
This is the **accepted version** of the book part:

Valtines-Álvarez, Jaume; LoPresti, E. «The Atom in the garden and the apocalyptic fungi : a tale on a global nuclearscape (with artworks and bird-songs)». A: Gardens and Human Agency in the Anthropocene. Chapter 10. 21 pàg. Routledge.

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**The atom in the Garden and the Apocalyptic fungi:
a tale on a global nuclearscape (with artworks and bird-songs)**

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With the special collaboration of Eric LoPresti, New York

To little-clover Rita, Max and Noa at dawn

To grandtree Balbina at dusk

To flower Flor at night

“The electricity, the steam, the radium and other energies the existence of which you do not have the slightest clue do wonders day after day (...). Will humankind find the right way some day, and put it finally on tracks to start a new era?” (Jorge 2004 [1912], 52).¹

Preface

This “tale” – illustrated with pictures, artworks, songs and songbirds – tries to reflect on the history of the making of a nuclear landscape on a global scale throughout the 20th century and the beginning of the 21st century. It is a personal and political account about how nuclear technologies shaped and still shape our real, imaginary, utopian and dystopian landscapes. It is quite indebted to anarchist thought, texts and practices, and has also benefited from lived experiences, art perspectives and different academic traditions such as history of technology, philosophy, anthropology, geology and microbiology.

The “tale” brings different textual, visual and acoustic forms of expression together in order to explore new historiographical ways of storytelling. Due to publishing constraints, images have been restricted to two colourful paintings of the series “Blooms” by Eric LoPresti, which were exhibited at the Elizabeth Houston Gallery in New York City in 2017. Besides being accompanied by visual resources, the text has been written to be read (or to be heard) while the music, audiovisuals or sounds recommended below the sections' titles are playing (the recording times are approximately the reading times needed to read every section; all the tracks can be easily found on-line).

The sections conducted by music songs and film songs (“#Play Track”) introduces – more or less chronologically, less or more in a simplified way – different moments of the story: Section 1 “The Forbidden Fruit in a Globescape” (around 1929-1945), Section 2 “The Gospel of Nuclear Edens” (1953-1986), Section 3 “Utopians are Everywhere” (1973-1986), and Section 4 “Updating: Nuclear_Eden.02” (2000-now) (as observed, the years around the biggest global financial and energetic crisis – 1929, 1973 and 2008 – play an important role). The two sections conducted through sounds (“#Play Sounds”), separated with asterisks, are devoted to art, and specially to the works by LoPresti in New York and West Coast in Portugal.

The music selection has been made attending the need to complement and contextualize the text (like in the artworks presented, melodies and lyrics contain epistemic clues for this story). The Opening and the Finale sections of the “tale” – which are devoted to thinking about what fungi teach us about life renewal – refer to the Greek myth of the women oracles called sibyls. This myth was appropriated during the Christian medieval world to prophesy the last judgement and the end of the world. The first track is a medieval Catalan version of the Song of the Sibyl recorded by soprano Montserrat Figueras and Jordi Savall. Figueras reviewed its meaning in the following terms (Figueras and Savall 1996): *“The Sibyl’s devastating words are dramatically relevant today, speaking as they do of the destruction of the planet, of mankind’s lack of respect for the vanishing natural world and of the brutality that has led man to regard nature as a machine”*. The last track is based on the version of the Song of the Sibyl that is still sung in Majorca on Christmas eve. It was recorded by the Iberian percussion orchestra Coetus, which means – in Latin – crowd, political or illegal assembly, or union. At the end of this recording, little whistles and musical instruments reproduce bird sounds as a metaphor of the possibility of new worlds.

“We are not in the least afraid of ruins. We are going to inherit the Earth. (...) We carry a new world, here in our hearts. That world is growing this minute,” are the famous words by anarchist Buenaventura Durruti (León, 1896-Madrid, 1936). The new worlds that “we” carry in our hearts are co-operative refuges for life based on biological and social mutual aid, instead of shelters based on technocratic-based technologies, forced security and authority. Rosalind Williams pointed out in the final lines of *Notes on the Underground: an essay on technology, society and the imagination* (Williams 2008, 213):

“The human environment is by definition technological to some degree. But if we allow technology to take over our surroundings, they can become inhospitable to human life (...). Our increased dependence on technological shelter may lead to the weakening of human interdependence, which is another source of security. We should not forget that society too provides shelter, and in many cases a more flexible and effective kind”.

Opening. The Apocalyptic Fungus (I – The Mushroom)ⁱⁱ

#PLAY TRACK. Montserrat Figueras, [“El cant de la Sibyl·la”](#) [Barcelona Sibyl] (10/11th centuries)
[18:13]#

A single big mushroom such as a specimen of *Langermannia gigantea* or of *Macrolepiota procera* (popularly known as Giant puffball and Parasol) can bear several millions of millions of tiny spores on its fruiting body and can spread tens of thousands of them every second. Air currents can make these spores blow to a height up to tens of miles in the atmosphere during days, weeks and months, and cross mountains, cities, seas, and even oceans. If all the spores of a single big mushroom of these species found a proper milieu, they could colonize the whole Earth's surface at once.

In 1945, the several thousand metre-high mushroom of gases, dust, water vapour and radioactive particles over the Trinity Site bore the “spores” for the nuclearization of the world. It made world-widely thinkable (and feasible) that the ancient millenarianist idea of the total annihilation of human life on Earth could be fleetingly achieved by technological means. Not by chance the year 1945 CE (Common Era) has been underlined by some scientists as the year 0 AE (Anthropocene Era). In the current Anthropocene debates, the starting of a new geological stratum induced by human activity has been

associated to the subsequent socio-technological “revolutions” to control nature: the Agricultural Revolution (especially, after the creation of the first agrarian states), the Scientific Revolution, the Industrial Revolution, the Green Revolution, and, finally, “the Atomic Revolution” (Lewis and Maslin 2015).

The world had already been *one* landscape for such different traditions for a long time: christians and muslims, political economists and socialists of every hue, esperantists and anti-colonial millenarists, and, of course, techno-optimists and techno-busters. The advent of railways, the telegraph, the telephone, radio, the aeroplane, TV and the WWW have been – successively and amnesiacly – evangelized the coming of a merry interdependent “global village” (Edgerton 2006, 105-117). At the same time, deforestation, steam-engine smokes and chemical products were also understood as seeds of catastrophic risks at a world-scale, especially before being normalized through “little modern de-inhibitions” which have led towards our current “joyful apocalypse”, as Jean-Paul Fressoz has pointed out (Fressoz 2012, 9-25; specifically about colonial deforestation and “global environmentalism”, see: Grove 1995, 168-388).

The appearance of the nuclear mushroom, thus, did not lead the world to be “as one” for the first time, nor was it the starting point of the globalization of technological risks. However, during the Cold War nuclear technologies – along with the development of sciences such as space sciences, geosciences and ecology – paved the way for new ideas on “global environment” (Grevsmühl 2014; Camprubí 2016). Moreover, nuclear technologies provided technological risks and the potential catastrophe with a new spacial and temporary dimension. According to philosopher Timothy Morton, nuclear “hyper-objects” such as A-bombs and H-bombs have thrown a new veil under the Sun for the next centuries and millennia due to its ubiquity, speed and transcendence: with them, the end of the world has still come (Morton 2013).

Is it a new epoch, here and now? Since the prefix of Anthropocene has been uneasy to many people (“which *anthropoi*? which humans? indifferently?”), a number of alternatives to the term have come up during the last years: Androcene-Christocene-Capitalocene-Plantationocene-Corporatocene-Chthulucene-Thermocene-Phagocene-Tanathocene-Agnotocene-Polemocene-Elachistocene-Plasticene... (Schneiderman, 2015; Moore 2016; Bonneuil and Fressoz 2017). Many other terms could be added to the list (in the case that they have not been invented and discussed before this publication). For instance, we could add Statocene and Highmodernocene, if we would draw on the work about the state and the high-modernist ideology by anarchist-leaning scholar James C. Scott (Scott 1998; Scott 2012). Or, a term which is not totally at odds with the last two: Uraniocene?

The Forbidden Fruit in a Globescape

#PLAY TRACK. Bradley Kincaid, “[Brush The Dust From That Old Bible](#)” (1950) [02:34] + Pink Floyd, “[Come In Number 51, Your Time Is Up](#)” from the final scene of *Zabriskie Point* (Michelangelo Antonioni, 1970) [06:56] + Los Ganglios, “[Hay](#)”, LP *La guapa y los ninjas* (2002) [04:51]#

Once upon a time, technology had been disturbing the beauty, pureness and silence of what was thought as pastoral paradises, as Leo Marx told in *The Machine in the Garden* (Marx 2000). Not just in the idyllic nature, of course: the uneasiness and resistances to machines by King Ludd and Captain Swing started at the very moment that they entered into the factory and the farm.

When the first world economic crisis broke out in 1929, the machine was put under the spotlight and under suspicion. Not just for its material responsibility, of course: also for other deeper reasons.

Philosopher José Ortega y Gasset fiercely criticized the technological processes of dehumanization, and lambasted the mass-man for believing that technology was a natural fruit of the Garden of Eden (Ortega 1932 [1929], 82; quoted in Marx 2000, 7-8; Mitcham 2005, 950-952):

“The world is a civilized one, its inhabitant is not. (...) The new man wants his motor-car, and enjoys it, but he believes that it is the spontaneous fruit of an Edenic tree. (...) [He] does not extend his enthusiasm for the instruments to the principles which make them possible”.

Ortega y Gasset could surely grasp the popular techno-enthusiasm, for example, during his visit to the 1929 International Exhibition in Barcelona, which became a huge showcase of engineering display and technological sublime like any other world fair. However, the social debates on the “machinery question”, on technological unemployment, on chemical weapons, and on industrial democracy and technocracy strongly heated up these years, especially after the financial crash. Besides, Ortega seemed to turn a blind eye – in the quote above – to the great popularity of “pure sciences” and their principles, such as astronomy and relativistic physics (Roca and Ruiz 2016; Glick 1988). Ortega was much more given to recognize a sinless new Adam in Albert Einstein than in the prosaic engineer or the mass-production worker (Ortega 1923). Even so, he could not imagine that the “innocence” and “purity” of this physicist would be so relevant in the race of providing a new “forbidden fruit” to the world in 1945, as Lewis Mumford suggested some decades later in *The Myth of the Machine* (Ortega 1923; Mumford 1970, 255).

After World War II, the shadow of the mushroom clouds entirely covered all the creatures and critters of the world. It seemed that a new fifth rider of the Apocalypse – leading the other biblical riders of conquest, of war, of famine and of death – could show up at any moment and destroy any blade of grass. In September 1945, the first foreign journalist who visited the horrific landscape of Hiroshima wrote in the newspaper article “The Atomic Plague” (Burchett 1945):

“Hiroshima does not look like a bombed city. It looks as if a monster steamroller had passed over it and squashed it out of existence. I write these facts as dispassionately as I can in the hope that they will act as a warning to the world”.

He was not the first one to notice that the destructive effects of nuclear technology could acquire a global dimension and could make the planet Earth into a single death-landscape or tanathoscape. Some weeks before the final decision of targeting Hiroshima and Nagasaki, Leo Szilard and nearly seventy scientists involved in the atomic project tried to prevent the US president Harry Truman from dropping the bomb. In the famous petition to the president they highlighted the possibility of “opening the door to an era of devastation on an unimaginable scale” and of providing “almost no limit to the destructive power” (Szilard 1945). Even Truman himself also depicted the Trinity nuclear test on July 16 as “the fire destruction prophesied in the Euphrates Valley Era, after Noah and his fabulous Ark”, as Peter Kuznick has recalled us (Kuznick 2007, 1). “I am become Death, the shatterer of worlds!” was also exclaimed by J. Robert Oppenheimer, in charge of the secret Los Alamos Laboratory. Even some years before the first nuclear conflagration, scientists and bureaucrats behind the Manhattan Project seemed to be aware that a new turning-(and not returning)-point could be “knockin' on Earth's door”. In 1942, the head of nuclear research at the Metallurgical Laboratory in Chicago, Arthur Holly Compton, confided his restlessness to Oppenheimer in the following terms: “better to accept the slavery of the Nazis than to run a chance of drawing the final curtain on mankind” (Compton 1956, 128; Kuznick 2007).

Going back to the first years of the 1929 crisis, psychoanalyst Sigmund Freud warned about the perils of civilization (and nature) in a kind of revised lyrics of the Song of the Sibyl (Freud, 1962 [1930], 92):

“Men have gained control over the forces of nature to such an extent that with their help they would have no difficulty in exterminating one another to the last man. They know this, and hence comes a large part of their current unrest, their unhappiness and their mood of anxiety”.

The Gospel of Nuclear Edens

#PLAY TRACK. [Opening theme](#) of *Dr. Strangelove or: How I Learned to Stop Worrying and Love the Bomb* (Stanley Kubrick, 1964) [03:20] + Elton Britt, [“Uranium Fever”](#) (1955) [02:12] + Lolita Sevilla, [“Americanos”](#) from *Welcome Mr. Marshall!* (Luis García Berlanga, 1953) [02:09]#

Some years after the “atomic plague” was heralded, a new edenic Garden was promised: a global techno-paradise run by atoms.ⁱⁱⁱ Scientists and scientific popularizers such as Frederick Soddy and Muriel Howarth defended early on that *“the nation which can transmute matter could transform a desert continent, thaw the frozen poles, and make the whole world one smiling Garden of Eden”* (quoted in: Johnson 2012, 553 and 567). In particular, irradiated seeds and radioactive plants were supposed to renew the sap of both the *“tree of knowledge”* and the *“tree of life”*. Biblical metaphors were extensively used to describe a new united brave world, as in Howarth's book *The Atom and Eve* (1955).

In 1953, the Atoms for Peace program was launched by US president Dwight D. Eisenhower in the United Nations General Assembly: the program announced a high-modernist global wonderland the abundance of which was to be provided through scientific expertise, irradiated crops, and “too cheap to meter”-energy from fission reactions in nuclear power plants (Forgan 2003, 188-191). Since this moment, nuclear rhetorics – alongside with nuclear things and nuclear energy – circulated as rapidly as the Atom Ant, from the dirty and hazardous mines in Portugal, Namibia and the Navajo Nation, to the warm and comfortable living rooms in Paris, Tokyo and New York (concerning the mentioned mines, see respectively: Marinho 2002; Hecht 2012; Gilles 1996).

During the Cold War, nuclear power was extolled as a symbol of international peace, safety, efficiency and modernization of all humankind – all this, despite its key role in the hot struggle for geopolitical hegemony in the post-colonial world and the dramatic increase in the number of warheads (from 1953 to 1986, the world number of warheads increased from 1,290 to 69,368 (98.5% in hands of US and USSR) (Norris and Kristensen 2010). Hand in hand with the proliferation of nuclear national programs, nuclear-internationalism and nuclear-globalism spread all over the world (Krige 2006; Edgerton 2007): from the Far East to the Far West, from communist Eastern Europe to fascist Southern Europe, etc. The International Atomic Energy Agency (1957), for example, borrowed the flag of the United Nations but replaced the original image of a world map by the image of an atom – in fact, the image of a three-electron atom in its first version, that is, a lithium atom the very coveted fuel for hydrogen bombs.

Especially since the International Conference on the Peaceful Uses of Atomic Energy held in Geneva in 1955, a huge amount of money, resources, films and exhibitions were invested to make the promised nuclear paradise desirable for politicians and citizens of the superpowers and the so-called “power-starved countries” (Krige 2010). The “gospel” of atomic energy was foretold from New Delhi and

Tehran to Accra and Madrid, from Ceylon and Malaysia to Venezuela and Korea, and of course in the core of the Japanese apocalyptic nightmare (Yuka 2014).

In Hiroshima, nearly a million people – many of them being “captive public” as school students – visited the travelling exhibition “The Peaceful Uses of Nuclear Energy” in the very A-bomb Museum between 1956 and 1958. There, visitors were urged, for instance, to write the words “*heiwa*” and “*genshi ryoku*” (peace and nuclear energy in Japanese) with the mechanical arms used to manage uranium in specialized laboratories (Zwigenberg 2012). Supported by the US Department of Defence as well as by the city council, the regional prefecture, universities and local newspapers, this exhibition played a crucial role in facing the huge popular resistance in Japan to nuclear proliferation. In this country, millions of signatures were collected after March 1954, when a US nuclear test in the Bikini Atoll led to the contamination of the tuna fishing boat Daigo Fukuryu-Maru (Lucky Dragon 5), the poisoning of the fishermen, the panic in the fish markets and the extensive mobilization of housewives (Tanaka 2011). In the Nippon's context as in many others for decades, technological displays, entertainment and fun became critical tools of rendering the nuclear landscape banal and natural (Sastre and Valentines, in preparation).

Even more disturbingly, not just atomic seeds and power plants were supposed to provide a healing sap to the new Garden: nuclear weapons were to be a source of life as well. The post-World War II official “triumphal narrative” transmuted the atomic bombs of the Armageddon – which had been called “Little Boy” and “Fat Man” and had killed two hundred thousand people in two blinks of an eye in Hiroshima and Nagasaki – into a kind of new “Saviour” (Dower 1997). According to this narrative, these bombs had supposedly accelerated the end of the war “saving” millions of Western bodies and souls. During the Cold War, governments, armies and scientists also contended that the reliability of a huge nuclear arsenal – which was waiting for the final hotline call – was the reason of not having a nuclear conflict of unimaginable dimensions (Gusterson 2004, 151). Besides, a number of ritual metaphors of life and birth were associated to nuclear weapons (or to the scientific processes to design them). The first unshielded nuclear reactor in Los Alamos, for example, was called as the mythical “Lady Godiva” (Godgifu, Gift of God, in Old English). Anthropologist Hugh Gusterson has recalled us the number of these metaphors: “little boy”, “daughter”, “babies”, “cradle”, “crib”, “father”, “breeder”, “umbilical cords”, “marriage”, “generations”... In Gusterson's terms (Gusterson 2004, 161-163),

“in metaphorically assimilating weapons and components of weapons to a world of babies, births, and breeding, weapons scientists use the connotative power of words to produce – and be produced by – a cosmological world where nuclear weapons tests symbolize not despair, destruction, and death but hope, renewal, and life”.

* * *

#PLAY SOUNDS. Beeps in [1945-1998](#) (Isao Hashimoto, 2003) [14:24] [overlapping] Birdsong by [Horne Lark](#) (*Eremophila alpestris*) [01:54] + [Cactus Wren](#) (*Campylorhynchus brunneicapillus*) [02:11] + [Common Raven](#) (*Corvus corax*) [01:05]#

Throughout the second half of the 20th century, the world was exponentially targeted by nuclear weapons, as video-artist Isao Hashimoto has made audible in the time-lapse map-artwork *1945-1998*

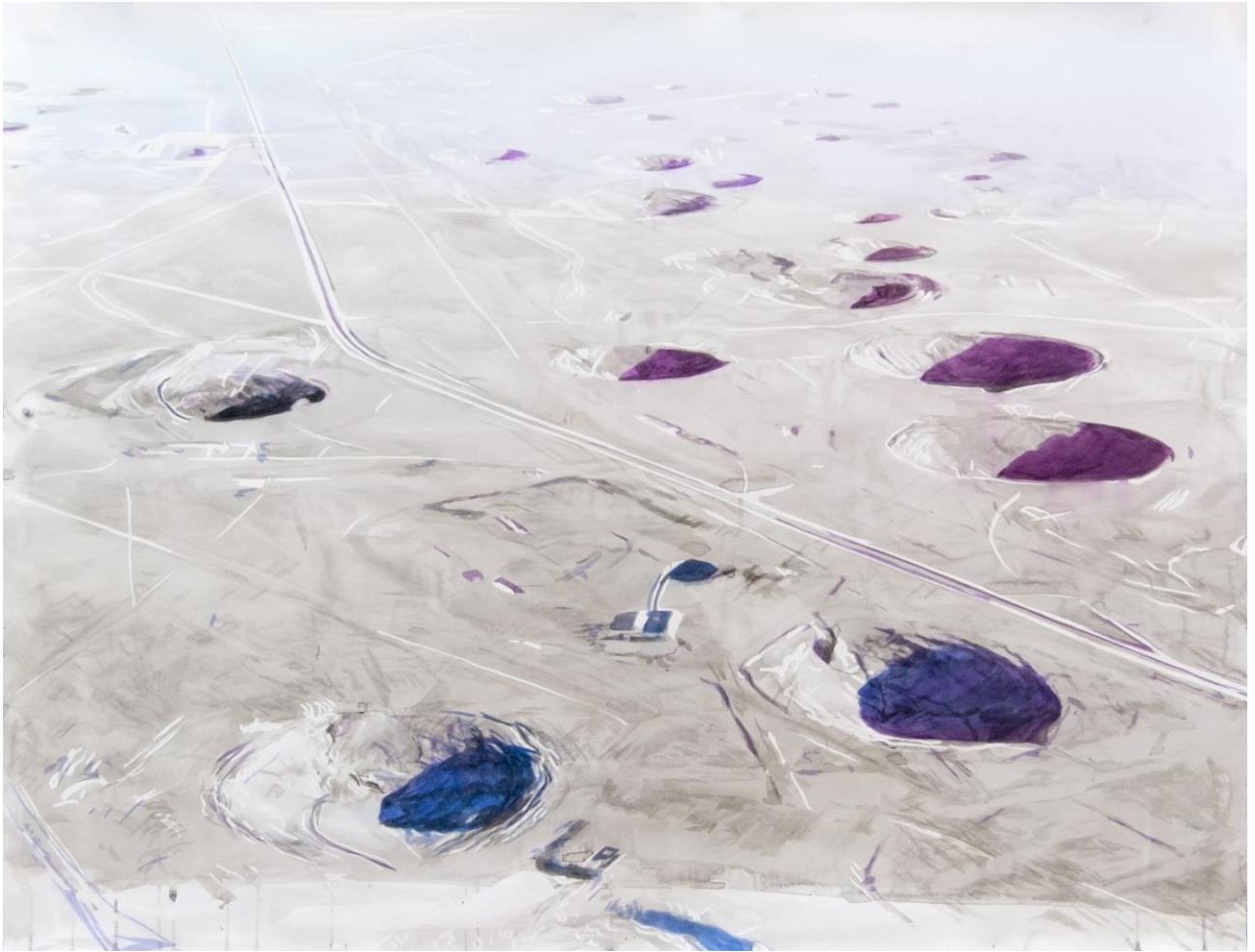
(Hashimoto 2003). One of the most bombed places was the Nevada Test Site. The 3.500 km² test site in south-central Nevada is a harsh and dry transitional zone between the Mojave desert and the Great Basin desert. There, atomic tests made “natural landscapes” (once inhabited by indigenous peoples) into nuclear landscapes (surrounded by radiation-exposed indigenous peoples) (Russ *et al.* 2004). From 1951 to 1992, hundreds of nuclear bombs from the US army left this vast salt flat pockmarked with 300-metre lunar craters. The nuclear site became an extreme representative of the confluence of conflict, environment and technology on the planet Earth (LoPresti 2016a). As the scientific pictures as much as the art pictures by Peter Goin seem to suggest, the site can be imagined as a portrayal of the apocalyptic ruins (Goin 1991).

In the 1960s, artists such as Michael Heizer created works amidst the militarized and nuclearized US west by channelling latent feelings of political impotence into the largest and most physical gestures available to them, a movement later called “Land Art” (LoPresti 2016a; Celant 1997, 203-289). Maybe because of the technological awe experienced by these artists, this movement generally failed to take into account what survived the nuclear blasts and their radioactive after-effects. Among the “survivors”, we find fungi, such as the *Podaxis pistillarisfungi*, popularly known as the Desert shaggy mane mushroom. But we also find resilient and tough species from the plant kingdom as well, such as the Fishhook cactus, the Kaibab agave, the Shinyleaf sandpaper, the Purple sage and the Apache plume, all with their fragile and colourful flowers. At the same time, the Rattlesnake pit viper, the Cooper tortoise, the Chuckwalla iguana and other underground, reptilian and venomous critters used to live on the debris of one of the most nuclearized spaces in the world (Tanner and Jorgensen 1963).

In contrast, recent artists such as Eric LoPresti have made life survival their explicit subject. This artist grew up near the Hanford site, giving him an unusually tight relationship to nuclear weapons production. This familiarity with militarized US deserts profoundly shaped his ways of seeing and painting. LoPresti’s recent series of large-format watercolour paintings juxtapose the blasted landscape of Nevada Test Site with paintings of bitterroot flowers (*Lewisia rediviva*), a resilient American shrub which grows in and adjacent the site. Whatever apocalyptic unease remains in LoPresti’s work, it doesn’t prevent the observation that, on an ecological scale, both nuclear craters and ephemeral flowers are contingent upon receptive viewers for their meaning. In his words, both are “meant to be observed” (LoPresti 2016b).

Neither did the birds – the Horne lark, the Cactus wren or the Common raven, for example – stop singing (Hayward, Killpack and Richards 1963).

* * *



Utopians are Everywhere

#PLAY TRACK (a heterogeneous Iberian “No Nukes” collectanea). Peret, “[Yo soy gitano](#)” (1972, Catalan rumba) [03:24] + Fausto, “[Rosalinda](#)”, LP *Madrugada dos Trapeiros* (1979, protest song) [02:58] + La Bullonera, “[El verrugón atómico](#)”, LP *La Bullonera, III* (1979, folk) + Las Vulpes, “[Central nuclear](#)”, LP *Quiero ser una zorra* (1983, feminine punk) [01:53] + Chicho Sánchez Ferlosio and Rosa Jiménez, “[Encuesta junto a una central nuclear](#)” ([1980-1985], vaudeville) [02:41] + Lluís Maria Panyella and Toni Giménez, “[I va fer un pet](#)” (1986, children's song) [01:13]#

At the beginning of the 1960s, however, it seemed that birds were singing lower and lower... For most people all over the globe, the nuclear Eden – with its abundance of promises of abundance – seemed not to come. Nor did the alleged “*man's progress not merely in knowledge but in the civility of his life on Earth*”, as Oppenheimer foretold at that time – he was, in fact, trying to “redeem” himself and his collaborators in Los Alamos Laboratory by fostering the discourse that linked the scientific revolution with the democratic institutions, a discourse which became essential in Cold War ideology (Oppenheimer 1984 [1963], 142).

For many people, the never-coming Eden was even turning into a quiet Hell. In 1962, biologist Rachel Carson was missing the sound of the birds in what seemed to be a “silent spring”, and warned against the terrible daily effects of chemical products and radioactivity stemming from weapons, reactors and laboratories. She put into words a social anxiety which was going to grow higher and higher (Carson 1994, 5-6):

“Only within the moment of time represented by the present century has one species – man – acquired significant power to alter the nature of his world. (...) The chain of evil initiates not only in the world that must support life but in living tissues is for the most part irreversible. (...) Strontium 90, released through nuclear explosions into the air, comes to earth in rain or drifts down as fallout, lodges in soil, enters into the grass or corn or wheat grown there, and in time takes up its abode in the bones of a human being, there to remain until his death”.

Carson had a great influence in the ecologist and anti-nuclear movements that globally arose since the late 1960s. Like the pro-nuclear program of Atoms for Peace, the anti-nuclear movement had a remarkable transnational dimension (although of different type, as it was especially bottom-up and decentralized). The most visible proof might be the “Smiling Sun” – with the leitmotiv “Nuclear Power? No Thanks” – which smiled in dozens of languages in millions of badges and stickers in all the continents. Anti-nuclear scientific reports, magazines, leaflets, news, actions and people circulated across borders. Former NIMBY resistances (acronym for “Not in My Back Yard”) gave way to NIABY opposition to nuclear technologies (acronym for “Not In Anyone's Backyard”). According to the so-called “anti-nukes”, the framework of resistances had to be worldwide as long as radioactivity was not a nail nor a snail: it could not be attached and it travelled quickly.

Shortly after the nuclear meltdown in Chernobyl, philosopher Günther Anders wrote “*Chernobyl is everywhere*” (Anders 2013 [1986]). In fact, he added this sentence to the previous “*Hiroshima is everywhere*”. With these statements, he sought to sum up the idea that any place in the world could be targeted by the bomb, and every place in the world was put in danger by radiation. After having seen a

beam of hopefulness in the dramatic psychological disorders of the “Hiroshima pilot” Claude Eatherly (with whom Anders kept a touching correspondence), he vindicated the state of panic about the possibility of a global genocide, or, in his terms, the possibility of a “globocide” (Anders 1961; Anders 2013). During the last years of his life, these conclusions drove Anders to move from promoting pacifist practices of resistance to open the possibility of violent direct actions, since, in legal terms, people would be living in a “state of necessity” (Anders 2008 [1987]). In fact, nuclear violence was not just a real or potential consequence of energy programs as it was shown in Mayak, Sellafield, Idaho Falls, Lucens, Madrid, Jaslovské Bohunice, Harrisburg, Tsuruga, Chernobyl... (the estimated number of premature deaths in Chernobyl ranges from some thousands to nearly a million). Violence also was an actual means of their production: like in the conquest of the Far West, the states and the private companies used barbed wired and guns to found the nuclear Eden. Among many arrested, imprisoned and injured protesters by police nightsticks, bullets and tear gas grenades, physics teacher Vital Michalon in Malville (France) and chemistry student Gladys del Estal in Tudela (Spain) were killed in pacifist anti-nuclear demonstrations in 1977 and 1979 (Tompkins 2016, 158-193; Lemoiz, 1987).

Besides criticisms and actions against the dreadful and violent features of the nuclear, anti-nuclear movement constantly expressed their willingness “for life” and “good places”. They asked for (and developed) playful work, sustainable communities, renewable energy, the recovery of abandoned villages, squatting, organic agriculture, bioarchitecture, and the use of bikes and plenty of gadgets which took advantage of the energy of atomic reactions produced millions of kilometres away, in the Sun: solar ovens, thermal collectors, wind turbines, wave power turbines, domestic biogas plants and other so-called “appropriate technologies”, “soft-technologies” or “liberatory technologies”.

There was no place for single, universal, abstract, individually designed, masculine, unblemished and edenic utopias. In this way, many “anti-nukes”, radical ecologists and anarchists did not just rejected the nuclear Eden, but also most of the former dreamed (and usually scientifically-managed) landscapes of the most famous utopians and utopian socialists, from Thomas More, Charles Fourier and Étienne Cabet to Dwight Eisenhower. In *History and Utopia* (1960), E. M. Cioran cynically stated (Cioran 2015, 85): “*In Fourier’s ‘societary state’, they are so pure that they are utterly unaware of the temptation to steal, to ‘pick an apple off a tree’. But a child who does not steal is not a child. What is the use of creating a society of marionettes?*”.^{iv} However, a tree without any utopia could seem to be completely dried up. In a previous and more-detailed critique of utopias, Lewis Mumford had also made this point (Mumford 2015 [1922], 279-280):

“The weakness of the utopian thinkers consisted in the assumption that the dreams and projects of any single man might be realized in society at large (...). Where the critics of the utopian method were, I believe, wrong was in holding that the business of projecting prouder worlds was a futile and footling pastime. These anti-utopian critics overlooked the fact that one of the main factors that condition any future are the attitudes and beliefs which people have in relation to that future”.

To collectively look for and find new utopias (in plural, with apples to be stolen and small technologies to be self-managed) and to develop and take care of *eutopias*, “good places” seemed to be of great interest to face the nuclear Eden. “*By striving to do the impossible, man has always achieved what is possible. Those who have cautiously done no more than they believed possible have never taken a single step forward,*” Mikhail Bakunin had stated short before the Paris Commune in 1871.

* * *

#PLAY SOUNDS. West Coast, [Cuckoo Clocks](#) (2017) [02:58] and [Bird Sampling](#) (2017) [02:28]#

Mushrooms could represent death and technological violence, but they are a spontaneous and delicious food from the wilderness and beyond. During the Cold War, they were specially appreciated by the self-organized and self-sufficient communities of anti-nuclear hippies, punks and ex-yuppies who decided to flee from the city to the countryside and the forests. Moreover, mushrooms revealed the critical relevance of preserving traditional knowledge and communal know-how for survival, for this knowledge and know-how were essential to avoid serious poisoning from toxic and lethal species. Some traditionally-used toxic species of mushrooms, nonetheless, could be greatly welcomed in some moments: for many counter-culture youngsters, Psilocybes and other hallucinogenic mushrooms could become the most direct way to be “integrated” in the natural and supernatural worlds (Schultes, Hofmann and Rätsch 1979). “Drink me”, Alice read in the bottle before she starts a strange travel with surrealistic shifts of time and space during her adventures in Wonderland. Curiously, Lewis Carroll's book had been extensively used during the 1940s and 1950s to popularize relativistic physics and to promote advanced technology as a liberating force for mankind (Forgan 2003).

In the 1970s and 1980s, an ephemeral counter-culture art flourished in publications, journals of radical ecology, anarchist fanzines, underground comics, books of popularisation, badges and stickers. Along with other artistic expressions such as theatre, street installations, performances and music of all kind of rhythms (from protest song to feminist punk and children's songs), drawings, graffiti and collages depicted gigantic apocalyptic scenarios, while making fun of the official myths associated to the nuclear Garden (Valentines and Macaya, in preparation). Collages – for example, the photo-montage *Nuclear Enchantment*, by artist Patrick Nagatani, on the commemorative obelisk at the Trinity Test Site – are still a source of confronting official history and destabilizing narratives of the past (Masco 2006).

The recent sound artworks “Towards a libertarian technology”, by Francisco Pinheiro, and “Cuckoo Clocks”, by West Coast collective, seem to represent as much as to pursue the spirit of these “ways of doing”. West Coast seeks to be a nomadic platform of creation and debate on coastal cultures, science and human ecology, which aims to put different social actors such as academic researchers, beekeepers or watchmakers to work together, collaboratively (West Coast 2017). After thinking, crafting and testing during many days in the patio of Marquis Pombal Palace in Lisbon and in the ancient convent of Montemor-o-Novo (Portugal), Pinheiro, Paulo Morais and other members of West Coast – being both artists and artisans at the same time – have shown how to make a waterwheel turn in order to ring an old little bell and to turn time around, or how to (re)produce bird-songs from organic elements and waste materials gleaned from post-industrial landscapes in order to create a space of awareness for endangered species (West Coast 2017; Pinheiro 2017: 84-105).

* * *

Updating: Nuclear_Eden.02

#PLAY TRACK. “The Garden / [In the golden afternoon](#)” from Walt Disney's *Alice in Wonderland* (1951) [03:49] + “[Always Look On The Bright Side Of Life](#)” from the ending scene of *Monty Python's Life of Brian* (Terry Jones, 1979) [03:22]#

Nowadays, a renewed nuclear Eden is being announced for the sake of all humankind. It is not the garden of Cornucopian abundance anymore, but a technocratically-managed globescape for the sustainability of Capitalism, in which there will not be biblical plagues, inundations, hurricanes, droughts, fires, rising sea levels and other “punishments for our sins” (those plagues that especially the poor are experiencing more and more because of the consequences of global warming). Nuclear technology is urged to control the weather, to revert global climate change and to overcome the lack of energy resources: eco-modernists, geoengineers, right libertarians, former environmental gurus and electrical corporations have strongly campaigned in favour of nuclear power for being a “green” and “sustainable” energy (Lovelock 2004).^v Westinghouse advertises on its website: “*Nuclear energy is the largest source of clean electricity in the world. No carbon emissions, and no air pollution. Just safe, clean, and reliable electricity*” (Westinghouse 2018).

Turning the language upside down, it is even told that the power of the atoms that can annihilate a town, a region or the whole humankind are now the super-techno-fix which is needed for the final survival of humankind (Miller 2013). The nuclear promoters seem to have melted the former discourses of nuclear paradises which spread since the 1950s with an apocalyptic language about “the end of nature” borrowed from Bill McKibben and other environmentalists. In the words of professor of ethics Michael Northcott, they somehow announce an “anthropic epiphany” through which humans beings would become the Redeemer and the redeemed “for the healing of the nations”, as if it was an updated John of Patmos' *Book of Revelation* (Northcott 2015, 104-106).

The new discourses are evangelized regardless of the already quite long nuclear history of empty promises, experienced suffering and political dominance, and without mention of the interests of the military-industrial complex, the energy stock market, the business of technological surveillance, and the maintenance of the political and social order. The greatest impact of nuclear engineering might have not been to produce some artefacts that are able to annihilate the world, but also to produce everyday consequences in society and politics. As Joseph Masco suggests, a new kind of “secret state” has been established based on the policies of the “secret science”, new forms of authority have been developed in democratic regimes, and nation-states have been reinforced by what he calls a permanent “nuclear state of emergency” in which governments have legitimacy to do anything in regard to national (in)security (Masco 2006). “*The nuclear issue is not a technological or scientific issue; it is simply a social issue*”, Jaime Semprún had written in *The Nuclearization of the World* in 1980. According to him, a state – in both terms of the word – of ignorance and control had been essential to the nuclear program (Semprún 1982 [1980]). A decade ago, Lewis Mumford had been categoric: the “nuclear pyramid” was the last step of a technocratic and bureaucratic endeavour that had started in the time of Ancient Egypt and epitomized “the universal imposition of the megamachine” (Mumford, 1970).

Science can methodologically and meticulously diagnose the catastrophe by providing plenty of data, percentages, graphics, diagrams, mathematical correlation, etc. (Debord 2015). Nevertheless, due to its limits, the dominant values it mirrors and the fact it is a significant cause of the problem, science –

especially, nuclear science – can not provide tools to face the main socio-technological challenges (Wynne 1992). It is necessary to do it by other means. And so the story goes on and on.

Finale? The Apocalyptic Fungus (II – The Mycelium)

#PLAY TRACK. Coetus, "[El cant de la Sibil·la](#) [Song of the Sibyl]" (2009) [10:12]#

A mushroom is just the ephemeral fruiting body of a much bigger being whose vegetative part – called mycelium – can unnoticeably sprawl some inches or many kilometres under ground. A large, process-complex and branched mass of filaments called hyphae (from *huphe*, “web” in Ancient Greek) is hidden behind the mushroom. These hyphae can develop extraordinary deep associations with roots of plants and with other living beings, such as the symbiotic associations called mycorrhizas which have a critical role in the circulation of nutrients and water, and in the composition of the soil. In fact, some of these forms of mutualist relationships appeared when plants started to occupy the land hundreds of millions of years ago. After quietly waiting enough time for the appropriate atmospheric and ground conditions, joined mycellia can make a mushroom appear on the surface, which will produce millions and millions of “reproductive fruits” or spores.

The mushroom became the image of the end of the world since 1945, but it can also be a metaphor of the beginning of a new world, as the Apocalypse can be interpreted. In some sense, the biblical phrase “*Destruam et aedificabo*” – which was recalled by Pierre-Joseph Proudhon in *The Philosophy of Misery* in 1847 – seems to make totally sense. The mushroom does not only represents death and catastrophe, but also life renewal and a turn around (*revolutio*, in Latin). Apart from bacteria and archaea, mushrooms were the first living being that appeared on the ground after some of the most dreadful nuclear accidents. In this sense, mushrooms allow us to consider the possibility of life over the ruins after (or during) the “apocalypse”, and even to think – as Anne Tsing makes it clear – about the possibility of (re)placing biological and technological refuges for life through multispecies collaboration and mutual aid (Tsing 2015, 1-9; Dighton 2008). “Make kin, not babies!”, Donna Haraway has exclaimed in six of the most poetic pages the current “academia-industrial complex” has probably produced about the Anthropocene debates during the last years (Haraway 2015): make kin, kind, care, babies, parents, aunts, uncles, cousins, grandmas, regardless of blood kin.

In *Mutual Aid: A Factor of Evolution* (1902), Pyotr Kropotkin defended that evolution in the animal kingdom could not be just explained through struggle and competition for food and life, as most Darwinists defended. The fittest were not always the strongest nor the most cunning (Kropotkin 2013 [1902]). Evolution also depended on multiple kinds of association, co-operation among individuals within a species, and mutualism among individuals of different species. These relationships had to do with the need to overcome the “natural checks to over-multiplication”, which could be of much greater importance in evolution than competition: in Eurasia, for example, animals have to face terrible frosts and snowstorms during the winter, and torrential rains and floods during the summer every year.

As urban geographer Mike Davis has recently reminded us, Kropotkin was also a renowned geologist who contemporaneously argued that we are living in a period of harsh desertification in the Holocene, that this global climate change is an outstanding mover of history of mankind, and that peoples have to find out the means to put a check to this situation (Davis 2016). According to Kropotkin, not only

might we need to plant millions of trees and dig thousands of artesian wells to avoid the final “desiccation of Eurasia”, for example: a wider extension of non-authoritarian relationships based on mutual aid are indispensable to not perish.

Many social experiences based on mutual aid and play-and-work collaboration have appeared in midst of natural and human-induced catastrophes or over the “ruins” of once symbols of flourishing capitalism. The social revolution in Barcelona in midst of the battle against fascism during the Spanish Civil War easily comes to mind, along with its plenty of anarchist and collectivist proposals put into practice. But we can also find many examples at the beginning of the 21st century: for instance, the collective action and sense of community among the ghostly architectures and the urban decay in Detroit; the self-management of workshops and factories after the financial *corralito* in Buenos Aires; the establishment of the so-called “democracy without state” during the war against ISIS in Kurdish Rojava; the self-organization of provisions and the non-state and leaderless system of emergency aid in the Caribbean Islands, Florida, and Mexico DF which followed hurricane Irma and the earthquakes last year (2017); or the solidarity-based work of forestation of local tree species and the rebuilding of houses and communities after the tremendous fires all along Portugal (Gomes 2018).

But do all these experiences really pop up like mushrooms in catastrophic landscapes? Absolutely, they do as mushrooms do: they just grow if (and only if) there is a previous dense web of invisible collaborative filaments from which dead matter can be re-cycled to become living matter again. It is not a sufficient condition, but a *sine qua non*. To preserve, reinforce and take care of these mycellia is a nice duty (and maybe the opportunity for a humble transcendence while expecting that delicious fruiting bodies come up in next generations).

Obviously, co-operative, self-managed and non-authoritarian experiences do not necessarily like living on debris. Fungi and other beings do not prefer the living conditions in Chernobyl's surroundings neither: studies have demonstrated that their activity is slower than usual (Mousseau, Milinevsky, Kenney and Møller 2014). Imagine, then, how vigorous and vivid could they grow in other material conditions than the worst dramatic and despairing circumstances...

Nuclear paradises, techno-scientific command and voluntary servitude? “No, thanks”, as anti-nuclear movement politely used to respond.

Energy sovereignty of individuals and peoples, technological self-management, and non-authoritarian uses of the “machine”? “Yes, thanks!”, as said by millions of peasants, workers and indigenous communities from large web-based organizations such as Via Campesina and MOCASE, and by tiny “techno-political” groups based on autonomy such as Fem-hi-Gas) (Via Campesina 2017; Fem-hi-Gas 2006).^{vi}

We

(we, maybe not all the critters on the Earth nor the whole humankind, but quite large underground mycelia of individuals and collectives from all over the world)

do

not

want a techno-Eden anymore:

we want collectively-made and non-hierarchically-based utopias alive!

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i

This excerpt is from the book *Irmânia* (which could be translated as "brotherland", or "sisterland"), one of the few examples of the utopian genre in Portuguese literature, as José Eduardo Reis points out in the introduction to this edition. The causes (and consequences) of the lack of social utopias in Portugal have been explored in other essays (Valadas 2006).

- ii A first draft of this chapter was presented – with a mushroom literally "on the table" – in the round-table "Landscape Fukushima. Dialogues on Hybrid Natures", organized by Laura Valls at the CSIC, Barcelona, on June 16, 2014. Since then, nice comments, suggestions and criticisms of many researchers, colleagues and friends have made this text a more collaborative (and interesting) work. In this sense, I am especially grateful to Álvaro Fonseca, Ana Macaya, Claudia Guerrero, Ferran Aragon, Francisco Pinheiro, Gloria Domínguez, Inês Ponte, Ivo Louro, Jaume Sastre, Leonor Valgueira, Leonor Vera, Luísa Sousa, Marta Macedo, Pedro Morais, Pedro Mota, Pepe Pardo, Vanessa Cirkel, and to the communities of Voltors, Pandores, Puris, Boesgers and Chien Bacou.
- iii About former colonial techno-Edens, see: Grove 1995; Fiege 1999.
- iv For a previous and more-detailed critique of utopias, see *The Story of Utopias* (1922), by Lewis Mumford (Mumford, 2015).
- v Critical insights to eco-modernism and right libertarianism, which defends Capitalism without the State, in: Hamilton 2013, 107-137 (ch. "Promethean Dreams"; Ippolita 2017, 155-166).
- vi We borrow the term "techno-politics" from Gabrielle Hecht, who uses it to refer to "*the strategic practice of designing and using technology to constitute, embody, or enact political goals*", even though we do not use it here exclusively in terms of national political goals (Hecht 2001, 256).