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Building Reserves of Risk

Notes Toward a Theory of de Facto and Fictional Conservation(ist) Regimes

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Introduction

In the late 1960s and through the 1970s, the whole Earth, as seen from space and/or mimicked in inflatables globes, gave rise to all kind of ideas, utopian concepts and thought possibilities invoking the common interest of all people to attune their senses to the fragility of Earth as an ecosystem and as the fundamental basis of all life. It has become the buttress of environmentalists to speak and conceive of human beings as a single unified category, as well as the metaphor to lead the goal of producing a more resilient human species and a more efficient practices management. At that time the prospect of biospherical problems, 'limits' and critical tipping points with possibly deleterious consequences for humanity, now leveraged into warnings of an irreversibly changed planet, fuelled rhetoric of ecological crises and served as the basis for wider debate and public interest in means of security organisation to protect the whole Earth against issues which would, of course, directly impact us.

Although a prior idea of ours as a threatened planet, and the construal of the world as problematic haunts this interest and debate, influential publications such as Rachel Carson's *Silent Spring* (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 thanks composed by preeminent scientists and decision-makers, such as the Clube 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, 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 serious ecological crises.

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 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 problems. Many of these attempts have as a major focus the production of spaces designed either to secure and keep apart – i.e. in reserve/s – things perceived as threatening to humanity or vital to its survival, or whereby such things are secured and isolated; arrangements which act as architectural agents in support of (human) life on the planet. Reservation arrangements of the kind with which I am concerned, include reserves of vital ecosystem *goods*, carbon and (renewable) energy sources; seed and blood 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 ecological and environmental crises, failing to achieve their goals, such attempts have often ended up exarcerbating rather than lessening the very problems they were intended to resolve or ameliorate.

Regimes of action

In a world of increasingly refined plans and actions to ameliorate the effect of the threats of many ecological and environmental crises, and to prevent the surprise of other possible negative upheavals or disasters, the defence of the whole, 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 coordinate threat-response. The entire planet is at risk in such a scenario, and the building up of sturdy reserve 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.

Everyday, 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[1]. 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)[2] has disrupted the environment and caused, or at least contributed to, massive devastation. It is, in fact, by reason of these events that mass culture has been obsessed with visions of comets and asteroids on collision paths with the planet, and that planetary defence initiatives are being devised. This interest has helped us advance our ideas about the physical

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[1] 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, as well as the famed Tunguska event and the Chicxulub impactor.

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

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, and preserve secure socio-natural (or socio-cosmical) relations.

Since the 1980s, physicians and representatives of the Russian aerospace industry and NASA have been lobbying for an orbital anti-asteroid/comet defence program for future generations to deal with NEO; 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; and the joint NASA-European Space Agency Asteroid Impact and Deflection Assessment (AIDA) is working to have asteroid impactors and gravity tractors[3] tested. Until now, the only strategy being devised for contending with the threat NEO 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 possible impact locations. A collision with Earth could cause a global catastrophe.

In the early morning of February 15, 2013, a rogue meteorite explosion over Chelyabinsk, Russia has sharpened public awareness of the dangers of a collision of these objects with Earth. 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 led to an avalanche of interest in the work of diverting and preventing NEO from falling to Earth, including of 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.

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

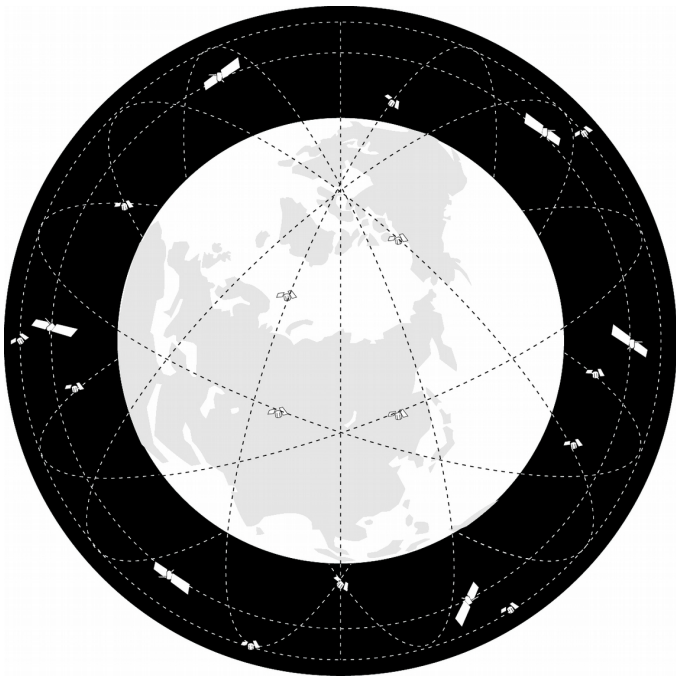

Figure 2 . NEOshield and NASA AIDA diagram

Officials from Russia's Nuclear Agency and the Ministry of Civil Defence, Emergencies and Disaster Relief told in 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, nuclear explosive deflectors (the aforementioned asteroid impactors) and reconnaissance satellites orbiting in a dense formation around our planet as earlier as 2018-2020. In addition, they are calling for a world-united NEO defence program. The media have suggested that Russia's Space Agency, *Roscosmos*, is joining NASA's ambitious AIDA mission, as well as the European NEOshield consortium[4], in order to study ways to capture and change the orbits of incoming objects through methods that impact directly on the target. The methods *Roscosmos,* NASA mission and European program are following to fulfil the necessity of defending our whole physical geography from incoming Near-Earth objects entail developing the means of tracing a "high frontier", an upper ceiling or sentry line of spacecraft circling the Earth above the Earth's atmosphere to look

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[4] Even though NASA AIDA and NEOshield page does not mention it.

up at, and fight the (hostile) cosmic universe. This 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 via incoming and constantly updated information from real-time mitigation technologies and various risk analyses. By doing 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 word, to enhance the Earth's current protection – as well as civil defence programmes - and gain influence above and beyond the Earth's bounding atmosphere and atmospheric limit of the Earth with the help of machines.

The shared aim of these Russian officials, of the NEOshield consortium' and the AIDA partners' mission 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. Certainly, the risk of a meteorite strike is considered sufficiently high for us to need such plans for an ultimate backup arrangement to 'artificially' protect the whole Earth and all humanity. The probability of an impact event but also the probable magnitude of such event lays the moral dimension of the risk and the obligation to do something about it to yield safety.

The means and ambition of this sentry line recasts in acute form the kind of 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 the whole Earth, not only the US within new technological limits. These new limits recast a conjectural proposition to defend the Earth from outer space, rather than, as previously, from within itself – and any human foe. The imperative of technological salvation is founded on a fear of *possible* impacts and also of the real possibility of setting up the means to destroy them, and it is reawakening doubts that had led indeed to the demise of SDI.

In 1983, President Reagan introduced the SDI as a solution to the stalemate of the Cold War: to improve the United States' military stature and war-fighting capability. He proposed the creation of a layered defence system that 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. In other words, 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 *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.

The similarity between the SDI and the global shielding project issues from the fact that, despite the differences between nuclear missiles and NEO threats, both 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 of a circular causal system, autonomous control mechanisms and information processing automation with built-in-autonomy to place defensive devices (or weapons that destroy other weapons) in orbit and maintain the enemy in (its) space.

For its supporters, in the 1980s, these improvements and the displacement of humans by *fully* automated 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. The attempts to encourage and launch the SDI met with serious suspicion and failed to garner much support.

Several different experts recognised that neither in theory nor in practice, were the high- tech

hybrid technologies 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 a Nuclear Winter[5] 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 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 technology 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 Norbert Wiener (1950)'s words, '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 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

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This is a global climatic effect scenario hypothesized to occur after widespread firestorms following a nuclear war. The hypothesis is based on the fact that such fires can inject soot into the stratosphere, where it can block direct sunlight from reaching the surface of the planet.

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.

Reagan's SDI is the perfect exemplification of this phenomenon. It 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 realities beyond Soviet bombers. 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 hybrid technology, infrastructure and logistical development, but also of inciting more negative reserves. The basic conviction arrived at was that the SDI initiative, and the inclusion of automated battlefields and cyberwar machines, signaled 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 other 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 that the political community found dangerous, uncomfortable or merely inconvenient, such as the detonation of weapons in space, whilst asserting it as presenting serious disadvantages for the security of space-power itself and of humanity as a whole. How are we to make them now, more acceptable? The introduction of activities such as the nationally-sponsored programmes and infrastructures of global shielding into which we are now pouring vast resources to give us the necessary capabilities to cope with the totality of the Earth and the universe must, equally, seek both reconciliation with the treaties legal foundations and consensus amongst the international political community.

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, aims at placing the entire earth into a reserve of risk 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. Fueled 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 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 – 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.

The problems of 'boundaries'

The territory around Chelyabinsk city, where the rogue meteorite fell to Earth on February 15 2013, 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: the first and secret site of the Soviet Union's nuclear weapons-grade plutonium production and isotope separation factory; also an example of purely passive (strategic) defence policies and procedures.

The natural and geological 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 Techa- 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 explosion[6] 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.

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[6] 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.

Throughout the 1940s, 1950s and the 1960s, most of the highly active waste had to be deposited in liquid form. Its quantities were already enormous and the shipping of it would have involved (as today) 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 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.

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.

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.

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 rightly 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 ultimate dispose of toxic industrial and military waste.

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 nature 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 studies, 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.

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.

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 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 fundamentals of what we do, in the western world, to pursue safety, 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.