has been reduced significantly in inhabited and recreational areas during 1986 and afterwards, one of the consequences of these processes has been secondary contamination of sewage systems and sludge storage (UN Chernobyl Forum, 2006:21).

This is very like that reported from, and currently haunting the East Urals Nature Reserve.

Ukrainian scientists are still evaluating Chernobyl-related problems and the present environmental conditions of the end-of-days, no-man’s landscape surrounding the nuclear power station. Occasionally, new evidence of the chain reaction (both literal and

¹⁰ Constituted by a panel of experts assembled by the UN, the World Health Organization and the International Atomic Energy Agency, based on environmental, socioeconomic and human health research.

epistemological) emerges. Some expect an outbreak of radiation-related illness due either to the clean-up efforts under way (and to be initiated) or a fire in the Red Forest, whereas others focus on a more positive impact at the level of the biotic. These experts look at the ways in which the region's ecosystem is rebounding since the accident and beginning to function normally, and how it is, paradoxically, becoming Europe's largest wildlife refuge, or nature reserve. The fate of this radiological environment, biologists argue, may give a glimpse into the future of the areas now absolutely closed to human life. Subsequent generations of wildlife have bounced back normally, and existing populations of the 'Red Forest'¹¹, a former wormwood plantation, have multiplied.

Together with the tall trees planted in specific locations, these radioactive plants, weeds and grasses have grown up through the pavements and spread into the upper stories of the built environment, ripping the abandoned structures apart; slowly deconstructing and reforming what was thought of as permanent, and reverting the zone to a big, untamed forest regenerating at an unprecedented rate. The evacuated territory is teeming with stable, if inedible ecological life, that which ecologists' call *ecotone* – environments where two or more contrasting ecologies meet and more or less healthily mingle (Clement, 1905 and Odum, 1953). In terms of its future, the plan is to recover the less-affected areas, make the non-affected areas available for limited use by the public, and maybe the construction of a deep nuclear waste depository for the country.¹² However, the idea of re-populating the Zone in this way, as the radionuclides decay with time, would remove the barrier of safety distance between the radiological danger and human experience; this idea is the subject of dispute and controversial empirical and epistemological reservations.

Challenges to Safety

Thus, the space that erupted in place of the disappearance of the former, so often compared to the desolate landscape of the zone in Tarkowski's *Stalker* (1979), or better still the inexplicable visitation zones of the Strugatsky brother's *Roadside Picnic*¹³ (1971), constitutes a different future from the projection of an apocalyptic and lifeless radioactive

11 The name 'Red Forest' refers to the colour of the pine trees that died from high doses of radiation and the clouds of smoke and dust released from the Chernobyl accident.

12 Current news also highlight plans to build a solar reserve in the territory of the Chernobyl EZ.

13 The science-fiction novel depicting strange and dangerous phenomena not understood by humans and from which the Strugatsky brothers based the screenplay of Tarkowski's *Stalker*.

future that accompanies the *cultural* construction of Chernobyl. It is engulfed in a radioactive wilderness at odds with the expected social, economic and ecological consequences of such a disaster, which have instead resulted in an unexpectedly inviting habitat that completely evades our perception and threatens to undermine the very concepts or categories we now rely upon, ‘with facts that are at once beautiful and horrible’ (Mycio, 2005). It evokes an experience of time’s healing, and perhaps even enables us to face death without fear, once placed in the continuum of timeless duration, archived in a continuous present, as the fauna and flora recolonise the zone.

This idea constructs a specific notion of the reserve, in which it is conceived to consist not only of a *life exposed to death*, in the original political sense of *bare life* or *sacred life*, but of a life already defined by death, involving a much greater loss of vital functioning than that which had previously been thought, and which we can potentially regard as immortality. Since the modern idea of immortality benefits from the collapse of our belief in a timeless realm of eternity and confronts instead an extension of the finality of death, its immanence and inevitability in biological life, by pushing life’s limit beyond death as an external limit.

To access the site, there are several restrictions, precautions and protocols, some institutional and others psychological; strategies to face the radiation levels – within the zone – and its impact in the future, once out; as little is still known about the extent of genetic harm that a low and short exposure can inflict. Those that enrol on the ecological tours offered by the Chernobyl Interforum sign a form that explains the rules: no wandering off from the tour guide, no touching, no picking objects up, or taking it out of the zone. Visitors must declare themselves complicit with a release-from-liability section, that denies any liability on the part of the Ukrainian government for any negative effect upon one’s health, now and in the future, and are they obliged to follow a dress code that, despite the reason that it is intended as a barrier to gamma and beta rays) closely resembles the clothing restrictions required of visitors to the walled sovereign territory of the Vatican City in Rome. This dress code and signed waiver are also protective reserves against the uncanny presence of toxic radiation that continues to seep from the site. The levels are well detected by the digital readout of radiological dosimeters but the risks radioisotopes pose at various levels are not yet sufficiently understood so as to guarantee safety within the zone. The reports based on environmental, socioeconomic and human health research provide an

optimistic view of the disaster's aftermath, while not denying that some of the central areas of the zone, including the Red Forest, remain acutely contaminated.

Currently, there are circa five thousand people working, in shifts, in the nuclear power plant, related areas and forestry. There are scientists performing research, construction workers of the NSC, nuclear waste employees, administrative officials and other maintenance, monitoring, decommissioning and clean-up workers, and a few people that have returned to their houses. There are three bars, one grocery store, the headquarters of Chernobyl Interforum, the official agency that ushers visitors into the Zone, and a few houses. At the very centre of their lives, encased in the cracked and unstable Sarcophagus stands the 'Elephant's Foot', the nickname given to the globular mass formed by the melted reactor core once it cooled in the disaster's aftermath (Mycio, 2005:217). Ideally, all the highly radioactive material inside it should be collected and moved into containers and safely stored. But, given the risks of lethal radiation exposure, no one can get close enough, neither to do so effectively nor to study the debris. This nuclear debris will mar the Earth deep into time, provoking fear, disgust and yet another level of avoidance. The NSC was put in place to cover over the old and unstable Sarcophagus and last enough time (at least one hundred years) to successfully research possible ways to dispose of the high radioactive materials that remain. Critics charge the structure with not being hermetically sealed, but only relatively safely enclosed, as well as for not doing anything to prevent the moisture that is inside the Sarcophagus from condensing. Once complete, the NSC will now keep it reserved in a *matryoshka*-like fashion. That is, like a Russian nesting doll; in, after Baudrillard, a never-ending simulacrum of complete units, as part of a larger system of a closed-world ideology and closed forms threatening to implode (as in Chapter III, Section 1).

In this context, the Chernobyl disaster is increasingly being managed and enveloped by boundaries that will continue to require defending. The division they constitute between the uncontaminated and contaminated must continually be asserted if they are to effectively keep up with even the remotest of possibilities, including those of events that are radically free and that transcend human-demarcated boundaries (and those so-induced), including between separate objects or processes as well those on which classical ontology is based (Chapter II, Section 1). If not, the probability must assume that an actual return on the safety investment will be lower than the expected. These have been

the ideas fuelling arguments about nuclear energy that might us help to understand Chernobyl not only as the biggest artificial and anthropogenic disaster but, in a positive sense, the key ‘natural’ disaster. And not because it has resulted from natural processes of the Earth, nor as a human-induced condition, fate or fortune that we can define as natural, but because of the virtual and generative nature of a force and kind of power that, as Jane Bennett argues in *Vibrant Matter* (2010), acts in excess of its association with human meanings, habits and projects (regardless of organic or inorganic status), wherein the artificial has become an integral part of the natural. This is not a ‘natural’ framed as normative or even apparently pristine. *This* natural is at once part of an environment that has been subject to human intervention, via our technical ensembles and dynamics, so as to ‘contain’ the military’s historical production and legacy in sterile conditions and thus keep it separate from the rest of the world, and also, perhaps, recognisably part of the activity of the ‘mode of existence of technical objects’ within our techno-geographic milieus, as per Simondon’s (1958) ontogenetic perspective.

Simondon shares Heidegger’s contempt for a world reduced to utility and calculation, and then goes on to theorise *technics* as characterized by the emergence of technical ‘individuals’ in the form of technical objects carrying tools. For Simondon, the technical object, more than an entity created in the service of humans, engenders ‘families’ and such transformation entail the idea of a natural ‘evolution’. To explain this, Simondon writes:

[the technical object] incorporates part of the natural world which intervenes as a condition of its functioning and, thus, becomes part of the system of causes and effects. As it evolves such an object loses its artificial character [...] The mode of existence of the concrete technical object is analogous to that of a spontaneously produced natural object, we can legitimately consider them as natural objects (Simondon, 1958:46-9).

For Simondon, technical objects acts actively on the natural world and there enter their full realization, toward naturalization. The negotiable and undetermined nature of the technical object (and their active part in shaping the world we live in), according to Simondon, is part of the necessary conditions, operation and maintenance that allow for structures to be generated and/or improved. Accidents (generated by it) are expected and integrated into the evolutions and concretion of the technical object itself. Our technical objects pass through a

series of ‘discontinuous improvements that bring about modifications in the internal scheme of the technical object’ (ibid:50). These are neither brought about by chance, nor are they independent of any assignable meaning but rather achieved and constituted by mutations in meaningful directions. He pays particular attention to the thresholds at which technical development meets natural systems, not as in the realm of confrontation, but more akin to what defines the Chernobyl EZ as a possible ecotone – that is, a transition area where ecologies are in tension, providing a shared zone of mutually beneficial interaction – taking on the rhetoric of control and atomic precision (that describes the behaviour of nuclear power plants as if in ideal, ‘laboratory’ conditions) to show another possible, albeit extremely vulnerable, reality.

Simondon’s insights thus offer us a more positive outlook on the reality left by the meltdown and its clean-up; they also coincide with many studies of science and technology which are dedicated to the ways that contemporary paradigms have limited our ability to see objects in their true complexity. In particular, there are those by the sociologist Ulrich Beck, the cultural theorist Paul Virilio, and the artists-researcher Susan Schuppli, that associate technological development with the exteriority of the forces that are manifested in an encounter/event either through risk or accident. These perspectives offer the basis of what constitutes an interesting way of posing the realm of potentials and forces at play in the Chernobyl EZ (and disaster), and moreover of radically altering the way we perceive the risks and threats contained in similar reservation arrangements.

Recalling Virilio (and Deleuze), Schuppli states that:

nuclear disasters don’t happen by mistake: they are inadvertently manufactured as one of the consequences of harnessing nuclear power. This is why the myth of a fail-safe system still requires a series of backup operations and contingency plans just in case the unthinkable future-event does arrive (Schuppli, 2011:140).

For her:

In the case of Chernobyl, it was in the act of entombing the colossal nuclear power plant in concrete and steel, creating a latter-day Sarcophagus, that the major nuclear accident was invented (ibid).

Thus, according to this order of ideas, the Chernobyl disaster was ‘not limited to the event-space time of the Ukraine in 1986’, but ‘always-already pre-emptively inscribed within

those event-making transmissions yet to come as well as those that have already perished' (Schuppli, 2011:133-4). This is so, for Schuppli, because as she asserts an accident is 'always-already preprogrammed into any technical object as one of its latent capacities, even though chance still has an important role to play in creating the necessary conditions for its emergence.' As such, it follows that 'when circumstances conspire 'accidents' can happen, but they do not, however, happen accidentally' (ibid). They happen systematically, rather concealed in the irony of the promise to prove that, as in this case, for example, Chernobyl's reactor 4 was absolutely safe and under control. In line with Ulrich Beck's contributions to risk discourse and theory:

The irony of the risk here is that rationality, that is, the experience of the past, encourages anticipation of the wrong kind of risk, the one we believe we can calculate and control, whereas the disaster arises from what we do not know and cannot calculate (Beck, 2006:330).

The most radical challenge that this presents is in positing that the Chernobyl disaster was already preprogrammed into the nuclear power station as part of its essence and concealed reservations, even though control of the station was aimed at preventing accidents. If so, then it alone does not constitute nor evoke a catastrophe; on the contrary, the catastrophe was already inherent to the activity, in its very 'infallibility'; in, even, the concrete of the nuclear power station and the remediation Sarcophagus that did work to reduce anxieties but, in fact, cracked. Perhaps as Smith writes:

the clouds of radioactivity released from Chernobyl [...] are accidental only in the very trivial sense that they were not (usually) the intended consequences of the social activities concerned [...] but a necessary and inevitable corollary of modern modes of production, of progress itself (Smith, 2011:71).

This mounts a significant challenge to the modality of thinking acts and architectures of reservation, and reservation arrangements as complete and safe.

As a disaster, the Chernobyl disaster exposed the ways in which we attempt to deal with certain risks and dangers by means of socially-constructed models and parameters of risk and uncertainty, and ways of coping with and managing them. It made visible those invisible agents that define themselves not only through their outcomes but through the performance of processes they have initiated, and that therefore hold risks captive to a

similar cyclical pattern to that which characterises the natural world. Risks, writes Beck (1992:30), always depend on decisions. That is, they presuppose decisions; they are bound up with the development of instrumental rational control as a largely defensive attempt to avoid problems and dangers. Risks anticipate destruction and disaster. They exist in a permanent and socially constructed state of virtuality, as ways of relating to the future. The age of the nuclear, for Beck, unleashes a destruction of the calculus of risks by which modern society has developed a consensus, or a kind of security pact, based on a reserve of calculated potential and forces held against industrially-produced dangers and enduring hazards that inhere within accidental changes.

In this way, and unsurprisingly, the reserve itself has become part and parcel of the chain of events as an effect of the anthropocentric architectural agenda. In what Beck calls the risk society, what *stands-in-reserve* is revealed to us as ‘destiny’, which for Heidegger shows what is *appropriate* – from *proper*, meaning true form, and one’s own – and for Simondon, the benefit of technical mediation. The reserve is therefore no longer a supposedly incontestable or accurate limit, in terms of accountability, that defines possibilities, both physically and metaphorically, but the limit of calculability itself: bound by the absence of any tie to the actual. Risks are always indeterminable themselves, in reserve of further power and (assembling) allies or actants.

Actants, according to Callon, Latour and Harman (in his reading of Latour), are nothing more than what they do: they are their own effect. They are independent from how humans refract them in their designs and representations. Actants, as Harman explains in *Prince of Networks, Bruno Latour and Metaphysics* (2009), ‘are not strong or weaker by virtue of some inherent strength or weakness harbored all along in their private essence. Instead, actants gain in strength only through their *alliances*’ (Graham, 2009:15). Any element that binds space around itself, making other elements dependent upon it is (an) actant, a hybrid or *quasi-object* (after Serres) that creates its own nonhuman and posthuman actant-worlds by embodying uncertainty. All natural and artificial things must, therefore, count as actants as long as they have some sort of effect on other things. This means that acting makes creative interventions in chains of events and that eventual outcomes are entirely unpredictable. Given the above, the tendency to reduce risks to vehicles of human thought, as Beck does, is predominantly correlation-idealist (see Meillassoux, 2008). It ignores that ‘forces are always rebellious. They lend themselves but do not give’ (Latour,

1988:198).

Allies of Actants

Chernobyl is one of the major examples of an intensely rational-technical Soviet response to risks and risk information. It provided a laboratory for identifying factors affecting public credibility and public anxiety; for phenomenological analyses of technical objects and for examining scientific knowledge, its inconsistencies and uncertainties. By accident, all kinds of controlled assumptions and judgments that had underpinned related scientific facts were corroded.

Similar to the Mayak power station and owing to the same compartmentalisation of information, secrecy and failure to inform the public of the dangers of radiation and the unpredictability of radioactive fallout, undertaken as a way to protect the nuclear power plant and the levels of contamination there that have continued to haunt the territory converted into the East Ural Nature Reserve for generations, Chernobyl, too, shows nature's resilience. It stands at once as a spectacle of nature's survival, and as testament to a failed conception of nature as subservient to human affairs and fantasies of remediation. In both cases, the nuclear sites have been handled as national sacrifice zones, each one an exemplary Soviet attempt to bind space and stop time against the chaos of the unknown actants involved and ecological transformations taking place. In both cases, it was insisted that the sites could be controlled through technical intervention; and that nature, once separated from humans, would have healing capacities to help it. The intention was thus to work with and through an embeddedness in, and via material exchanges with the environment to 'naturally' delete the uncertainties inherent to radioactivity, rather than taking account of nature's own agency. This omission itself calls into question the scientific assumption that risks were measurable and predictable. The clean-up and current management, in both cases, yield evidence of not only the containment, but of the reported radiation levels from waste and material fallout; and are (the clean-up and current management) not immune to the interactive processes between material and human factors that are in a continual state of becoming, as recognised in Latour's theoretical accounts of the network, as well in Baudrillard's incursions into system theory and his thesis on *The Transparency of Evil* (1990).

Like Latour, Baudrillard writes that Chernobyl plunged scientific knowledge into

doubt by rendering visible what is, by definition, contingent. In his argument on Chernobyl, Baudrillard writes that the disaster ought to make way for a more appropriate process of assimilating possibilities, as a means to encourage the exercise of critical judgment about the current condition of both the nuclear energy system, the logic of partition, isolation and distancing for control and containment and the silent poisoning of humans and the environment this system involves. These are themes that reappear in Gianni Vattimo's ethico-political elaboration of 'weak thought' (Rovatti and Vattimo; 1983, Chapter 2, Section 1 of this thesis) via a critique of modernity; specifically, in the concepts with which Vattimo comes to terms with the errancy of *foundations*, so as to promote a retreat of metaphysics as a progressive weakening of ontological claims and an opening towards new and diverse modes of being (Vattimo, 1985; Borradori, 1987-88; Zabala, 2007) determined by a radical withdrawal of the future, being that which is predicated on and managed by the tendency to universalise and impose a single point of view of how the world and works are ordered.

Vattimo's concepts, which have aroused worldwide interest since the mid-1980s, are concerned with direct experience rather than idealised and conceptual manifestations. He seeks from them a hermeneutic rationality, as 'a meta-theory of the play of interpretations' (Vattimo, 1997:9), so as to celebrate the groundlessness that has followed upon the demise of the 'grand narratives' (Lyotard, 1979), or unifying systems.

This position springs from the recognition that the present-day status of reason, of knowledge and the methodological project, are locked in the foundations of their ideas and criticism; compelling dubious reflections on principles, commitments and appropriateness based on a 'rational' system of causes and effects, or statistical forecasting universal claims about reality. These must be relinquished:

the ultimate grounding of reason as it evolved through the scientific enterprises of recent history does not reside within the horizon of reason (which is to say in its language) but outside of it, mainly in the fields and activities whose primary concern is not of necessity of reason or the implementation of power (Carravetta, 1988:7).

This being so, he declares that we must moderate our ambitions and in accepting that radical complexity and contingency is inevitably held in reserve, realise that we are not separated from, but the creators of new alliances between humans and non-humans alike.

There is no way to stand outside of the cocoon of reserves and coexistences that we have created and exploited, or to be an impartial spectator.

The consensus is that whilst radiation occurs naturally in the environment, the enrichment of uranium (and the production of plutonium) incurs risks (and costs) beyond those generated by the operation of the nuclear industry's reactors. It also devastates the ecologies of those countries that mine uranium and that host operational and/or withdrawn nuclear power stations, as well the ecosystems that connect the mines to the power stations, not only those that link these to weapons of mass destruction (see Wyck, 2010). The operational and logistical level of manufacturing and production involve hazards of chance. Also, their ideal of strength contains an inherent vulnerability, of understanding, and in relation to the dimension of time, since, as radiation cannot be figured or sensed, it can only be detected and registered through devices. Finally, the risks of harm through accident or environmental disaster and the process of accommodating the materiality of the nuclear infrastructure (by dismantling and decommissioning it, in parts) presents us with an additional challenge. This stems from the belief in harnessing the mysteries of the atom for nuclear power (whether military or civil), that has led to almost unlimited expenditure, seen the industry expand faster than the time it takes to dispose of its waste products or to clean up its emissions into the environment, and restricted the strengthening of health and safety procedures after crises.

Standard measures of nuclear guardianship have been obliged to simplify and reduce a multiplicity of problems, chain reactions and practicalities in their efforts to correct parts destroyed in an accident, or just routinely broken/worn. However, these very pragmatic responses to such challenges are now being developed, in 'hybrid forums' (Callon, 2001) or dialogical spaces in which the images of accidents, failures and controversies – about how to deal with, and avoid them – are further defined so as to clarify and articulate complex socio-technical issues. These spaces or forums are defined as hybrid because the questions and problems they pose, or take up, are addressed at different levels in a variety of epistemic or disciplinary domains and perspectives, and thus make way for an ethos of dialogue and interpretation which, according to Gianni Vattimo, is likely to weaken the persuasive forces of the real. Participants include nuclear physicians, politicians, and technicians in the field who are accustomed to thinking and acting with technical competence so as to reduce uncertainty in the behaviour of nuclear materials,

facilities and subsystems of safety (such as those involved in their testing, and in their being built). In addition, persons without professional or specialised knowledge but who, nonetheless, consider themselves to be involved, as well as semioticians, anthropologists, historians and social theorists concerned with the work and tactical ethics that are and have been developed in these forums. They communicate their conclusions, reveal information on operational and decommissioned reactors, and radiological reservations related to releases of radioactivity into the environment, as well as what remains secret and unknown (see Bradley, 1997).

Nuclear Waste Challenges

The idea that the use of nuclear power has advantages over fossil fuels in terms of reducing air pollution and greenhouse emissions, and that the material abundance of nuclear waste, the effect of radiation over time and space, and the structures intended to tame these can be safely contained in reservation arrangements, have fostered discussions and debate in the media, in hybrid forums and within the international diplomatic community. Together with tasks such as building structures so as to neutralise radioactivity and/or reduce the likelihood of events reoccurring, these arrangements have led to nuclear power being made the subject of high standards of regulatory, administrative, safety and engineering control, themselves suspended between certainty and uncertainty. Radioactive (or nuclear) wastes, whether in the form of spent fuel, or the water, tools and infrastructures used to cool and contain the reactors, are said to ‘settle’, ‘until conditions that provoke them into retroactive presence arise’ (Schuppli, 2014:140). While decaying, they emit alpha, beta and gamma radiation that can be very harmful for people and the environment for thousands of years to come. They ‘inhabit space at the expense of time’. They are ‘historic agents, producing their own future’ (Paglen, 2012:xii) and their very volume exceeds our imagination.

Each year, globally, the already large amounts of low and high-level transuranic radioactive waste created by nuclear power plants and fuel cycles together with research and defence programmes (weapons reprocessing, or decommissioning) increase by hundreds of metric tons. These wastes are normally placed and kept either in vitrification facilities, dry cast storage or cooling pools that create a shield for radioactive emission and cool the fuel rods; or in infrastructures of brute simplicity such as landfill. Places that are considered as the first step in the long-term approach to radioactive waste safety, and that require extensive surveillance and security maintenance. These places, normally situated

within the fenced-in plant area or EZ, either on the ground surface or in voids such as deactivated mining galleries, are often criticised as vulnerable to earthly forces, human errors or accidents. The history of nuclear power plant containment conditions is littered with such events¹⁴.

Nuclear wastes contain highly radioactive fission products and some heavy elements with long-lived radioactivity that is radiant, volatile and mobile energy which needs to be isolated or placed in reserve in order to secure the threat it presents, as in prison parks. Pollutants of this kind are, as mentioned, harmful to the present and future environment and all species on planet Earth.

Long cited as the bitterest legacy of our rationalised, technologically enslaved world, nuclear wastes challenge borders and predictions, myth and imagery, while carrying emotional force (Weart, 1988). Michel Serres terms nuclear wastes as *world-objects*,¹⁵ that is, materials whose global dimension is commensurate with the dimension of time; they are literally *about time*. Timothy Morton prefers the definition of *hyper-objects* (2010), that is, objects that ‘stretch our ideas of time and space, since they far outlast most human timescales and are massively distributed across the vast areas of terrestrial space’ (Morton, 2010:131). As such, *hyper-objects* are never experienced directly, but via a false immediacy. They occupy several places simultaneously – including, possibly our DNA. Morton refers to *hyper-objects* as strange-strangers for the reason that their uncanniness undermines normative ideas of what an object or material (proper or improper) is.

Morton’s account presumes, above all, the need for an ethics of how to account for how *hyper-objects* are situated in a network of interdependencies with other entities and how much influence they exercise. For him:

we need some other basis for making decisions about a future to which we have no sense of connection. We must urgently construct some other ethics and politics based on a non-self to deal with these pernicious and colossal entities. Not self-interest theory (ibid:119).

The realities of nuclear practices and activity (and their various residues) are of a properly

14 Take for example the Chalk River accident (1952), the Kyshtym disaster (1957) in Chelyabinsk along with the Chernobyl disaster (1986) and Fukushima Daiichi (2011).

15 The concept and history of ‘world-objects’ appears in *Parasite* (1980), *The Natural Contract* (1990), *Conversations on Science, Culture and Time* (1995) and *Mal-Feasance* (2008).

ecological sort: ‘awkward and dangerously lively [...] they cannot be adequately contained within an arithmetic of risk and probability’; they ‘do not conform to traditional notions of responsibility and reparation, or location and jurisdiction, or for that matter cause and effect’ (Wyck, 2005:xvi). Their complexities, motility and longevity defy architecture, design and engineering capabilities. ‘Nuclear materials can neither be completely accumulated (contained) nor spent (disposed). They tend to drift. The duration over which they must be maintained and protected spatially is too long’ (ibid:4). Yet we are nonetheless confronted with (and compelled by) the necessity to build and conceive infrastructures to deal with, and to occlude the stockpile of nuclear waste on a continuous basis; that have, as their conceptual form, the reserve.

The Ukrainian government has approved and begun to implement a national strategy for the safe handling and disposal of the radioactive wastes that have accumulated across the country and in the Chernobyl EZ, to be completed by 2060. This involves the deep processing, conditioning and storage of radioactive containers in a central repository or disposal facility 17 kilometres away from the Chernobyl power plant (but within the 30km zone), which will be subject to radiological monitoring for three hundred years, when the radioactivity will have decayed to such an extent that monitoring is no longer required. Several of these repositories are being built worldwide. In *Signs of Danger: Waste, Trauma and Nuclear Threat* (2005), Peter C. Wyck, investigates into and explores nuclear waste as an ecological threat in its temporality and toxicity through an analysis of the solutions presented by the US government for the WIPP, Waste Isolation Pilot Plant and underground disposal facility being built to store inter-defence related transuranic radioactive waste, in desert land near Carlsbad, New Mexico. In the book, he acknowledges that such infrastructures and ‘strategies cannot simply be directed at constructing lines of defence against the possible.’ He writes that:

the burial in the desert amounts to the extension of thinking about the possible to its absolute temporal limits. Yet what is excluded from this picture is everything that threat can accomplish that does not resemble what its possibilities are thought to include (Wyck, 2005:119).

The emphasis on the limits and restrictions that there might be on/with the WIPP and other, similar underground disposal facilities tells us a great deal about the conceptual framework that has enabled Western society to develop ecologically-destructive ways of life, and the

perceptual shifts that are necessary to learn from complexity and ecological embeddedness. According to its Latin (etymological) origin, a limit refers to a boundary or frontier, an impassable obstacle or the impossibility of moving beyond, as manifested in the function of walls. These walls served important military functions but they also served purely symbolic functions (Alberti, 1452). This is related to the desire of prophylactic reason that Baudrillard explains in the *Transparency of Evil* (1990), as intended to fabricate a false reality that is to be consumed as real.

Epidemiological studies and health surveys challenge the same notion of limit when they conclude that there is no low-threshold limit for radiation risks. How exactly are we, then, to build these limits? How do we architecture the space for nuclear waste? Can there be an anti-type of architecture, as its negation; an architecture of space restored to its indeterminacy?

2 ISOLATION PROTECTION

In Onkiluoto, near the town of Eurajoki, on the south west coast of Finland, a facility comprising a system of underground tunnels 5 kilometres long and circa 400 metres deep is being hollowed out of magmatic gneiss, the solid bedrock. This geological repository facility is on track to be the first attempt to implement an official a permanent solution for high-grade nuclear waste disposal.

Named *Onkalo*, the Finnish word for ‘hidden place’, the facility is being built to be sealed off and never opened again once the past and near mediate future nuclear waste of the Finnish – and only the Finnish – has been deposited and cocooned in the tunnels deep underground. To that end, its construction follows the models for the disposal of radioactive wastes that are being developed by many countries worldwide, and that conform to mandated solutions that regard geological repositories as the most stable and secure option to permanently separate hazardous contents from the public and the environment. And because ‘environmental regulations such as those proposed for burying nuclear waste are fundamental to human society’, and ‘what they do is protect the lives of future generations by prohibiting us from prematurely destroying their chance for an existence. The worldwide burial of this nuclear waste guarantees our descendants to their own futures’ (Thue in D’Agata, 2010:87).

Since 1954, the year the world's first nuclear power plant became operational, significant experimental research and development programmes have been undertaken to determine satisfactory disposal sites and methods, given the health and safety concerns. These comprise socio-technical combinations of many factors and actors that are, in many respect, hypotheses of stability (and functionality) tested via computer models for their actual long-term safety. The fundamentals of the recommendations for the disposal of waste in deep porous beds come from the *Status Report on the Disposal of Radioactive Wastes*, as a logical and necessary part of the *Study of the Biological Effects of Atomic Radiation*¹⁶ published in 1957. The report states that deep underground disposal (or geological storage) facilities are best suited to the task of holding and leaving large volumes of high level waste and spent fuel to rest, far into the distant future associated with radioactive half-lives and emissions. Such disposal, it is argued, is capable of meeting the monumental forces of geological time and the gradational movement of long-lived radioactive materials and their decay. It must be built in environments unlikely to be affected by natural geological phenomena or attractive to exploratory drilling or other anthropological interest, so that they should be left undisturbed.

Accordingly, the Waste Management Committee of the International Nuclear Energy Agency, the group responsible for fostering international co-operation, stresses the importance of gathering information on long-term geological change and geo-storage processes to assess the safety of deep depositories through an analysis of the present characteristics and incidence of natural resources of any site, their differences in the geological past, and likelihood of changes in the future. That is, of the whole geo-storage process. The depth at which the disposed-of material is to be placed depends largely on the type of formation provided by the host rock and the isolation capacity of the overlay clay – boundary conditions aimed at scenarios of geological permanence, and deep time.¹⁷ Because the main component of concrete, ‘particles of sand and gravel, dominated by

16 This was a study providing information on the nature and problem of radioactive wastes that proposed processes for a permanent disposal and background information on reactor processes, along with certain aspects of the economics of waste and a review of the potentialities and problems of land disposal. The Committee on Disposal and Dispersal of Radioactive Waste, sponsored by the United States National Academy of Sciences, the United States National Research Council and the Rockefeller Foundation, prepared this study following the 1955 first Geneva Summit (a Cold War-era meeting between American and Soviet leaders to reduce international tensions and begin discussions on peace).

17 The stretch of geological time.

quartz, has inbuilt geological durability, it is likely to be a survivor within the underground realm, although it might not survive entirely unchanged' (Zalasiewicz, 2008:175). This brew of quartz-heavy sand and gravel, the calcium of ancient seashells hardened into an artificial rock has good enough geological credentials to act a fossil-containing rock – the stratum whose consistent characteristics scientists and engineers correlate with a hardness over time – as repositories: that is, to allow architecture to mimic geology and build (as if) a fossil.

Passive systems made up of engineered and natural barriers, such as deep underground facilities for geological repositories, entail a combination of waste form, waste package, engineered seals and geological formations suited to providing long-term isolation, confinement and containment of high-level nuclear waste with no need for surveillance or maintenance, in contrast to the intermediate storage facilities that currently exist. Conceived as a purely technical problem and able to operate by themselves, these repositories are thought to be secure and able to protect the outside from – by stopping or retarding – the release and migration of radionuclides into the environment, and to protect the inside from the intrusion of anything (like the water table) or anyone penetrating from the outside and releasing dangerous materials. They are constructed according to the intention to build an incorruptible place; the ideal protection-exclusion design, enclosed firmly in the surrounding underground mass; and for that they need to take measurements and assure geophysical monitoring to ensure that the models behave as predicted, remain isolated and are able to respond appropriately.

The main technical challenge likely depends on an assessment of the bedrock as solid enough to be transformed into predictable 'best case scenarios'; to make room for nuclear waste in a sealed and confined burial ground. This is a realm that, through the mimesis of the fossil – a recollection-object that bears the trace of past life, as of 'an ancestral distant reality or event' (Meillassoux, 2008:10) – mirrors the stratagem of the crypt, described by Derrida as 'a place comprehended within another but rigorously separated from it, isolated from general space by partition, an enclosure, an enclave. So as to purloin the thing to rest' (Derrida, 1986:xiv). The space of the crypt constitutes a secret. It is external to the forum, outside the reach of the human and of exchange, sealed with secrecy to preserve the probable final resting place. The crypt is meant to exclude organic life, 'the sight and stench of mangled bodies' (Williams, 2008:199); to respond directly to

the thanatopic image. It constitutes an *off limits* interiority: in order to be encrypted, *for* and not only *to* others to fail to remember it.

Onkalo

In Finland, the planning and preparation to deal with the stock of nuclear waste through geological storage started in the 1970s, around plant sites chosen based on thorough evaluations. The scope and the schedule were defined in 1983, and the decision was ratified in 2011 with the stable geologic environment of the Onkiluoto Nuclear Power Plant chosen as the site for the country's (very) long-term disposal of spent nuclear fuel: altogether circa 12,000 tons of high-level radioactive waste. Onkalo, the geological repository facility being built in the site, is giving form to the forthcoming EU Safety Standards for Nuclear Waste Disposal Directive, in a realm mediated by legislative design, scales of risk, ideas of liability, ethical considerations, limits of predictability, and, in the case of Onkalo in particular, the effects of permafrost and glaciations expected in the region. The construction of this precedent-setting facility started in 2004; the encapsulation plan, for the handling, storing and permanent disposal, is expected to be completed by the year 2100 and to be sealed in 2120 to last one million years, with no return of waste to the surface.

For the facility's post-closure safety, the Finnish and Swedish joint expert organisation, Positiva Oy, is working with security standards based on theoretical and scientific assumptions whose parameters are duplicated from the US Department of Energy's WIPP, approved in 1999 to last ten thousand years¹⁸ but recently extended to a standard of one million years by the Environmental Protection Agency, the same agency that has reported on the predictability for Onkalo. This time extension alone may provide the point from which to apply Ariadne's thread, the tortuous line that leads *through* the labyrinth of overlapping and extensive spaces, and which is also a metaphor for the human condition. Ariadne's thread was a guiding device, the wisdom to anchor her Theseus in reality, helping him move through and overcome the challenges of Daedalus' labyrinth; while also, as according to Nietzsche, to help him deny the paths *within* the labyrinth – i.e. as a self-created world. The metaphor is also a fitting one because, insofar as humanity has

¹⁸ A future equivalent to the half-life of most of the radioactive isotopes in high-level waste and removed 400 generations from us. At that time, the scientific rationale argues that activity in spent fuel becomes less than that in the natural uranium from which the fuel is fabricated.

no previous experience of building structures to last for periods of time measured in terms of hundreds of thousands of years, periods longer than the effective tenure of any political state in history and the accumulation of pre-human and pre-observational spatial and temporal pasts, the standard of one million years also suggests hope, and a sheer positivism in averting errors (and dead-ends).

Through an exhaustive application of logic, the perfection of techniques and of labour, together with the imposition of a single temporal line overlapping extensive spaces, to arrive at the full knowing of, and to anticipate (or even survey) the unique environmental conditions underground – the work in Onkalo renders the desired solution, the unthinkable task real: this is a place we have studied thoroughly. However, it also calls for a blind faith in geology, palaeontology and archaeology, which unearth reliable and quasi-rational pasts – and paths – so as to learn from the past, in order to project the future. In fact, of course, the only certainty about this future is uncertainty. It remains unknown, revealing only the fragility of our capacity to know.

The proponents know that inadvertent intrusion into the site might result in accidental releases of radioactivity; that the site cannot be secured for such (non)foreseeable futures, and that it is inevitably subject to the uncertain. In their words:

When you do a project like this you must state what you know, and you must state what you know that you don't know. And also what you don't know that you don't know (Esko Rukuola, principal advisor of Finland's regulation, radiation and nuclear safety authority, in Madsen, 2009).

When you make a decision concerning this kind of thing, which takes you to 2100 when the final sealing takes place, there will always be uncertainty. So you have to trust (Timo Aikas, Positiva's Vice-President in charge of Onkalo's engineering, in Black, BBC News, 2006).

Eventually, but at very different times for different parts of the disposal system, uncertainties are so large that predictions regarding their evolution [the evolution of the required assumptions about surface environmental processes, radiological exposure modes and even of a well-chosen site and design] cannot meaningfully be made (Nuclear Energy Agency, 2004).

The US Department of Energy has created a panel to study the design and implementation of a marker system that could deter people from intruding upon the repository for ten

thousand years. In the report entitled *Communication Measures to Bridge Ten Millennia* (Human Interference Task Force, 1984) this long-lasting warning system takes cognisance of the soundest knowledge then currently available in the fields of General Semiotics, and is presented as a reserve of non-verbal message interchange or communication, one whose purpose is to secure the knowledge that the site is dangerous (also Wyck, 2005; Galison and Moss, 2015 focus of interest). At present, some comments about certain predictable problems involving this marker are raising complicated questions. The answers, in circumstances as delicate as the project for burying nuclear waste demands, are neither obvious nor should they be taken for granted. In this regard, the lack of objective structure and the absence of objective facts, being transcended, operate as a tool for and of political management. This leaves room for discussion and debate, while raising diverse quandaries that, besides all efforts and active changes already undertaken¹⁹, promise to follow the given norms – with facts and solutions rather than hypothesis and provisional understanding. Along with them and many other aspects – including the commercial – the certainty of a site’s inviolability as a place disappears, and a natural uncertainty about the possible destinations of those difficult spatial and time scales sets in. This uncertainty emerges as ‘certain uncertainty’, increasing social fractures and transforming geological facilities into preening but incoherent hopes. The intention, then, is to gain a wider perspective on the challenges they face and to gain public acceptance for responses that, paradoxically, affirm indeterminacy.

As seen in the WIPP, the harder the works and the deeper the diggings, the more plans differ from the reality of the situation. According to the U.S. Department of Energy, two isolated events took place at the WIPP in February 2014, releasing radioactive contaminants into the environment and the air.²⁰ Resulting in a ‘horrific comedy of errors’, according to James Conca, a scientific adviser and WIPP expert, the design of the deep foundation pit enclosure supporting the geological infrastructural facility for American nuclear wastes also resembles Andrei Platonov’s *The Foundation Pit* (1930), a novel that frames the impressions of a society trapped in a paradox of building continuously toward

¹⁹ Take for example the new reprocessing technologies, diminished interests in nuclear energy and deflected pressure on nuclear weaponry.

²⁰ A combination of radionuclides, acids and salts, it is said, was created, but determining the cause of the events has been made difficult because the precise composition of the waste in the damaged barrels is unknown.

the future – legitimating long-term solutions for social problems – while becoming increasingly unable to make progress. In the end, efficiency and the successful intensification of power become impoverished via the construction of an immense grave, and the application of an architecture that loses sight of the way risks and contingency are used to govern indeterminacy.

Platonov's book, set in the early Soviet Union, acknowledges the many good intentions of a (Communist) system and endeavour that, despite the task of and interest in improving the world, sinks into a suicidal despair, unable to reconcile human emotions with (modern) idealist and analytical ways of thinking. This is a factor that inheres in the task of having to construct questions, possibilities and limits for dealing with the stockpile of nuclear waste we have generated. To be sure, the safety of geo-storage facilities, and the true compatibility between a to-be-remote past and a further future is to be (and is being) ascertained in the construction phase. It is thought and in response to the materiality – the infrastructural space (engineering containment), and the geological barrier, of the magmatic gneiss bedrock (approximately 1 900 million years old) – that the theoretical and scientific assumptions assert safely, that Onkalo will be able to provide adequate containment to operate successfully for the time period fitting the magnitude of radioactive decay. These assumptions, discussed in terms of the stability of the deep rock, with respect to groundwater flows, rock mechanics and other properties, together with the existence of natural analogues, have led the technological development (and guided models) used to assess whether or not the radiological consequences will meet the safety levels required to deal with the realities of the nuclear materials and the future that the boundary condition needs to accurately limit throughout.

The vast literature intended to help policymakers be better informed relies on existing and accessible empirical data and the socio-scientific methods for collecting and dealing with it. It is focused on the plausibility of possible outcomes to improve target thinking and guarantee that Onkilo's geological past can provide the basis for trust in the nature of a presumed continuum. The expert community that monitors and earmarks sites, and develops new technologies to deal with the waste and the radioactivity stored in intermediate storage facilities, on the surface of the Earth, also asserts the 'facts' of the measured life of the solid bedrock and the expected timescale for radioactivity to decay, in order to support and sustain an epistemological realism as a means to manage and balance

the ethical and technical considerations with public concerns about nuclear safety. Of course, there is currently no practical way to *eliminate* the wastes.

Out of this approach, setting the task of thinking in terms of a *continuum* (duration), Onkalo applies science as engine of material change: to construct a ‘cultural fossil’²¹ between the water table and the surface: to bury the waste in the ground for it, ideally, to never reappear. Such a construction mimics the fossil, that monument of the natural world, seen as evidence, in geology; so that ‘to preserve’ is part of the great operation of nature²² (Lyell, 1830). Fossils unlock the binaries of life-death: timely untimely, corporeal-incorporeal equations, the forces of mute matter in lively bodies; a corporeality driven by inhuman forces. In this way, they convey the *rationale* for modelling space across deep time, because throughout all the deviations transferred by nature, the fossil permits resemblances to subsist. It functions as a distant and approximate form of identity, strongly indexical of deep history. It is ‘the privileged locus of a resemblance required by the historian of the continuum’ (Foucault, 1969:170), in support of an order of things.

The fossil records specific conditions at moments in the past while allowing the reconstruction of events in geohistory to ‘be placed at various points of a continuum, from the most rigorously determinist to those in which the narrative conceded substantial contingency’ (Rudwick, 1996:230). Fossils illuminate systematic attempts and methods of investigating (and understanding) the physical basis of the earth. They provide empirical evidence with which to construct knowledge of the strata of archaeological time and natural history, or to construct knowledge from which natural history and the fossilisation of time can be read. Fossils *preserve* the past in a clear *distinct* space and they are, for this reason, the most common way of distinguishing periods of geological time, by means of what they contain. The Anthropocene itself (as described previously in Chapter I, Section 2), is marked by a stratigraphical aggregation of our impact on the planet. The fossil record of the

21 The idea of a ‘cultural fossil’, as formulated by Walter Benjamin, entails a thing as never just a thing but a constellation of forces petrified and a way of charting the past. This is further explored in *The Artificial Kingdom* (1998) by Celeste Olalquiaga. In her book, Olalquiaga describes cultural fossils – such as those spurred by the Victorian love of imitation, and reduced to the status of precious objects – to be in a state of apparent and permanently stalled life, and as a constant reminder of mortality, that which is already lost. Cultural fossils combine in equal measure a melancholic sense of loss with its realisation, as oddity.

22 A necessary consequence of the existing laws of sedimentary deposition, ascribed in the agency of the disturbing, (sub)terranean movements and forces. All that does not turn into fossil disappears. It dissolves into sediments, leaving behind only molecular traces. Geology studies the velocity with which time re-orders the surface of the Earth through fossils.

Anthropocene thus shows a planetary ecosystem homogenised through human influence (see Ellis, 2011). It also reproduces the repository, or reservoir for a continuum, promising transcendence and guaranteeing things will go on.

By means of this operation, Onkalo consigns the high radioactive materials to a state of suspended animation, to be conserved, ideally, in a reservoir ‘awaiting’ disintegration. To build Onkalo, scientists analyse the bedrock to represent the Earth as having an inert character; that is, to demonstrate that the rock is structurally stable enough to proceed with the disposal of spent fuel rods containing plutonium and other high-radioactive materials. Subsequently, via a Victorian-esque glass encasement technology known as ‘vitrification’, Onkalo subjugates the contingency of time to finite and regular, represented space. Through the process of solidifying the high-grade waste into glass to be enclosed in copper canisters and cocooned in the network of storage tunnels bored horizontally into the rock strata, 400 metres below the ground, Onkalo aims to hold time in place without the annoying distortions brought about by the passage of time. The structure of intentionality and actualisation can thus be seen as a direct result of a desire to mimic fossil imprints or fossilized artefacts.

Fossil Construct

In his essay *Mimicry and Legendary Psychasthenia* (1935), Roger Caillois focuses on the set of phenomena referred to as mimicry within a biological context: that of insect mimicry, the morphological and behavioural adaptation of a living organism to resemble and simulate its environments as a means of defence. The result, as Caillois describes it, can be defined as an assimilation to its surroundings: a succumbing of body to the lure of space. The living organism, the insectal, becomes the double of its background. It has passed from ‘figure against ground’ to ‘ground on ground’, thus to both be possessed by its surroundings and to hold itself intact. Insects do not dominate or exploit a space, but open up spaces – and themselves *to* spaces – in a convulsive possession critical to the quality of their boundaries and reserves. Mimicry as effect or process, as Caillois describes it, is, in effect, an effacement of the figure. It ‘takes life a step backwards’ (ibid:98), he says, in a thanatophilic movement, blurring the boundaries between organism and the space it simultaneously forms and inhabits while closing it off in a reduced and reserved existence in itself. At the heart of mimicry is a similitude and simulation, or camouflage: a mode of resemblance and the efficacious production of resemblance, at once improbable and

natural, which attempts to disguise and secrete the figure by immersing it in a surrounding ‘natural’ world.

In *The Mask of Medusa* (1964), Caillois’ later book, he develops this theory arguing that mimicry in nature relates to mimicry in human society (and behaviour). Caillois’ description of protective strategies common among animals helps him translate and understand our fabrication of masks. But Caillois’ reflections on this relation find another, perhaps more powerful and disturbing example in geo-storage facilities and environments such as Onkalo. This is because, in the future, once the tunnel and especially the canisters have decomposed, geological repositories like Onkalo will be legible only as dots, a pattern of radiation encrusted as an influence on the host rock. They could thus be read as an artificial fossil with a symmetry to ‘natural’ fossils that does not signal an equivalence within the realm of nature (M Madsen 2012, pers.comm., 12 July) other than the fact of itself being contingent.

The challenge arising from this conjecture relates to the fact that:

the dubious nature of morphology-based classification is compounded by the fact that fossils are by definition not the remains so much as material traces: the visibility of the form of a hard part of an animal as it is preserved. This replacement process, as well as the simple elapsing of time and the long-term impact of environmental factors, inevitably causes a great deal of distortion, and for this reason paleontological classification must remain provisional (Smith, 2011a).

As in Derridean philosophical and literary analysis, a trace ‘is the mark of the absence of a presence and always-already absent presence’ (Derrida, 1976:xvii). Fossils are but *impressions* made on the geological substrate by an organism of a past geological age, and as impressions they give themselves as and to an objective knowledge – that of geology – apparently without human mediation.

For geology, the stratum of the globe is but a series of documents that demonstrates a series of revolutions (unique events) on the planet. They use fossils as a way of identifying and of correlating particular strata of time, to re-actualise the past through a reconstruction of the real. This is the argument that both supports and stresses the ideal future-bound design of Onkalo by placing a spotlight on a certain fundamental uncertainty to do with producing material for nuclear disposal – proof in the form of a fossil.

Among all of the various forms that the belief in burying radioactive materials takes, there is no guarantee for the projected performance of a site, nor of a ground, over the hundreds of thousands of millenia it is to be left without maintenance and surveillance, nor is it guaranteed that future generations will have greater success (or better transmutation technologies) to deal with the waste stored there than we do at present. In addition, and since these environments consist almost exclusively of interior space, they appear deficient of all the desirable qualities that architecture and its history possess, associated instead with a ‘troglydyte’²³ architecture (Rodofsky, 1964). These are the troubles and the sobering facts that fuel much of the campaign against plans for siting Onkalo and other geological repositories, for nuclear waste in particular, and as a matter of great complexity and (epistemological) fallibility. It is hard to deny that Onkalo’s simulation is a disturbing element in the arguments used to legitimate it.

Onkalo extends debates about whether such places should be marked or left concealed, and centres concerns about the elusiveness of geological repositories. It is the subject of several semiotic studies, journalistic investigations and art projects such as Smudge Studio’s *Containing Uncertainty* (2010). It is also the leading figure of Michael Madsen’s documentary feature film entitled *Into Eternity* (2009), a film dedicated to the future being constructed in Finland, that provides a rich analysis of the efforts and acknowledgements made for and in Onkalo so far, and articulates the aesthetic, scientific, historiographic, ethical, legal and political issues that arise from the intersection of responsibility with a belief in the human (and Onkalo’s) ability to maintain a uniformity of time and causality; in other words, that between the duty to deal with radioactive wastes and the convictions driving technological determinism.

Madsen’s film focuses on the desired reality – the impact and far-reaching consequences of Onkalo – and addresses the temporality of the waste to consider not only the revision of the technologies employed, but the way we process and also perceive waste. The film is therefore a fictional representation of a (science) fictional rationality, insofar as it deals with and frames an unprecedented need for, and guarantee of permanence, in the absence of any certainty regarding the objectives of isolation, confinement and containment

²³ ‘Troglydyte’ as a term, has been used in architectural history and theory to refer to cave-dwellings, in both in a literal and an evaluative figurative sense. Bernard Rudofsky describes, for example, the Cappadocian city carved out of the Earth, in the mountains of Turkey, as the most clear and imposing model example of this type.

in dealing with nuclear waste.

Madsen's documentary film produces possibilities for thinking and experiencing Onkalo as a place provided for the withdrawal into subterranean safety of long-living radioactive materials, and, for this reason, is an extreme fiction-making proposal. The film problematises the social factors and severe human costs involved in Onkalo and the atmosphere of scientific credulity – about physics, space and time – that surrounds efforts to control it. It reveals the interpretation of phenomena by scientific minds there as advocating an objective denial of the dangers and risks involved, where no such denial is effectively possible. With that, our basic trust in epistemological foundations appears a fantasy; as pretend theory, and ultimately a source of danger. Onkalo is a place that we must forget; it must be kept, and only disclosed as a secret to make it last, separate from a certain arrangement of events, so as to make it less dangerous.

400 Meters Deep into 1 Million Years Further On

As a place, Onkalo is designed to enclose, protect and conceal or remove from visibility the poisoned legacies of the Finnish nuclear facilities. It is an infrastructure comprised of both material conditions (the enclosure of the reservation) and of practices aimed at keeping it likely to be forgotten, so that it can safely preserve its interior space and relegate the radioactive materials to the realm of the hidden. Perhaps inevitably, however, several authors who write about or investigate Onkalo object to this by reason of its intrinsic fallacy. According to Peter C. Wyck, the dual and apparently contradictory requirement of secrecy concerns the fact that geological facilities like Onkalo are projects that operate in a complex relation to a limit.

He observes,

At the limit of civilization [...] At the limit of history; its time is the deep future. At the limit of meaning, its witnesses are unknown. At the limit of the symbolic; auguring the *language* of the future is a dizzying confrontation with the aporias that obtain when one-steps outside of the frame of the present. At the limit of technology; the ability to engineer materials for this unprecedented duration is and remains hypothetical at best (Wyck, 2005:25-6).

In Onkalo, the safety of the epistemological foundations, and of the bedrock itself, embody limits to knowledge. In this notion is included the relationship between the known and the

unknown, in line with the epistemological riff²⁴ of Donald Rumsfeld (2002) and Slavoj Žižek's extrapolation of it, extending to 'unknown knowns' (Žižek, 2004) – i.e. things which we intentionally refuse to acknowledge that we know, an a-logicity to be read both at a micro and macro level. Limits to knowledge fluctuate with how much at ease we are, as a society, about the future. Furthermore, 'it is our diminished potential, or diminished awareness of the effects of future risks that inflate the danger of the threat' (Beck, 1992). In Onkalo, as in all the other geo-storage facilities, risk management and contingency planning deal with the past, the present and the projected; the mediated immediate and further future, but it is based on an endless present, an uncertain future and an inconsistent past. Not only are these facilities and planning are (and will be) in contact with the way that humans and infrastructures interact in relation to one another, through examination and amendment (Simondon, 1980), but they are also (and will keep) in contact with Earth's unpredictable forces. The authorities and group of experts involved maintain the conviction that, the deeper the diggings, the more firm, stable and immovable will be the ground. But this ground, also a result of geologists' broad appreciation of geological processes and engineering time, becomes a powerful part of Onkalo's territory, for it extends and complicates the (en)closure to the earthliness of the Earth itself.

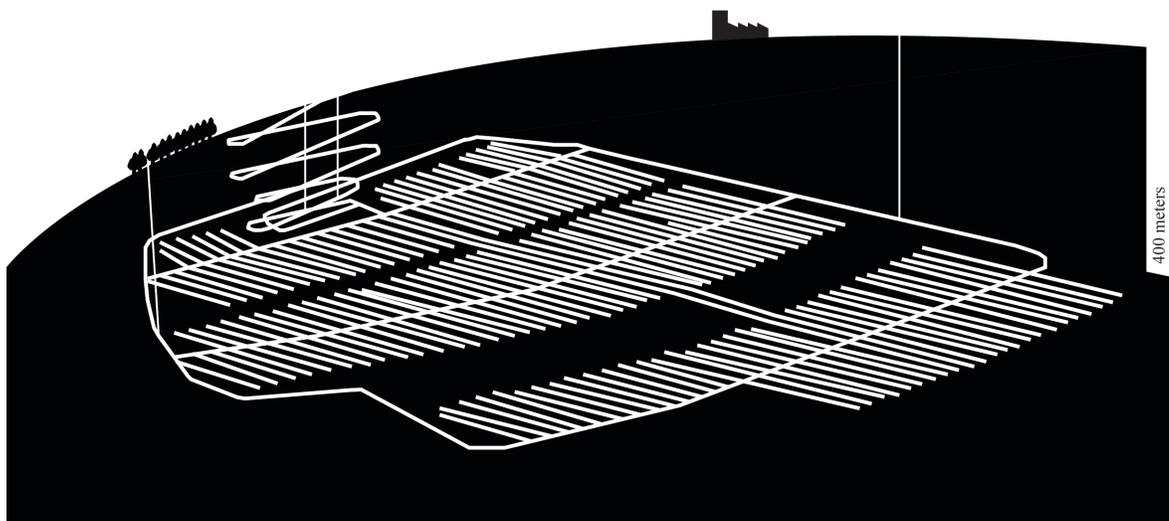


Figure 3. Diagram of Onkalo

²⁴ In February 2002, the United States Secretary of Defense, Donald Rumsfeld, addressing the threats and lack of evidence linking the government of Iraq with the supply of weapons of mass destruction to terrorists' groups, stated that 'there are known knowns. These are things we know that we know. There are known unknowns. That is to say, there are things that we know we don't know. But there are also unknown unknowns. There are things we don't know we don't know'. This has become known as the Rumsfeldian theory of knowledge or epistemological riff.

The depth at which the facility is to be placed confounds the horizontal, two-dimensional (surface) limit structure and architectural task, and it destabilises the security of human artifice even further because, as a gap in nature, or in the bedrock, it is exclusively an interior, hollowed out of the vast and formless body of the Earth, which does not allow one to see all of the facility. The special condition of the crypt, and of the cellar, as places in and of the ground, is:

only experienced from within [...]. The cellar, with its actual and implied extensions into the ground, becomes the perfect counter to the figures placed upon it. Its single-sided walls hold back the earth but also make us constantly aware of the ground's immediacy. Actually and metaphorically, this ground becomes a powerful part of the cellar's territory (Dripps, 2005:63).

Thus, far from visibility, the cellar is (only) discerned as continuous with its environment.

Drawing on Gaston Bachelard's *The Poetics of Space* (1958), Robin Dripps points out the literal and conceptual, material and experimental fullness of this physical ground. In her essay 'Groundworks', published in *Site Matters* (2005), she develops an awareness of the dynamics inherent in the structure and materiality of the ground that provide the basis for agreement that it is a place connected to, or open to, a more extensive, varied and complex web of relationships – rather than simply operating as pre-existent background:

[Grounds] are open networks, partial fields, radical repetition, and suggestive fragments that overlap, weave together and constantly transform. Within this textural density, edges, seams, junctures and other gaps reveal moments of fertile discontinuity where new relationships might grow. Relationships among grounds are multiple, shifting and inclusive. They engage the particular and the concrete rather than the abstract and the general (Dripps, 2005:67).

In her book, Robin Dripps considers the ground, rather than sites, as part of our empirical quest for knowledge and of architecture as whole, for it traverses the temporal basis separating the horizontal – as a paradigm of landscape imaging and imagining – and the vertical frontier of historical layering, and destabilises the authority of human artifice. Dripps questions certain assumptions about the relationship of ground-to-human existence, in particular those embedded within the figure-ground juxtaposition, against which architectural objects usually stand out, to suggest that the security of human artifice should be capable of responding effectively to the unpredictable changes inevitably taking place

outside its control. For her only:

once the ground is revealed and its structure made visible, it is possible to give the ground a voice equal to that of the products of human artifice. At this point architecture can open to and take into its domain a rich world that can augment what architecture is capable of. In being open to the ground, [she concludes] architecture will also discover a wealth of means to deal with intractable problems of its own (Dripps, 2005:88).

The consequence of this intense engagement and the implications that the ground should play in an imaginative reinvention of concepts – beginning in architectural discourse – is an ‘effective reattachment of humans to the many worlds that support them’ (ibid:86). Our blindness to the rich, intense and subtle structure of the ground is, for her, problematic:

It is easy to understand how the earth’s rough and bumpy surfaces, its uncertain and shifting fixity and its damp porosity, could be considered qualities that would destabilize physical, political and even psychological equilibrium. But it is not only the intense earthiness of the earth that proves problematic, but the whole question of how humans ground their thought, actions, and structures so that effective hypothesis can be made about relationships among things (ibid:60).

Dripps approaches the complexities of the ground as a fount for design ideas. For her, they signal the emergence of hybrid figures that are open, ambiguous, mutable and continually unfolding. In this respect, her work adds (through a different lens) to Rosalind Williams’ well-known inquiry into humanity’s descent into the ground as metaphor for the ‘abstract progress of civilization’.

In the book *Notes on the Underground* (1990), Williams examines how actual and imaginary under-grounds have shaped our attitude towards the manufactured environments we inhabit. She considers, from a historical perspective, the psychological, social, political, cultural and material effects of humanity’s gradual penetration of the underground. Her book surveys the challenges of, and demands brought to ‘building with holes’ in the quest for safety – in the names of scientific truth, technological power and perfection. The book was published at a time when other historians of technology were starting to give more attention to ‘technology as environment’ and to inquire into the origins and implications of subterranean experiences in the largely human-made habitat. Haunted by the spectre of disaster, social as well as natural in origin, the underground setting, she notes, ‘takes to an extreme the displacement of the natural environment by a technological one’ (1990:4). It

takes over the place of nature to space human ends and desirable safety, to reveal an environment that is in fact only technological

The underground, as Williams defines it, is an enduring archetype that developed along with modern science and technology as part of the quest for scientific truth and technological power. Because of its apparent solidity, it has nested a hollow world of primitive dwellings and more contemporary reserve spaces and formations related with war (to hide, secure secrecy and offer passage) and environmental disaster, following or anticipating a catastrophe. It has long been considered an ideal refuge from sources of danger, holding regression and fear independent from the surface world. Along these lines, Williams describes the emergence of what we now call environmental consciousness as subterranean consciousness, the awareness that we are in a very real sense not on Earth but inside it (ibid:231) – that we live ‘inside the earth: beneath the atmospheric ocean, in a closed, sealed, finite environment where everything is recycled and everything is limited’ (ibid:212) – since at least the end of the nineteenth century. The late nineteenth century saw the emergence of a new and interactively natural *and* ‘human-built world’ (Hughes, 2004), consisting of artefacts and systems associated with control and management as well as with the psychological, social, political, cultural and materials effects of a threatening external reality. These artefacts and systems grew so large that they have come to encompass the natural systems of the globe and take over our surroundings, on various levels.

Williams book features general social and psychological narratives ‘fascinated with death-dealing catastrophes’ (ibid:270) rather than specific physical effects of environmental change and despoliation, so as to question the implications these artefacts and systems brought into human life. Their defining characteristic is, accordingly, not (only) material but one of consciousness; ‘the realization, among beings, that our needs, desires, works and actions will henceforth rule the fate of everything in the planet, including our own’ (ibid:270) but are themselves related with our ways of evading or delaying mortality. This is the order of ideas which Williams brings to her writing about the quest for general and ecological security, and shelter against disaster, that has prompted extensive and expensive constructions including enormous subterranean reservation arrangements to separate and distance nuclear waste. She uses these ideas not only to make sense of the end, but of the sensing of the end; that is of that many interactions and scenarios dominating our historical and hybrid life-world that interpret the end of the world.

This is a theme further explored by Donald Reid in his book, *Paris Sewers and the Sewermen* (1991), in which Reid asks, ‘how in particular was society to prevent its unattended underground waste from breeding very real epidemics which could strike back unexpectedly at society which had secreted that waste[?]’ (Reid, 1991:3). His book translates the concern that helped give impetus to the unprecedented efforts taken to control and transform the subterranean, from the days of cesspools and street waste disposal in garbage dumps to the evolution of a comprehensive and effective drain and sewer system, in late nineteenth-century Paris. These were part of a vast socio-political and technological modernisation of the infrastructure of the city, and a vital agent of the aesthetic, moral and the civilised: an integral and binding element of the Parisian urban space. Made of a bold network of spacious tunnels stretching for thousands of kilometres, and over various levels, this infrastructure would remove, or keep out of sight, everything that could in any way annoy the senses and thus ravage city life. The network replaced Paris’s medieval underground (built in the 1200s) which terrified the authorities and the popular imagination with its hideous labyrinth of enclosed places²⁵, cesspits and garbage dumps, contributing to the persistent threat of disease-inducing miasmas, pestilence and epidemic diseases such as cholera, typhoid and the black death. For this reason, Reid writes, sewage was the archetypal hazardous waste of the mid nineteenth century; industrial pollutants such as chemicals, heavy metals and radioactive refuse have since taken its place.

By the end of the Old Regime, concerns about the disruptive physical and social evils confined in the subterranean medieval infrastructure gave impetus to the engineering of the Paris unitary sewer system in the second half of the nineteenth century: this was driven by a desire to master, control and transform the residuum-retentive medieval infrastructure and to deal with new concerns for the dangers arising from decaying refuse. This drive was as central to the strategies to evacuate the waste as the faith in the application of industrial and scientific principles to support a comprehensive, technocratically-minded approach to planning which dictated that ‘only by processing this refuse could society conquer its anxieties and turn to profit the hidden world of what it

²⁵ These enclosed spaces of the Paris medieval underground were used not only to dispose of human faeces and excrements – a place to secrete or sweep away the city wastes – but to shroud criminality. They were also used by thieves and subversives, social outcasts, and *Misérables* – such as Victor Hugo’s *Valjean* (1862), to escape or hide, store contraband goods or establish revolutionary command posts and first-aid stations.

rejected' (Reid, 1991:4). In fact, they spread litter and stench into the adjacent countryside, a timely reminder that technology can produce as well as alleviate social concerns; it may also be used to entertain the view that the benefits of the application of technology to nuclear waste may outweigh the harm. The nuclear waste scenario may be viewed as reiterating many of the social and symbolic processes that characterised the nineteenth-century interpretation of sewage, demanding the improvement, not only of the infrastructures but of judgment also, to deal safely with the issues troubling the security of populations, correct the environment and isolate the waste.

In addition to the positive will to multiply reservation arrangements, the history of changes that the move from depositing nuclear waste on the horizontal and two-dimensional (surface, temporarily) to the vertical and four-dimensional (subterranean, long term) has undergone, so as to protect people and places, brings with it a list of technical concerns, potential difficulties and radiation dangers associated with the architecture of the geological repositories, and its technological feasibility and costs. All of which are being considered 'no greater or more technically challenging than those affecting other types of nuclear facilities' (IEAE, 2010) but they are geochemically specific. Of the fifty countries worldwide who are producing and storing spent fuel in temporary locations, not all have the 'appropriate' geological conditions for geo-storage disposal, or even have their waste reliably secure; not all have answers to fundamental questions about the safety of their 'appropriate' containment choices, or how to transport the waste to safely secure the shipment and filling of the facilities (see Lamb and Resnikoff. 2001²⁶). However, efforts to secure them are under way.

In England, significant charges and formal accusations have been made by environmental protection agencies and Atomic Energy authorities about several of the nation's nuclear facilities. Under the Radioactive Substance Act²⁷, the UK Atomic Energy Authority found the Dounreay Nuclear Plant guilty of 'a failure to prevent fragments of irradiated nuclear fuel being discharged into the environment' (Edwards, 2011). The

26 In the Worst Case Credible Nuclear Transportation Accidents: Analysis for Urban and Rural Nevada, as published by Radioactive Waste Management Associates, 2001.

27 This is a legislative Act to regulate the storage and use of radioactive materials, to make provision for the disposal and accumulation of radioactive wastes and to consolidate certain enactments relating to radioactive substances, with corrections and improvements made under the Consolidation of Enactments Procedure Act, 1949.

charges were brought forty years after the illegal contamination of the environment occurred when high-level radioactive fuel leaked from a local nuclear waste landfill into the sea, polluting local beaches and prompting a ban on fishing. At Dounreay it had been agreed that ‘low activity’ solid waste would be disposed in a series of trenches while ‘higher activity’ waste would be disposed in the shaft, a column sixty five metres deep, that had then experienced an explosion and caused widespread radioactive contamination to the Dounreay foreshore and pollution to the North Sea. The shaft that was supposedly enveloping and containing the central nuclear waste leaked for more than two decades, and it ‘will never be completely cleaned up, a Scottish government agency has admitted’ (ibid). The Scottish Environmental Protection Agency has decided to give up on its aims of returning the seabed near the plant to a ‘pristine condition’. To do so, they warn, ‘can cause more harm than good’.

In West Cumbria, near the Sellafield Nuclear Complex, erosion by storms and rising sea levels are threatening the Drigg Low-Level Waste Repository. The Environmental Agency suggests that in retrospect it was a mistake to site it on the coast and it is pointed out that the future use of the site is ‘unsustainable, unethical and highly dangerous’ (Edwards, 2014). Following the Fukushima disaster in Japan, a review of flood defences has raised global concerns about the vulnerability of atomic power stations in coastal areas. In the UK, these concerns were also raised in relation to the Bradwell Power Station, Essex (already mentioned) and the Dungeness Power Plant, Kent. The Office of Nuclear Regulation admitted, ‘the shingle bank between the reactors and the sea was not as robust as previously thought’ (Macalister, 2014). Due to the storage capacity and the technical feasibility of the works, this system of trenches, shafts and vaults appears similar to the typical cesspit systems, which were constructed, with no regulation, until the eighteenth century. In Paris, before construction reforms were introduced, the liquid waste would seep away through the ground, contaminating water sources, creating health public problems and the staggering mortality rates of the period. The reform involved technological solutions of isolation with attention to the consequences detected to approach correctly the risk.

Since 1997, for similar reasons (i.e. to prevent such occurrences), a summary of the amounts of radioactive waste, management approaches and operations is periodically presented and reviewed as part of the Joint Convention on the Safety of Spent Fuel

Management and on the Safety of Radioactive Waste Management: the first (multilateral) treaty to address radioactive waste management on a global scale.

Out Of Geology

All of the abovementioned incidents may attest to Reza Negarastani's idea – taking on Lovecraft's poro-mechanical universe – of a holey space and 'a complex of hole agencies and obscures surfaces' through which the sealed gradually appears outside its seemingly inaccessible interiority (Negarastami, 2011:44), and to the idea of our Earth as porous (A Lowe 2010, pers.comm., 27 September); torn, inseminated and polluted with ideas that can be known and yet completely unknown. In *Cyclonopedia: Complicity With Anonymous Materials* (2011), Reza Negarastani calls this space essentially cryptogenic and interconnected with the *Incognitum Hactenus* (Anonymous-Till-Now); another definition of reservation that reveal the twists of contingency emerging as monstrosities, horrors and uncanny science fictions that, through survival, economical openness and illusive intelligibility, re-double their withdrawnness and transform us into *voidic necronauts*. For there can be no ultimate separation between us humans and the unstable dynamics of the Earth. Rather, the relationship raises profound (geo)philosophical, ecological and political questions unsettling the integrity, solidity and stability of the Earth, showing, moreover, that what they have taken for solid ground is in fact corrupted by perforations, processes of decay, putrefaction and rot.

Ben Woodard's *On an Ungrounded Earth* (2013) also emphasises these points. He builds on the effects and experience of an ungrounding threatening the conditions of human life on Earth and in general. Developing reflections by not only Reza Negarastani, but also Deleuze, Bataille and Lyotard, Woodard examines processes of digging, mining and building holes, and moles, blurring not only the distinction between the Earth, matter and bodies but between surface architecture and troglodytic architecture. In his view, the environmental apocalypse above ground is preceded by a corollary interest in the Hollow Earth, or in piercing the Earth to advance and protect civilisation. He cites the entombment of radioactive material waste in sites such as the WIPP and the Yucca Mountains, stating that they 'imply the possibility of an absolute solution for the burial of the problematic waste of modern life' (Woodard, 2013:66), but one slightly dismissive of the future of the earth the capacity of human stewardship (although human life may not have much longevity).

Even the very practical operation of waste management demonstrates the inflexibility of anthropocentric thought's determination of life over nature, a life that is not the possibility of organicity, but is rather a phenomenologized form of life in the Kantian sense. Furthermore, the earth is codified as a ground, but a dead ground – a platform for human activity from which ideation somehow manages to escape (ibid:66).

At the risk of destabilising the certainties of their entombment, these facilities combine a disregard for the forces of the Earth with extensive and fantastically advanced studies for waste to remain unseen. The excavations and works being undertaken to build nuclear waste repositories will either give rise to the withholding of radiant hazards or bring forward adverse possibilities. Applying Negarastani's words, 'anything can happen for some weird reason; yet also without any reason, nothing at all can happen. Things lead into each other according to a logic that does not belong to us and cannot be correlated to our chronological time' (Negarastani, 2008:49). This is the part played by contingency – a realm of possibilities beneath the world of actuality – and, according to Bergson, that upon which Western metaphysics is based. Our scientific tradition, along with its theological, ethical, metaphysical and logical implications all have their roots in contingency, 'the concomitant expression of possibilities' (Negarastani, 2011). At its simplest, contingency refers to the attempt to think events that take place, in response to that which is sublimated or invested with symbolic power. Contingency reasserts the primacy of physical and spatial experience, and arbitrary existence, 'contingency and disorder are not its irrational residues, but rather the keys to its access' (Rovatti, 1983:62).

Insofar as each needs to be complemented, and responded to in some guise, the basic presupposition is that there are other entities we need to contend with. We cannot pretend to be absolute and universal, and/or the master of anything. In fact, Vattimo argues, contingency and disorder imply a particular relation to thought and our attitude towards things and this:

ought to occur against or independently from endlessly criss-crossing and unpredictable yet determining paths whose boundaries and thresholds appear only to read, alas, another boundary or limit right after them. The post-metaphysical man [*sic*] acknowledges a 'condition' or 'destiny', that of being 'forever set on a path tortuous and irregular, extremely long and tiring' [...] a positive contribution to a weak ontology (Carravetta in Vattimo and Rovatti, 1983:12).

As Mackay argues, this is ‘in direct violation of all dogmatic systems of metaphysics, philosophies that attempt to bind in principle every event, past and future, within an account of what must be’ (2011:1). In *The Medium of Contingency* (2011), Robin Mackay, the philosopher and editor of *Collapse Journal of Philosophical Research and Development*, poses the challenges that contingency opens for thought. He believes that our conceptual tools tend to subordinate contingency to other concepts such as chance, probability and risk management, but in doing so, we reabsorb the contingent event into a new rational metaphysics with parameters within which events are, at least, circumscribed. Thus, the contingency plan is revealed as a contradiction in terms. It introduces a kind of precariousness into our dealings with the present and the future, akin to that which Vattimo and the other proponents of weak thought describe as great strength.

This precarity can be translated as the threatening autonomy of *technics*, as Peter Sloterdijk suggests, or that of reservation spaces and formations. In its essence, *technics* ‘is something that man does not master by his own power [*sic*]’ (Heidegger, 1976) and our reserves seem to follow this incapacity. For Sloterdijk to believe the opposite is to be a victim of an illusion because order requires action more than present and absent things, and space is inescapably dependent on time. In *The Infinite Mobilization: Towards a Critique of Political Kynetics* (1989) he writes:

things happen differently than we thought, because we did not consider them with movement. Things happen necessarily otherwise, because, by invoking thought and evoking what is to come, we put in motion that which we did not think of, we did not want to, we did not account for (Sloterdijk, 1989:25).

The contingent and the unpredictable are thus, far from a threat to the establishment of firm grounds, the necessary context for the development of an ethical and responsible position. For, as in the case of Onkalo, the strength seems to lie in the restraint that its model applies to the external: a model in which architecture is ultimately situated along with its tendencies to make reductions to inscribe and separate time in its stages – those organised by human thought and human ends, both historical and discursive – as well in its contingent and uncontrollable nature and materials. It might be a good reminder that long-lived theory-loaded experiments that do not fail to create phenomena and be treated as mistakes, have commonly turned out to be wonderful achievements. Vilém Flusser writes in his *Post-*

History that ‘only malfunctioning programs and apparatus allow for freedom. Only malfunctioning functionality can hope for freedom. The essence of freedom is unpredictability’ (Flusser, 1983:xii). The categories of technical discourse trace the path to freedom, but this path, as mentioned, makes for an increasingly complex labyrinth.

The potential to create new relationships between things is, for Flusser, the only way to change our concepts of the real and to create new meaning. It has more to do with alchemy and magical thinking than with history. This seems to be the direction we need to travel in to privilege what is excluded from the lines of defence set by the instrumental programme and to reduce nature and matter to units or resources in environmental and radiological reservations or systems. These are units and resources organised, designed and managed only by simplistic oppositions against the possible. We should perhaps learn how to better apply our reserves, to take them radically as limit rather than as, and through, finality, the ongoing decimation of species, suffocation in waste, agonising images of toxic technologies used and discharged by our civilisation and the like. This will not only preserve our powerlessness but enhance it.

CONCLUSION

At worst, to think of acts and architectures of reservation, as the limitless means or tools by which the limitless stability and, indeed, continuity of whatever is threatened may be ensured against that which is threatening, actively leads to our discounting the involvement of how many of these acts and architectures maintain with the very same (and other, subsequent) threats themselves. This leads as well to our utter inability to act (and think) effectively upon the future; and in particular, in the case of threats, in the matter of Earth crises. These are culturally and socially-shaped threats to – and arising from – the planetary environment, that are part and parcel of the processes that, as this thesis has shown, evolves at both a technical and planetary level. Thus, crises larger than the most cultural fantasies and architectural practices of reservation and safety can comprehend and so attempt to control.

The main contention of this thesis is that our investment in acts and architectures of reservation, is a means by which we can secure and keep apart – i.e. *in reserve/s* – both perceived threats, and things to safeguard in, and thus protect the security of, the planet. The global drive to reduce the impact of environmental destruction and danger, preserve natural and man-made resources, and combat pollution and contamination, has in fact given form to a order of spatial partition, isolation and distancing for purposes of control and containment that, despite its being intended to safeguard humanity's future, in reality, does not respect the vastly and ineradicably interconnected nature of the environment, the reciprocity of its processes and the many (cumulative) cause-and-effect relationships that exist on a global, planetary scale, endangering the very continuity of human history. Hence, in contrast to those schools of thought that locate the reserve as the means by which the fundamental task of acting upon the threats of Earth crises can be effectively achieved (as in Chapter I and II), and as that in which general principles for doing so may be grounded (Chapter III and IV), this thesis has argued that reservation arrangements fail to provide any such adequate solutions or answer. Instead, it has been argued, these often result in counter-productive arrangements; the prevalence of the reserve model all too frequently encourages

those who do have agency to fall back upon a wrong methodological treatment of the problems before them, in the building of artificial and fictional boundaries and *limits*, and thus the construction of further antagonisms; in this way, the problems they have set out to address are exacerbated.

In support of this assertion, this thesis has presented the logic of division and/or partition, isolation and distancing, for control and containment, and the creation of places and architectures as a means of withdrawal or reservation – presumably to keep anticipated threats under control and survive them – behind the projects and programmes of many acts and architectures of reservation. It has traced the ways in which this logic has given rise to a vast and growing space of insecurity, albeit unintentionally, by reason of assimilating the structure and pattern of crises, and then by reproducing, sustaining and reinstalling the ill effects of threats in the reserve form and structure itself.

This thesis has tried to ascertain how it has come to be that, within and through these reserves, we find a series of postponements, both originating in and giving rise to the acceleration of the whirlpool of despair of eco-catastrophic imagination, feeding visions that, in turn, lend themselves to the apparently vital development, building and activation of more reservation arrangements, *rather* than to the finding of efficient solutions (and decisions) to crises – as portrayed in various sections of this thesis. Such solutions might pass by the paying of closer attention to the way in which the politics of fear emerge in such arrangements, and, how, along with paranoia and anxiety about the risks to, and the necessary conditions for, the continuation of our existence, such fears have led to a prevailing view which, effectively, situates the environment as the most important factor, and Earth as the critical counterpart to humanity's existence. How, this view is having an effect in and on solutions to Earth crisis issues but is also dominant in the popular imagination; this preoccupation emphasises our natural vulnerability because of the large-scale planetary harm we have done and are doing, and, above all, has posited the task, global in scope, of regaining control over such harm as an ethical and moral imperative. However, the task of finding the means of harm cessation still needs to be acknowledged. As outlined in Chapter II, a search for a proper understanding and evaluation of 'the world' as a habitat, as well as for a new consciousness about the limits we must observe, and other ways by which humanity must aim to continue its existence and achieve at least a fair equilibrium with the Earth-as-planet, is being pursued and discussed.

Driven by the failure of previous control and containment strategies, the general affirmation of many instances of environmental destruction and danger, pollution and hazardous contamination, as well as the depletion of important sources and resources, which, as stated, loom over our collective future as a consequence of industrial society's expansion and silent war against nature, grew exponentially during and after WWII, particularly during the Cold War. This task (of regaining control over the harm that affects the entire planet) is rationalized, in this thesis and in general, according to the general view described above; the potential solutions to the causes and struggles of human impact and the way we have organised the world and our infrastructures in order to make ourselves at home in our planet. As this thesis has argued, while the modes and models employed in pursuit of this task may have mutated, having been modified and differently translated since the (above) establishment of a canonical ecological awareness, they have continued to follow the same organisational logic and have resulted in similar acts (and architectures) of reservation as those that preceded them. These continue to be concerned mainly with the arrangement of things, in the expectation of (a dim view of) the future, together with a form of anxiety about the potential destruction (both intentional and unintentional) that human history and experience on the planet has brought with it: they mean, and are meant, therefore, to adjust things, according to the paradigms and conceptual frameworks they – or, we – think to be efficient, as means to preserve the resources on which we depend. In the end, these models and means not only foreground the very idea of the future, but also reveal the challenges of seeking positive and alternative ways to approach a shifting (not suspended/*in reserve/s*) present.

The prevalent modes and models presented as such in this thesis all appear to confirm that there stands, at their foundation, the spectre of a fundamental uncertainty. It is this uncertainty that triggers not only the act of placing and keeping in reserve – as a form of investment and insurance, to meet probable or possible future demands – but the creation of overlapping and conflicting reservations. Uncertainty gives the reserve the force to both build upon and destroy a fortifying system of ideas, in order to withhold other possible, undesired outcomes. It is the force/idea behind the contingency planning of (coordinated) threat-responses, and of their power, while also being that which alone gives meaning to our inability to master the future.

Reserve as Critique

After years of assiduous observations, gathering documentation of increasingly interdependent and imbricated planetary problems, our actions cannot be solely directed toward the ethical and moral urgency of the world's salvation via acts and architectures of reservation, and a rhetoric (in favour of) of division and/or partition for the control and containment of uncertainties and the issues of Earth crises. Instead, we need now to recognise that the contingency task ahead calls for new models of organisation and methodological engagements. Likewise, the notion of environment can no longer be considered as an abstract geographic context upon which an idealised figuration can be projected; it is instead to be understood as a complex territory wherein project and context are operationally engrafted. In this sense, a project such as the Onkalo Nuclear Waste Storage Facility (subject of Chapter IV, Section 2) appears not only unstable, in its role and extent, but intrinsically ambiguous. It extends the architectural realm and operations to the very earthliness of our planet, and offers to critical inquiry its ability to appear fictional; that is, to remain open not only to interpretation but also as to the true composition and transformation of the planet.

As such, it could in fact be better to regard uncertainty and the issues of Earth crises here described *not* as the enemy, or the object of problem-solving endeavours, but perhaps, as the strategies and workings of the military regard their 'black sites', i.e., as shields, guaranteeing advantage over the enemy, and power over knowledge – including civilian access to disturbing truths – and above all, as something that moves us to search at scales and distances (otherwise) beyond our limit. In the same way that certain images and phenomena have helped to synthesise and popularise ideas and worries about the alteration of nature itself, concerns over exhaustions, mutations, extinctions and contaminations impacting on current reserves, and their ultimate and even imminent finitude, have challenged and continue to inform the way we conceive of ourselves and our future, as well as our previous assumptions of, and reliance on there being a clear boundary between culture and nature, bodies and the environment, in the context of a spate of disasters, natural and no-longer-natural events unfolding in the present. In fact, such instances of uncertainty and issues of Earth crises offer themselves as clues for finding one's bearing in an interconnected, inextricable and inescapable Earthly existence, via the pooling together of perspectives not (previously) usually in dialogue with another, as they seem to demand.

As described in Chapter II, thus far these images, phenomena, ideas and worries have largely been portrayed through pessimistic or even fatalistic forecasts; these have tended to privilege certain individual and collective improvements, and offer a conjuncture that stretches the ‘lifeworld’ to allow for a perspective upon the world as a series of processes to be contained and epistemologically unified into a coherent outlook capable of reconfiguring old imperialist ambitions and political demarcations in favour of a connectedness like, but also unlike that which helped to define the closed world (as in Chapter III, Section 1). Original in its stimulation of perspectives and interpretative engagements, this connectedness has inspired mankind’s attempts to move beyond the structures, belief systems and epistemological foundations of many acts and architectures of reservation to dissolve boundaries and draw together matters previously set apart.

At a time when more of us are aspiring to understand the world and all its parts or components as a world in which the human species is only a small part of the complexity of interrelated processes, albeit nonetheless the strongest of forces, the reserve has become an increasingly contested means and space. It has become the complex and active principle, shaping and reflecting the practices and relations of power that dominate our ways of acting upon the outcomes of humanity’s long-standing battle against the environment. The reserve has come to epitomise some of the problematic aspects and wider implications of the spatialisation of regulations and differences, and in meeting the criteria of order, regularity, control and indeed purification that are involved in the construction of such a space, separated from a society in need of new and more finely attuned responses. It only affirms the illusion of mastery, which accompanies the task of fortifying and keeping reserves to retain control. In other words, this entails a sort of pessimistic optimism constantly held in the realm of uncertainty and the deluded joy and power of deferring (until) ‘the last’.

As Deleuze explains in the interview by Claire Parnet documented in Pierre-Andr e Boutang’s *L’Abodecaire* (1996), ‘the last’ in fact affirms the possibility *before* the ultimate; that is, the penultimate, before the last, extreme possibility and thus provides an opportunity to engender (the ultimate as) a second-last. In the interview, Deleuze describes the relationship between the penultimate and the ultimate through the relationship between alcoholism and the ‘last drink’. He says:

An alcoholic never ceases to stop drinking; never means that he cannot stand to drink one more glass that particular day. It’s the last in his

power, versus the last beyond his power which causes him to collapse, so the search is for the penultimate drink, the final drink before the starting of the next day (Deleuze in Boutang, 1996).

For Zeno Cosini, in his *Confessions of Zeno* (1925), such endless delay is owed to the fact that this ‘last’ (cigarette, in his case), ‘has an aroma of all of its own, bestowed by a sense of victory over oneself and the sure hope of health and strength in the immediate future’ (Cosini, 1925:12). This aroma, a sign for Cosini of illusory freedom and ‘good health’, is also the source of his insistent deferral of ending his (willful self-destructive) habit of smoking; as such, it seems to be a good metaphor through which to explore the wake of survivalist and neo-liberal articulations of an environmental crisis, arising in large measure out of the growing awareness that humanity is destroying itself through the destruction of the environment.

For this is a time in which we seek a sense of victory over ourselves, and our past errors – as humanity – in order to assure our hope of preserving our continued existence. But hope is ultimately tragic and we are all too aware of the destructive potential of our acts. We know that, having become a force with powers commensurate to nature, we have also developed the ability to self-annihilate, and destroy our own species. Civilisation is nowadays menaced from within as much as from without. We are all too upset about it; threatened by the numerous accounts of battles against resource exhaustion, excessive carbon dioxide levels, energy and water shortages, mass extinctions, radioactive contamination and our hyper-vulnerability to droughts, floods and other natural and non-natural events and viruses. We live in a time of rapidly accelerating climate change and of economic failures. The century suffers from the detrimental effects of many poisonous social and cultural ways of doing things, which impact upon the Earth’s physical structure and life systems. In this regard, to most of our minds, creating a planetary environment able to maintain its continuity stands as the most widely accepted, if not only, proposition to which we should subscribe. We blame the ideological and material structures which provide hegemonic models and a culture of anthropocentric mastery for the blunt of global transformations which impact upon humanity’s future and continued capacity to exist on the surface of the planet. Yet ongoing strategies that place the globe in custody and austerity – presented as a necessary scripture – seem only to increase the scope and parameters of environmental and ecological illness. In fact, such an approach preserves the

exact same sick time, body and consciousness, through insistent deferrals of limits and endings, that Cosini presents in his forever-delayed ‘last cigarette’.

Thus, if what looms on the horizon is the (longed-for) possibility of a direct, subjective intervention in the historical processes and substances that threaten to disturb our run on Earth by triggering an ecological disaster, we might say it has a similar aroma to that described in *Confessions of Zeno* (1925), a novel by and about Zeno Cosini, a rich Trieste businessman tormented by a lust for self-improvement. In the novel, the eponymous Zeno states that his sickness is a conviction that he was born with. He then connects the source of his sickness to his vice of smoking. The precise nature and exclusive importance of this connection leads Zeno to a continual struggle to conquer ‘good health’, and his engagement in a succession of always-postponed dates for his ‘last cigarette’ – which statement he writes in advance on the walls of his bedroom.

This ‘writing on the walls’ appears to be symbolic of a future that is predetermined. In idiomatic terms, the ‘writing on the walls’ generally implies a divine menace, an impending doom which, in the case of the ‘last cigarette’, is also an ominous symbol of willful self-destruction and the spectre of self-accelerated mortality. Zeno foresees his death in advance, going as far as to describe that it will begin with a gangrene of the lower limbs. Thus, when considering those of our scenarios that keep – or are intended to keep – Earth crises in reserve, we might usefully learn something from Zeno’s grail of freedom and ‘good health’ (and his own, ultimate conclusions). At the end of his confessions, Zeno discovers that what he needs to cure is not his sickness but his health. His addiction is not to cigarettes but to the stress of quitting his habit; this would be equivalent to saying that what we need to cure is not the state of the Earth and our depleting resources, but rather the terms in which we understand our engagement with the planet.

We can question whether Zeno’s concept of health is something to be confronted (and overcome, as Zeno himself does) or an ideal to fight for, but if we now have a particular desire or need to pursue – and it isn’t to continue being stuck in the willing of it, and the undertaking of repetitive acts to achieve it – then a readiness to risk everything does not seem like such a very bad idea after all. Our reserves would then be required to meet criteria of a new order: one more attentive to the/our shifting present and to the radical contingency of life held at its foot – as in Manzoni’s *Socle du Monde* (1961), Chapter II. To conceive of the/a world without hegemonic models (and the dominant objects which they

are manifested as) such as those of acts and architectures of reservation, implies, for many, a certain connivance with ruin; but it may also allow for this conceptual ground-clearing to be possible, without waiting for us ourselves to be gone. This is a task that undoubtedly requires careful consideration, but one that I think it would be wrong to neglect.

Critique of an Imprisoning Crises

It is proceeding from this conviction that this thesis has presented acts and architectures of reservation, in the various sections structuring and organising this thesis, with a consistent focus on the characteristic conditions and rationales related to the logic *and* fantasies of realising safety via division and/or partition, isolation and distancing for control and containment, that belong to the conceptual positioning of architecture. These examples were selected with the aim of showing that there are indefinite and undecidable things that do not necessarily conform with the claims, promises, propositions and interpretations sustaining architectural acts of reservation, but are nonetheless part of such actions and solutions, as well as of an open-ended concatenation of simultaneously natural and unnatural interrelations that are difficult to predict. Thus, in actuality, the feasibility of such claims, promises, propositions and interpretations is intended to ensure control and security – over and above the formal structure (material reality) of our planet – and collides with the infrastructural and boundary system our society continues to rely on.

As abstract models and spatialisations of real and virtual matter, the reservation arrangements presented in this thesis find a parallel in architectural practice, and help acknowledge the uneasy task, that are the consequences of such acts and architectures of reservations. Taken together, it is the intention of this thesis that these should provide us with a platform that can 1) enable the original architectural format of the *reserve* to be experienced as something operating in different registers, in response to various problems, and at a variety of scales, both concrete and abstract; 2) enable the critical review of the reserve as site, including the mediums and design strategies employed by various strands of agency in building such enclosures, engendered to control and guarantee future planetary (ecological) safety. The platform thus constituted by this thesis is intended to act as 3) a privileged site via which to understand certain dynamics and processes inherited from modernity's methodological approaches, and the discourses and narrative constructions that depict and define its effects and attempts, according to various critical positions and ideological requests. Within the history of architecture, a precedent for this approach may

be found, for example, in the architectural criticism of Manfredo Tafuri, in his work at the Venetian Institute of Architecture, where he assembled a team of researchers to examine the apparent and ordered success with which the deliberate abstraction and false awareness of architecture (or architectural ideology) and its plans are put into practice.

For Tafuri, those that have approached the architectural project as complete, dominated by a technological and economic capitalist rationality, have failed precisely because any other further development or approach was, for them, considered unnecessary. Moreover, in fact, they made use of the design and planning of dominant objects precisely to lead, as in Cacciari¹ words, to ‘the closure of ideology to further development’ (Cacciari, 1973:163): a closure rejecting rather than reclaiming the ability to make new values and that reveals fundamentally utopian endeavours. For Tafuri, in order to study the complexities of the past, it was essential to consult a variety of sources both outside and inside traditional disciplinary boundaries. These sources constituted the refined set of instruments required for the project extra to those of the historians because, for Tafuri, the production of form alone cannot intervene productively in the (social) world. Further, beyond a knowledge of architectural form, they led into a broader understanding of the relationship between society and the very notion of architecture as contingent.

It is from this point of view, and, sharing a similar strategy, that this thesis hopes to contribute to knowledge in the field of architecture. It approaches and defines architecture in terms of its relation to acts of reservation and participation in the crises of the present through existing architectural engagements and the current architectural understanding of spatial thinking and developments – i.e. architecture’s openness to unplanned, undetermined and often unintended consequences, and the incompleteness of many of its intentionally-designed reserves. For this reason, this thesis presents reservation as a concept that plays a key role both as and within architecture’s work. Indeed, it is the first thesis to be fundamentally concerned with this relationship, and to present it not only within the context of architecture (its history and theory) but also that of the expansive literature

¹ Massimo Cacciari, the advocate of constructive negative thought – with affinities to Vattimo’s weak thought (Chapter II) – was part of Tafuri’s team and very influential in Tafuri’s work. His thought excludes any absolute value, based on systematic, excessive logic, unified and teleological arguments in favour of a plurality of voices and opinions. Instead of attempting to absorb all contradictions, and to use the technique of shock and the politics of fear as their foundations, both negative and weak thought favour a knowing that there are no foundations, no final explanatory cause beyond the provisional foundations we create in order to live.

devoted to understanding the ways of constructing and rethinking our relationship to the environment and the planet; and it also suggests the necessity of overcoming the negative to pursue the development and formulation of new and more ethical ambitions and methodological engagements than seeking to construct this relationship further through partitions, decisions, deferrals and distancing, as a reserve of reserves.

To provide a contextual and conceptual framework within which such engagement might be seen, Tafuri's image of a flooded room might well prove useful. He writes:

In a room where there seem to be no door or windows, is the architect. And in a moment the room begins to flood. This action would compose the operation of critique, quite willing to drown the architect, not for malice, but for him to discover that the room has no walls, no floors, no ceiling. In other words, to realise that the room does not exist. [...] If the architect in the room persists, stubbornly, in believing that the room is real and actually exists, he will drown. But, probably, it is likely that, desperately, at the last minute he will claim: 'This room does not exist' and so he is saved. Thus, obliged by the water to try to save himself or drown, he will have invented a new space. Of course I do not mean a person but a reasoning (Tafuri, 1983).

The larger totality, which is possible for architecture to approach without illusions of security and safety, certainly does not fit nor inhabit a room.

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APPENDICES

GLOSSARY

RESERVE derives from the Latin (verb) *reservare* meaning “keep back, save up, retain and preserve” and the French (nom) *reservé*, “something stored up, set aside and withhold”. It has been referring to both the contents and the container, what it saves and what saves or preserves for future use or need (i.e. for disposal, purpose or treatment): a paradigmatic assemblage. Examples of this include fuel and federal reserves, food (and grain) and nature reserves, and are manifested in wildlife parks, zoological, national and forbidden collections and archives, data centers, seed and blood banks, pandemic and retention centers and many other types of refuges, part of a *reserve army*. Built as intentional time capsules *for* life – to supplant and protect areas of importance and that which can re-serve if necessary – as well as places set aside *from* life – holding in quarantine that that is deemed de-serving isolation, such as the temporary solutions for the storage of radioactive waste - these are (types of) spaces part of a vast range of expression of fortress-like structures and defensive counter-reactions, opposed to the open-endedness character of the future. In other words, spaces that provide organization cohesion and a creative form of retreat; secluded or isolated space. For this nature reserve offers a way of addressing a network (of models) of lodgings and spaces, following a desperate strategy for outwitting or deceiving “the end”, to enhance and improve life, free humanity from, or just to fetishise, material concerns - whatever the specific cases. But also something, altogether, more puzzling.

In *Question Concerning Technology* (1954), Heidegger uses the term to describe the outcome (and essence) of an instrumental orientation and way of thinking that drives the process of “putting everything into boxes” – to enclose things within categories of understanding that we can control by keeping them in reserve or reserved for our beck and call. This is, for Heidegger, a way of thinking that actually degrades more human and material reserves than it can create and regenerate, in the sense things organized this way remain inaccessible to direct access. To the extent that things in themselves are always deeper than our perceptions or theories on/about them, and they have to be always present-

at-hand or ready-at-hand, on waiting, they retain a deeper excess than our relation with them. Heidegger uses the concept reserve to evaluate technology in a detailed and analytical way but also to draw attention to a sub-phenomenal world of things; to the fact that things withdraw from us – and from our attempts to grasp them. This is perhaps better understood through Graham Harman's object-oriented philosophy and take on Heidegger's account of the nature, potency and reality of tools and equipments as lying *in reserve*. Harman applies the concept to highlight the secret harbored in things themselves and that our dealing with it never touches.

In *Archive Fever: A Freudian Impression* (1998), writing about a feature of a virtual archive of the mind as it is manifested in Sigmund Freud's *oeuvre*, Derrida writes that this secret is also, and indeed, the trouble of the archive. It has to do with the technical structure of archiving archive as also determining the structure of the achievable content, in its coming into existence and in its relationship to the future. And it stems from an archive fever: i.e. "to have a compulsive, repetitive and nostalgic desire for the archive, an irrepressible desire to return to the origin, a homesickness, a nostalgia for return to the most archaic place of absolute commencement" (1998:57). Entwined in this desire there's a repetitive force to deliver the original moment but a force that non only maintains and curates memory but also buries it as well. Derrida pairs this force with the power of *consignation*; i.e. "the act of assigning residence or of entrusting so as to put into reserve (to consign, to deposit), in a place and or a subtract" but also "through the gathering together signs"(1998:10), where something secret is held back, will remain foreign, secret and inassimilable.

KATECHON is a key figure or entity in Paul's second Epistle to the Thessalonians that is described as the one "who restrains" and who maintains earthly authority in the absence of law characterizing the messianic (remaining) time. As figure, the Katechon is called to justify obedience to the existing order until the (conservative evangelist) Last Judgment's arrival. That is, to validate earthly authority from the "lawlessness" signalling the Thessalonians premature Apocalyptic enthusiasm. It is called to postpone authority's devaluation while vigilantly protecting earthly orders against chaos. It is an eschatological force of restraint that protects against the 'real' end of the world by keeping it as potential, in reserve. Temporary and with a deadline, the value of the Katechon's eschatological view lies in the political awareness of finitude that it produces. It lies in an awareness of death; in

its unpredictability and finality to produce the urgency necessary for the perpetuation of political order. The production of this awareness belongs to a profoundly existential strain in Carl Schmitt's theological-political thinking. According to William Ruscher in *Until the End of the World – Carl Schmitt, Apocalypse and the Katechon* (2011), Schmitt's Katechon promotes a kind of political being-towards-death necessary for political identity and political survival. Schmitt inscribes the modern sovereign of his political theology within the tradition of the Katechon after emphasizing (in previous writings) that the possibility of reading history itself stems from locating the Katechon within each particular era. For him, the very fact that there has been history serves as proof that the role of the Katechon has been taken on each time. In his own words: “the decisive historical concept of this continuity was that of the restrainer: Katechon” (Schmitt, 1950:59). The Katechon is a spatial-temporal theological fix to history; a bridge between eschatology and historical thought, deployed to impose order in the face of uncertainty and finitude.

In the post-war era, German writing largely turned its gaze away from the sight of its own catastrophic ruins to remain resolutely attuned towards destruction under the presumption that the end of the World does not only mean the end of History but that it grants shape to History. Along these lines, Paul's theological Katechon postpones the entire world from ending. It would be called to warn the Thelassonians of the anxiety that may be produced by the announcement of the Messiah's eminence. Schmitt's generalized Katechon, at his turn, postpones the end of a particular empire. It is another term for the sovereign, "he who decides on the exception". This exception is for Schmitt the paradigm that defines the proper functioning and structure of the law. It is an *inclusive exclusion*, an *ex-ception* - a seizing of that outside of the law. Drawing on Schmitt's remarks, Paul's second Epistle and Benjamin's critique of violence, Giorgio Agamben shows that the messianic arrival is a crucial step on the way to reveal the mystery of lawness. In *The Time that Remains* (2000a), he writes, “the messianic *pleroma* [fullness] of the law is an *Aufhebung* [sublation] of the state of exception, an absolutizing of *Katargesis* [the state of tendential lawless that characterizes the messianic]”(ibid:109). The Katechon shows that the messianic law is a non-normative figure of law itself, not just its negation. Messianic law is the law of faith, the suspension, literally the “exclusion” of the law.

OIKONOMIA functions as a ductile tool, rationality and administrative praxis. From Ancient Greek *οἶκος* (*oikos*, "house") + *νόμος* (*nomos*, "law"), meaning “the management

of the household”, *oikonomia* has come to be employed to refer to, and as matrix of, a vast theological and managerial device transmitted to modern governmentality - and the stewardship of a community or a society – to describe the administration of the concerns and resources of any community or establishment with a view to orderly conduct and productiveness.

In *The Kingdom and the Glory* (2007) Giorgio Agamben explores the semantic history of the concept to investigate the economies of power and their role in the paradigm of governance that the great Western powers try to realise on both a local and global scale. And more, to investigate how *oikonomia* reveals the arcane lineage connecting modernity to theology, our contemporary media-centric society to the consolidation of the Christian Trinity. The Trinitarian economy was, as Agamben explains, articulated and codified through a complex structure with the coexisting rule by one god (as three hypostases) and was delivered in ceremonial and liturgical form. It was the site where the particular assembly of practices of government administration and control – at the basis of both Foucault’s *dispositif* and Heidegger’s enframing – first took place. In the language of Christianity, *oikonomia* implied decision and measures that could not be understood simply in relation to a given problem but as an orderly management, and divine government taken for the sake of redemption. It separated and yet coordinated in good being and acting, nature and the techniques of government - that the (Christian) church had been used in guidance management and control before the power of the church had been coextensive with the State power or sovereign power. Essential to Agamben argument is the thesis that the modern notion of economics, of modern biopolitics and of political economy together with the forms of organization and government of life that proliferate in all contemporary institutional settings derives from the theological *oikonomia* conceived as immanent ordering of divine and human life. The central question follows the need to reconcile the plan of salvation with respect for human freedom – as activity held within the constraints of the law.

The introduction of *oikonomia* to political praxis is thus explored through a fundamentally anarchic dimension. In his words, "the fracture between being and praxis, and the anarchic character of the divine *oikonomia*, constitute the logical place in which the fundamental nexus that, in our culture, unites government and anarchy becomes comprehensible" (2007:64). The anarchic condition is, according to Agamben, often presented as an exceptional state, a zone of indecision between the general law and

economy, between the calculated and the non-willed. To explain it, Agamben engages with the *Katechon*, that is, the interpretation of the reasons behind the delay of the presumed *eschaton*: lawlessness. It is from heralding the relative decline of the sovereign and the emergence of governmentality that primacy is granted to order and security and to the mere management of the machine (or of the household). In the process, the administration and dispensing of *glory* emerge as a key *dispositif*; a “hidden” inner nature of Western governmentality and an acclamatory form of consensus. For him, “the efficacy of acclamation, multiplied and disseminated by the media beyond imagination” (Agamben, 2007:155) supports the governmental machine and allows for a constant recomposition and containment of effects in a supposed “general interest”. The modern state, Agamben writes, inherits aspects of the theological machine as malleable and endemic management (and production) of the world and presents itself as the fulfillment of the providential understanding of the *oikonomia*. The crucial element shared by both pastorate and the modern government is the idea of the economy as the orderly management of individuals, things and Wealth. The crucial breaking point is the transfer from God to a new modern subject: the body of a people and their historical (and biopolitical) destiny.

CRISIS is a key concept or, horizon of change (in history and all human and social sciences) delineating epochs and structures. Along with its development, crisis moved from a signifier of a critical, decisive moment into a historical and experiential condition. That is, to a non-locus from which one claims access to history and knowledge of history. Crisis is constituted as an object of knowledge, to mark a "moment of truth", a turning point or point in history when/where decisions are taken and events decided – in response to perceived or articulated external threats, or “known unknowns”. It is bound up in the predicament of signifying human history and entails a theory of time. For what Reinhart Koselleck's conceptual history maintains, from the end of the eighteenth-century, crisis is the basis to claim that one can judge history by means of a diagnosis of time. In his words, "the concept of crisis has become the fundamental mode of interpreting historical time" (Koselleck, 1972-79:371).

Koselleck's study *Critique and Crisis: Enlightenment and the Pathogenesis of Modern Society* (1959) entails a historical consciousness that poses history as a temporality upon which one can act. In this way, crisis is change catching us unprepared. It is a structural rather than merely incidental relationship with critique – the way in which we

endeavour to initiate change – that has made crisis acquire the status of a historical-philosophical concept (Koselleck, 1959). Crisis is, indeed, a judgment that evokes a moral demand for a difference between past and future times. The etymology of the term speaks of this origin: from the ancient Greek term Κρσις, crisis is literally to separate, to choose, to judge, to decide "as a means of 'measuring oneself', to quarrel, or to fight" (Koselleck, 1972-79:358). For the Greeks, crisis was a "central concept by which justice and the political order could be harmonized through appropriate legal decisions [...] Beyond that, the concept gains central significance in the wake of apocalyptic expectations: the Κρσις (*krisis*) at the end of the world will for the first time reveal true justice. Christians lived in the expectation of the last judgment (crisis: *judicium*), whose hour, time and place remained unknown but whose inevitability is certain. It will cover everyone, the pious and the unbelievers, the living and the dead. The Last Judgment itself, however, will proceed like an ongoing trial" (ibid:359-60). With its adoption into Latin, the concept underwent a metaphorical expansion into the domain of social and political language to the point of modernity itself being described as "crisis-ridden". As it pertains to historical time, then, the semantics of the concept crisis come to contain diverse interpretative possibilities.

According to Koselleck, these diverse interpretative possibilities extended to two new historical (or temporal) coinages: "the first uses "crisis" as a permanent or conditional category pointing to a critical situation that may constantly recur or else to situations in which decisions have momentous consequences. The second new coinage uses "crisis" to indicate a historically immanent transitional phase. When this transition will occur and whether it leads to a worse or better condition depends on the specific diagnosis offered. All of these possibilities reveal attempts to develop a single concept limited to the present with which to capture a new era that may have various temporal beginnings and whose unknown future seems to give free scope to all sorts of wishes and anxieties, fears and hope. It becomes a structural signature of modernity." (ibid:372) From an epoch consciousness, crisis came to refer both to the retrospective effects of events and their constitutive presuppositions. It became a criterion for what counts as "history" and a means to access history itself.

CATASTROPH(IZ)E

Catastrophe is an event or state of a disruption (or rupture) in lived time and the experience of a spatial opening in the way things are. Etymologically, it refers to "an overturning,

sudden end” from the Greek *katastrophē*: ”an overturning; change of fortune or a sudden end” also applied to the climax and resolution of a plot in ancient Greek drama. Catastrophe is therefore a figure of limit. It marked the final resolution in the plot, unraveling the intrigue and bringing the piece to a close.

Catastrophe names an excess and/or exception to be located in relation to ordained laws. It is suspended in a structure of law – whether natural, political or rethoric - and the temporality of fate. The catastrophe is a *caesura*, a form of interruption that redirects and repositions what is and was interrupted and transformed into process. But the catastrophe is a *caesura* that is allowed because it is employed in the sense of a crisis and the need for a decisive response to it. It entails, as we’ve seen in crisis, a reconceptualization of time and an articulation of temporal limits.

It is for this reason that Agamben states that the central idea in Benjamin’s *Theses on the Philosophy of History* (1940) is “messianic time”, the paradigm for understanding the present in “messianic time” (see Katechon). The catastrophe contains the kernel of the messianic. In *On The Concept of History*, he uses Paul Klee’s painting *Angelus Novus* to describe the Angel of History has "his face turned towards the past. Where we perceive a chain of events, he sees one single catastrophe which keeps piling wreckage and hurls in front of his feet" (Benjamin, 1940). The Angel is horrified by the catastrophic events (the storm) we call progress and he stands for historical materialism with the messiah replaced by the materialism - the ever-increasing pile of debris (stockpiling). Through an allegorical account, Benjamin argues that writing history is inextricably linked to making history. A shared belief among other German intellectuals (after the first World War) concerned the legacy of the Enlightenment and of instrumental reason as irretrievably linked and causal to the terrors and catastrophes of the XX century - “the age of catastrophe” - as much as the current catastrophes (those of the XXI century) are irretrievably linked to causality and a mode of existence that has been largely insensitive to the environmental devastation caused by progress, according to postmodern (and) ecocriticism.

The catastrophe has come to signal both how we live in a commodified culture, its total management of life, and what we need in order to break out of the structural and compliant ways in which we live. For Baudrillard (and others), the problem of catastrophe is therefore a symptom of catastrophe - that finds itself paradoxically trapped in the discourse of the catastrophe as a means to avert the catastrophe or the end. This is catastrophization. To catastrophize is to enroll in a process in which the catastrophe is

imminent, the suspended moment that makes possible both moral urgency and political manipulation. It is governmental. It is a process in which accidental and man-made forces work together to instigate catastrophic effects. According to Adi Ophir its first plane is that of the actual – objective – the second is discursive – to trace the patterns of expansion, to help contain and mitigate the effects. For Ophir, throughout the proliferation of orders and decisions rather than systems and norms to cope with the catastrophe, the catastrophe itself stretches the capacity of law to act in law-like ways. Ophir's argument extends Agamben's formulation to explain that the force of catastrophe initiates and establishes a state of exception. Ophir uses the site and time of catastrophes - both natural and man-made - as a prism for studying the relation between sovereignty and governmentality.

CONSERVAT(ION)ISM

Conservatism is a modern political tradition that looks for the defense of inherited political, economic, religious and social traditions against the forces of abrupt change. Their philosophy is, therefore, based upon the belief that to maintain continuity and stability in society, established customs, laws and mores should guide change. Conservatives place a high value upon order in society – preferring organic change to revolution, by definition. They perceive continuity to be most essential to the canon of social order. For them, the government is the most effective means of protecting territories and populations. They uphold inherited moral values and believe that natural or divine law transcends human law - their *nomos*, compounded of customs and the existence of physical, psychological, political and social conditions.

Conservationism can be seen as part of the worldwide problem of political, environmental and social movement that seeks to protect natural resources; for the protection of a pre-humanized nature and for the preservation of human health. It is not to be confused with conservatism. Although mutually exclusive, true conservationism is thought to be conservative. Conservationism is based on human value systems and it stands not only for protecting nature against misbehavior but also for developing human activities, enhancing present and future human life. It is a political, environmental and social practice (even movement) in itself. Nevertheless and according to René Dubos in *Franciscan Conservation versus Benedictine stewardship* (1972), conservationism entails "a scientific justification for taking a conservative attitude towards changes in nature", mainly those that are disruptive. As example, "conservation of natural systems is the best guarantee against

the irrevocable loss of diversity and the simplest way to minimize ecological disasters" (Dubos, 1972). Yet, such resistance is unequivocally a strategy of conservatism. Above all, conservatism and conservationism share an article of faith; a noun of action from *conservare*, meaning, etymologically, the preservation of existing conditions. That is, conservationism is the common ground between the premises of conservatism and preservation. Inherent in the very concept of conservation are the notions of invariability and opposition to change.

Conservative environmentalism paves the way to a more general appreciation of environmentalism's character, namely, the fundamental orientation of its core value and policy proposals. These promote a strong recognition of nature's value, defending the need to restrict its substitutability by enclosing the form of nature in a reserve or through a scaling back of society for the benefit of nature. Conservationism maintain that nature has some kind of intrinsic values that deserve social recognition, and as such that greater degrees of protection should be put in place in order to grant its autonomy. In a deep sense in several ways it speaks about a separated nature, set apart from the physical, psychological, political and social human environment. This is an attempt to conserve a certain (socio)natural relation in contrast with an open and contingent view of that relation. The "foundations" are a predictable future and one where nature can flourish. Strictly speaking conservative "foundations".

DEEP ECOLOGY is form of radical environmentalism, now influenced by Jean Baudrillard's critique of the negative gestures undermining the theoretical, ethical and political normative positions and by his concerns against foundational strategies. The power and promise of deep ecology includes a vigorous critique and rejection of political rationales and all forms of sovereignty – including the anthropological power and moral authority – over and above nature. Instead, it tries to speak about the natural world but also to speak with(in) and possibly for the natural world, in a sense more than linguistic. Deep ecology main critique concerns the status of nature as the ultimate source and location of moral and economic values. It attempts to go beyond the instrumentalist orientation and, or right-based systems but as well the state and sign of the world, or of Earth, as hostile to our well being. The project of deep ecology takes from the critique of environmental destruction a critique of society and modernity's established moral and spatial strategies, profoundly shaped by scientific though and action, mainly those to fix the space and time

of the human. It decries the mode of existence that is delivered in, and derived from what it considers to have been largely insensitive to the environment and its devastation, with a focus on anthropocentric and sovereign dominion as responsible for nature's loss of permanent and legitimate standing. In this respect, deep ecology rejects many elements of our contemporary "forms of life". It follows that environmentalism must find other ways to articulate its ethics, an alternative ethos, because the established forms of ethics will inevitably distort or exclude the values of critics who live and envisage a different form of life. For that reason, deep ecology is able to provide a point of entry and alternative perspective that among all areas of cultural production explores the contemporary contestation of the figure of the Earth (and of nature) as vulnerable, enduring and evolving unnaturally in negative terms.

As a form of radical environmentalism, deep ecology takes into account all of the other forms of ecocriticism – such as ecofeminism, social and eco-Marxism and Heideggerian ecosophy (see Garrard, 2011) - and has an overly pessimistic approach to the impact of reform environmentalism, conservation and conservationism included. In addition, it is overly indifferent to ecocentrism. Deep ecology is based on the notion of biocentric equality, meaning all beings with equal intrinsic value. It asks for a reconsideration and moderation of the meaning, value and significance of nature to undermine nature's historical construction and it invites us to resist the lines and foundations that the modern world has drawn to distinguish humanity from the natural world. Founded by the Norwegian philosopher Arne Naess (a student of Spinoza's stoicism) in his article *The Shallow and the Deep, Long-Range Ecology Movement: a summary* (1973:95-100), deep ecology centres on the healing of the social and environmental crisis with the desire to realize a more fundamental, more essential ecological consciousness and, spiritual egalitarianism with all things, and beings: inorganic and organic. It envisions a world in which ecological respect; care and integrity would expand and enhance, rather than reduce the possibilities of well-being. It has a holistic total filed image defined via recognition of a continuity that exists between human well-being and all the other entities.

Developing an Earth-ethics secured at the level of a totalizing intrinsic value schema, deep ecological thinking articulates minority traditions of culture and philosophy, those that focus on "self-regulating communities" to re-discover spiritual and rational anti-dialectical ways of knowing and acting against the dominant, traditional and modern

position. Critical in the exploration of the grounds for a genuine society, deep ecology responds to specific social and historical conditions that cut across spatiotemporal dimensions according to metaphysical visions and truth certitudes, such as reserve formations. It explores the ontological shift from an anthropocentric, dualist and utilitarian understanding of nature to an understanding of “let things be” as the logic of the “enough”, meaning that humans have no right to reduce richness and diversity except to satisfy their vital needs. That is, to a non-anthropocentric humanity that would inhabit, respect and care for all beings because they conceive the “let things be” not so much as producing things but rather as freeing them up to realize their own potential. This is a point of agreement with Heideggerian ecosophy (in turn influenced by romanticism of nature, at a certain extent a counter modern discourse within modernity), and in the twofold sense of allowing things to manifest themselves according to their own possibilities, and of allowing them to pursue their own destinies with as little interference from humans as possible. As result, deep ecology advances a conception of the human subject that is singular but an ecologically benign denizen (Smith, 2011).

WEAK THOUGHT is “a metaphor and, to some extent a paradox” (Vattimo and Rovatti, 1983) describing the act of theorizing the advent of a new era. At its root lies a comment on the “weakness” of thinking and meaning in relation to Being, and an interest in formulating a new approach to the problematic of “the crisis of reason” within the idea of truth. “Weak thought” or *il pensiero debole*, “refers the nature of truth at the point in time it lost, definitively the characteristics imparted to it by the sphere of metaphysical evidence”(Borradori, 1987-88:40). Its model was to be found in the arts where a truth is presented as mobile and susceptible to an infinite number of interpretations; whereby the postmodern experience of truth is considered as an aesthetic experience in itself (Vattimo, 1985). For the conceptual philosophical framework of “weak thought” concerns an ethics of *de-potentialization*, and even of interpretation. It represents an attempt to provide truth with a non-philosophical foundation by suggesting that by re-defining the theoretical basis of modernity and re-writing metaphysics, a new mode of “overcoming” can be emplaced, and with it new spaces of referentiality can be made available.

The general interpretation and major philosophical notions of “weak thought” were developed by Gianni Vattimo in the 1980s to resolve his concerns with a particular type of *knowing* characterized by a profound rethinking of all notions that served as the

foundations of Western civilization in every field of culture. Vattimo's theses concentrate on the dismantling of all metaphysical truth claims and all the metaphysical systems of logic. They reject any notion of fundamental transcendental structures of reason or reality as a given truth, due to the plethora of contemporary continental discourses around the loss of referent. He is convinced that reason is no longer central but is rather weakened, shadowed or almost eclipsed by linguistic horizons not unique nor static but historical-temporal. Things grow into existence only within linguistic horizons and man is thrown into them. Along with this, truth becomes the changeable transmission of a linguistic and historical patrimony that renders possible and gives an orientation to the comprehension of the world.

Under this light, the idea of a total knowledge of the world and the idea of a possible and certain truth, are dissolved. Under a multiplicity of voices, thought is not capable of knowing or articulating the fundamental state of being and therefore cannot even determine values that are objective and valid to all man. In brief, the idea of history as a continuous renewal and “overcoming” - a progress guided by laws - with a logical determinism is invalidated, replaced by the postmodern dissolution of the new and embrace of the relative, which greeted the end of history. “Weak thought” is a postmodern syndrome that marks the end of modernity’s metaphysical voyage of discovery by weakening all the metaphysical, ultimate foundations and incontrovertible principles that modernity sought to establish, opening a new era within which reason and history cannot be discerned or in any way made intelligible. It is a theoretical categorization of the world that does not give strength to ultimate or normative “foundations” of thought. Because, as Vattimo asserts (following Baudrillard), a philosophy that requires certainties and unique foundations for the theories of man, of God, of history and of value cannot be proposed any longer. A crisis of the fundamentals has made all those vacillate.

At the heart of “weak thought” lies Heidegger's and Nietzsche’s legacy of nihilism. For the project of nihilism is to unmask all systems of reason as systems of persuasion. All thought that pretends to discover truth is but an expression of the will to power – even domination. In this way the weak thought approaches the past with piety, the present with attention to areas of human experience that would otherwise be trampled by an all-encompassing gaze, and the future as open to error and new relations. For “weak thought” demands care for us (and for more-than-humans) on scales of time and space far in excess

of the usual (and modern) parameters, and as such is more open to, focused upon and found of uncertainty – against the validity of conservat(ion)ist rhetoric.

STOCKPILING is a term that Timothy Morton in *Unsustaining* (2011), among other short writings, uses from Heidegger's inquiry – *The Question Concerning Technology* (1954) – to draw one's attention to the dominant mode and form of authority of our social existence. It shows how Nature itself is but a human category pre-existing capitalist labour in all its guises. For Morton, Nature is stockpiling. It is indeed, the “stockpile of the stockpiles”, the reserve supply of all reserve supplies – ordered and stored for its potential and scope to be used. It is de-animated, non-autonomous, self-defeating and almost non-existent in any meaningful, essentialist and, or genuine kind.

Among Heidegger's elaborated language and terminology, Morton refers to the concept of “standing reserve”, an unconcealedness mode of Ordering that reduces things to mere resources (or supplies), that is, utilities. And as such, it conceals all other autonomous possibilities for these resources, except for their use (as seen in the RESERVE entry). Things that exist in 'standing reserve' no longer stand against or separate to us, instead they remain at our beck and call: immediately at hand, awaiting human activation (project or purpose), ready for further Ordering. For Heidegger in our purposeful life we tend to conceal things as they are, in and of themselves, by instead disclosing them as tools. It is only after things have revealed themselves to us as useful - the “unconcealment of things” - that we incorporate or enroll them into our projects. This unconcealment, revelation or disclosure concerns Nature, above all, as the chief storehouse of the 'standing-reserve'. As example, he draws upon how a living forest may be perceived as merely a “standing-reserve” of timber (*Bestand*); no longer trees even, but just timber-in-waiting, the reduction of forest to utility. For Heidegger, the sheltering Earth provides the entities from which we, human beings, found a world. What lies outside of us is in practice neither available nor existent, so that to be is not just to exist but to disclose how one can be used – the *thingness of things*.

Aimed at defining Modern technology's essence (not just any technology) and humanity's role of being with it, Heidegger's inquiry investigates the consequences of the particular human orientation to the world as one of *enframing* or construct (*Ge-stel*) – instrumentalism. Heidegger investigates how Modern technology has fundamentally altered man's relationship with the natural world, challenging Nature by exploiting the land as pure

resource. Modern technology, for Heidegger, challenges the land, or whatever this technology happens to be exploiting, to yield more. Objects are thus revealed as pure resources (supplies), stockpile and stockpiling. They are exploited for all the energy or use they can yield and are left to stand there until they are to be challenged for more use again. The problem of Modern technology for Heidegger is that seeing everything in the world as merely resources in this way dominates the consciousness of humanity. Of all modes of revealing, the mode corresponding to modern technology is unique in excluding other modes of revealing. It is a mode of revealing that limits what counts, and by extension it is only one mode of revealing, one way of relating to the world, amongst others. For Morton it is indeed one function of Modern capitalist society. Building on Heideggerian thinking, Morton's ecocritical interest in historicizing Nature entails the analysis of the concept of stockpiling to challenge the very character of the Earth; he perceives the materialist world as having caused the mirror of Nature to no longer appear to us natural, but instead as a category of the human. An idea that for him we need to accept and not to resist in order to counter the world in which we live and, structurally, realign it.