A WARM WELCOME TO

THE PLEISTOCENE PARK

A sociocultural approach to de-extinction science

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A WARM WELCOME TO THE PLEISTOCENE PARK:

A sociocultural approach to de-extinction science

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A Warm Welcome to the Pleistocene Park: A Sociocultural Approach to De-Extinction Science

Introduction

Few people will have missed the mass attention given to climate changes and animal extinction. Many scientists and public figures have claimed that we are now either already living in or are entering the sixth mass extinction, meaning that biodiversity is disappearing at an alarming rate. Two herpetologists, David Wake, of the University of California-Berkeley and Vance Vredenburg, of San Francisco State, have noted in one of their articles that "a detailed worldwide assessment and subsequent updates show that one-third or more of the 6,300 species are threatened with extinction."[1] They have argued that the increasing pressure on species due to habitat destruction and the global climate crisis are likely to impact biodiversity majorly.[2] The bushfire crises in Brazil, California, and Australia affect many people and have resulted in dramatic animal losses and habitat destruction. These are very unfortunate examples of what is currently going on. Many people have pointed at a negligence of government policies and an indifferency of its citizens who do not seem to acknowledge the severity of the climate crises. The role humans play and have played as an ecological predator, for instance by overhunting and by the occupation of environments, is often mentioned as a cause for animal extinctions.[3]

Paradigms of and approaches to prevent animal extinction (or not) have radically changed in the past centuries. In the seventeenth century, the perspective of natural theology held an impossibility of extinction, since that idea would crumble the perfection of nature, which would mean an imperfection of God.[4] In 1691, John

[1] Wake, 11466.
[2] Ibid.
[3] See for these studies: Wake, 11466; Kolbert, 1.
[4] Rowland, 225.

Ray had published his widely read book *Wisdom of God Manifested in the Works of Creation*. The book insisted that the perfect order of nature proved the presence of a deity, as he wrote:

"A curious machine, […] design, […] and in all the several pieces of it, do necessarily infer the being and operation of some intelligent architect or engineer, why shall not also the works of nature, that (grandeur and magnificence, that excellent contrivance of beauty, order, use, […] wherein they do as much transcend the effects of humane art as infinite power and wisdom exceeds finite, infer the existence and efficiency of an omnipotent and all-wise creator?"[5]

The idea prevailed that nature as a whole had been created at one point in history at the divine creation, and the complexity, order, and regularities of nature were thought to reveal the omnipresence, wisdom, and power of God.[6] However, slowly but certainly after more discoveries in nature and of fossil species were done, the possibility of extinction became a definite one.[7] These shifting views of nature and fossils erupted paradigm shifts of earth as a whole. In a study done by Fernando Vidal and Nélia Dias, carried out in *Endangerment, Biodiversity, and Culture* (2016), the authors historically situate the understanding of extinction and show that it is a reflection of broader cultural perceptions and valuations.[8]

Today, the world is on fire, Greta Thunberg is shirking school for a year, Extinction Rebellion organized a global climate hunger strike, scholars and public figures try to raise attention for the climate and others freeze like a deer in headlights. In a recently appeared article in the Dutch newspaper *NRC*, seven editors described

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[5] Ray, 30.
[6] Mark Barrow, "The Discovery of Extinction." *Nature's Ghosts. Confronting Extinction from the Age of Jefferson to the Age of Ecology*, 2009, Accessed on 17 October 2019, https://www.press.uchicago.edu/Misc/Chicago/038148.html.
[7] George Cuvier, often referred to as the "father of Palaeontology", offered convincing evidence that extinction had been a regular part of earth's history by deploying the principles of comparative anatomy. In his book *Animal Kingdom* (1817), he described and illustrated a "virtual zoo of lost creatures" and he also was the first to distinguish between different species of living elephants and of the extinct elephants, the mammoth and mastodon. From: Barrow, "The Discovery of Extinction."
[8] Vidal, 63.

upcoming scientific prospects for 2020. Main editor of the article, Bart Funnekotter, had remarked that there exists a clear cleavage between optimism and pessimism for the future in the expectations of the authors, but there does remain one unity: technology is omnipresent.[9] Now, a relatively new scientific practice is arriving and some of the active scientists promise solutions to both species' extinction and global warming. This practice is called de-extinction science. It can be defined as "the process of creating an organism which is or greatly resembles a member of an extinct species."[10] Thanks to advances in synthetic biology, various auspicious potentials are offered for achieving this goal.[11] De-extinction science, resurrection science or extinction revival is a scientific method that copes with extinction and combats its finality and continues to provoke a broad variety of responses. It brings questions to the fore like: Why would anyone want to bring back the woolly mammoth? What kind of ecological, practical, cultural, and symbolic impact would its "return" have? Would this mean a redefinition of extinction and its inscribed moral lessons it was supposed teach?

Urgency

Looking into the sociocultural contexts in which de-extinction science is rooted and the processes whereby it comes about, it might become apparent that it both affects the world and it can be used as a means to apprehend the world at a deeper level of symbols, actions, values, desires, and fears. A thorough study of de-extinction science from a sociocultural approach will help to clarify issues and challenges of the future as well as its possibilities. After being asked in an interview with *Spiegel* whether he would find it desirable to clone a Neanderthal, de-extinction scientist George Church had answered: "I tend to decide on what is desirable based on societal consensus.

[9] Bart Funnekotter, "Wetenschap in 2020: van oermens tot kunstmatige intelligentie.", *NRC* (2020) https://www.nrc.nl/nieuws/2020/01/03/wetenschap-in-2020-van-oermens-tot-kunstmatige-intelligentie-a3985648 .
[10] Martinelli, 423.
[11] Ibid.

My role is to determine what's technologically feasible."[12] This statement expresses an explicit distinction between society and science. In this reasoning, society would decide what is good and what is bad, and scientists would be mainly concerned with what is achievable. Science often appears as a domain apart from culture and aesthetics and thereby sometimes manifests itself as an autonomous field, neglecting the cultural embedment from which it often arises. The urgency of studying technological objects from a cultural perspective is expressed by Andrew Feenberg who had written: "As a social object, technology ought to be subject to interpretation like any other cultural artefact, but it is generally excluded from humanities study. We are assured that its essence lies in a technically explainable function, rather than a hermeneutically interpretable meaning."[13]A cultural approach of de-extinction science will offer a better comprehension of the condition under which certain activities are done. The discussion on the study of de-extinction science is mainly reserved to scientists themselves, which is unfortunate since humanities scholars can utilize their knowledge to expand the epistemology of de-extinction science and thereby offer a deeper cultural understanding of the phenomena. This study aims to expand the current epistemology of de-extinction science by critically analysing the phenomena from a sociocultural perspective. It will explore whether, and if so, how, resurrection science and the cultural and social world are intertwined and how de-extinction science might complicate social reality. Most generally, it asks for a more active participation of humanities scholars within the complex discussion on de-extinction science. The urgency of this study lies in a clearer understanding of the world we inhabit now, and, in the future, and how we could relate ourselves to the changing environments.

[12] "Can Neanderthals Be Brought Back from the Dead?", *Spiegel*, 2013. Accessed on 3 January 2020. https://www.spiegel.de/international/zeitgeist/george-church-explains-how-dna-will-be-construction-material-of-the-future-a-877634.html.
[13] Feenberg, 307.

Methods, Theories and Approaches

For this study, academic scholarship, scientific journals, popular non-fiction books, artworks and popular visual culture will be consulted. First, the projects of de-extinction science will be viewed as cultural artefacts through the device of sociologist Wendy Grishold: "the cultural diamond". The cultural diamond is consistent of four elements: cultural objects, cultural creators, cultural receivers, and the social world.[14] Wendy Grishold had defined the cultural object as "a shared significance embodied in form. In other words, it is a socially meaningful expression that is audible, visible, or tangible, or that can be articulated. A cultural object, moreover, tells a story."[15] The status from the object is not built in the object itself, but is a result from an analytic observation made by the cultural receivers.[16] Since the discussed "object", the woolly mammoth, does not exist (yet) in living shape and because this study wishes to avoid an object-oriented ontology following art theorist Krysztof Ziarek's shift from art objects to events, the desired creatures are referred to as "cultural events".[17] Even though the resurrection of the woolly mammoth remains a hypothetical instance, the prospects are promising. Active voices in the debates are viewed as cultural storytellers that both affect the social world and are subjected to the laws of the social world.

This study holds the assumption that the way one views the world is coloured by a multiplicity of gazes and works toward a deeper understanding of the concept of the "de-extinctionist gaze", introduced by Rosie Ibbotson.[18] In this research, a gaze expresses a power mechanism brought into being by cultural values, events, discoveries, desires, fears, and hopes, articulated in popular and high culture as photography, film, art, scientific research and practices, academic literature and other expressions. The gaze ideologically structures the way one enters a personal relationship with a subject of social reality. The gaze is thus viewed as a forceful

[14] Grishold, 11.
[15] Ibid.
[16] Ibid.
[17] Ziarek, 104.
[18] Ibbotson, 80.

device, a powerful tool that can be applied to direct one's eyes. By the direction of the gaze and what is revealed a certain message is transferred. As will appear, the gaze can be both applied to distort and reveal how reality manifests to us. This research draws inspiration from Jean Paul Sartre's concept *le regard*, the gaze, by which he defined the act of gazing as an instant construction of a power-relation between the "Other-as-object" and "me-as-subject" as explicated in *Being and Nothingness (*1943), Michel Foucault's application of the gaze as tool to exercise power as discussed in *Discipline and Punish* (1975), and Jacques Derrida's demonstration of the gaze as a device to establish interspecies relationships in *The Animal that Therefore I Am* (2008).[19] The de-extinctionist gaze will be further explicated by looking into to other constructing forces that appear to be more generally present in today's social reality, revealing other underlying gazes. Throughout this study a Foucauldian view of questioning the power mechanisms and knowledge structures that are constitutive of our social reality is applied. This study acknowledges the plurality of things and attempts to identify how meaning within the framework of de-extinction science is socioculturally constructed.

In short, this research aims to answer to following main question: How does a sociocultural approach to de-extinction science, particularly focusing on the potential recreation of the woolly mammoth and its introduction in the Pleistocene Park, expand its current epistemology? In order to specify this question, the following sub-questions have been formulated: What are dominant views within the theoretical discourse of de-extinction science and what sociocultural narratological trends can be identified? How can the woolly mammoth in the Pleistocene Park be hermeneutically understood as a cultural event? How do contemporary artists position themselves in debates about deliberate human involvement in evolution through bioengineering and what kind of ideas do they express?

[19] Following the theory of Derrida, processes of objectification occur when one becomes subjected to the gaze. That does not mean that something *is* an object, it is rather viewed as such.

Structure

The first chapter studies the theoretical discourse of de-extinction science. It will explain its scientific successes, methods and projects, why proponents cheer for extinction revival (from a scientific-utilitarian perspective), and why opponents reject this particular science. Further this chapter discusses underlying sociocultural narratological trends. For this chapter, studies from de-extinction proponents like George Church, Stewart Brand, Ben Novak, and others will be consulted, as well as studies from clear opponents like Ben Minteer, Luca Martinelli (et al), and others. The second chapter will specifically focus on the potential recreation of the woolly mammoth in the Pleistocene Park. The creature will be hermeneutically approached as a cultural event. It will further show how science and culture are intertwined and how by its deconstruction other types of gazes emerge. This chapter aims to clarify how the potential recreation of the woolly mammoth could be viewed as a cultural event brought into being by cultural forces. It will look into the social status of the resurrected mammoth, the cultural memory of the woolly mammoth and the deployed language by de-extinction scientists), while exploring the cultural event through theories of Jean Baudrillard, Rosi Braidotti, and W.J.T. Mitchell. The third chapter analyses how contemporary bio-artists are concerned with active human involvement in evolution through biogenetic engineering and what kind of intellectual views they express. It will show how art potentially expands epistemological systems, revealing the urgency of the arts in the contemporary world as being an intellectual force. Throughout this study, there will be worked toward some extent of closure to the complicated human-animal relationality by deconstructing the ideological power-mechanisms of the gazes in the context of de-extinction science. It seeks for potential ways how to engage with earth, other forms of life and the self in a world that is radically changing.

1. Theoretical Trends in De-Extinction Science

This first chapter explores the theoretical discourse of de-extinction science. It offers a contextual foundation for the following chapters and a first step to bridge the scientific practice to cultural studies will be made. First, general theoretical trends will be documented. By doing that, the practice of de-extinction science is explained, as are its scientific successes, its projects, its methods, the Pleistocene Park, and often-mentioned reasons why advocators invest time, money, and efforts in it, and why others object to de-extinction science. It thereby gives a general overview of reigning ideas within the theoretical landscape. The second part aims to go beyond a mere scientific discourse by disclosing cultural trends in the theoretical discourse of de-extinction science. The second part will thus focus on broader cultural grounds that are underlying these practices and texts. This chapter therefore wishes to reveal underlying cultural fears and values and to show how they come into being within the framework of de-extinction sciences.

In an article by the hand of de-extinction scientist Ben Novak (2018), the theoretical landscape on resurrection science was mapped out. He had written: "To date, eleven popular books have been published with chapters on de-extinction, or entirely on de-extinction, including a biopic novel on George Church's work on woolly mammoth de-extinction, and one very creative, fictional take on passenger pigeon de-extinction self-published by eleven-year-old Ryan Patrick Lewis. In peer-reviewed literature, de-extinction has been subject of several special journal issues and many independent articles, totalling published 66 papers."[1] He had identified the following unifying trends: what de-extinction science means, the processes by which it could be achieved and its intended purposes.[2] In addition, others are also

[1] Novak, 1-2.
[2] Ibid.

investigating particular projects, ethical aspects, and risk assessment. However, few have dedicated attention to how de-extinction science is situated within culture. This chapter will view the active voices in the debates as cultural creators.

Scientific Successes, Methods, and Projects

The past centuries marked eras of radical scientific and technological discoveries and developments. After the invention of photography in 1839, ways of seeing had deeply changed. Thanks to this development, "reality" could be captured and widely circulated. Between 1856 and 1863, Johann Gregor Mendel did plant hybridisation experiments by cultivating plants with desirable traits, He thereby established the fundamental laws of heredity. Technical improvements in the microscope and the arrival of the X-ray created by Wilhelm Röntgen (1895) had profound influence on the way we can perceive the world; a world that was invisible for the naked eye became revealed. During the 1920s, Alexander Fleming discovered penicillin and photographer Edward Steichen was among the first to create genetic art by hybridizing plants. Suzanne Anker and Dorothy Nelkin had identified a corresponding "quest for reality" in works of artists like Malevich and Duchamp.[3] In the 1970s, Lewis Thomas produced an influential collection of essays called *The Lives of a cell*. His essays focused on an interconnectedness of everything on earth and had a dramatic effect on how we perceive living organisms. The findings of this book were that all complex life-forms originated from bacteria.[4] Moreover, he approached bacteria as potentially social beings that communicate and interact.[5] These developments led to new ways of seeing: a molecular and technological gaze. This meant a focus on life on a microscopic level in which life itself was viewed as high technology that could be altered. The molecular gaze had also led to a changed perception of the body as both human and nonhuman, as mentioned by artist Eduardo Kac in *Signs of Life,* and thereby static ideas of a "pure" or solid body shifted.

[3] Anker, 1.
[4] Lewis, 6.
[5] Ibid.

Especially due to the advent of the CRISPR-Cas 9 technique (Clustered Regularly Interspaced Short Palindromic Repeats-Cas9), possibilities of changing the human genome became a definite one. As remarked by art theorist Krysztof Ziarek, all in this world is formed and regulated by technicity, and that "the world has come to be constituted in terms of certain technics – that is resource, production, and power – and conceived as exploitable and usable matter and energy."[6] The technological gaze is shaped by an unstoppable demand for attaining control over everything on earth, an ambition definitely present within the framework of the de-extinctionist gaze. As George Church once had said: "The best way to predict the future is to change it."[7]

The scientific practice of resurrection science is defined in scientific efforts to bring back extinct animals into existence through complex biogenetical efforts like cloning and back-breeding. It is not likely that de-extinction science will ever bring back fully authentic "pure" extinct animals, so formal arguments about ending the finality of extinction will remain under dispute.[8] What is probably most provocative about resurrection science is interestingly described by Amy Lynn Fletcher, who had noted that "even if one takes the more delimited definition of de-extinction science as genetic rescue, in which valuable genetic information (though not necessarily full species) will be reintegrated into the global genome, the linear progression from life to death now seems less absolute than it did before and our ability to mix and match genes more powerful."[9] De-extinction science contests traditional views of the finality of death and brings up the question to what extent humans could and should be involved in this process.

The second half of the twentieth century accumulated in an explosion of successful biogenetic efforts. Of course, the cloning of Dolly the sheep marks one of the most important accomplishments for biogenetic engineering (and also in cultural theories she has become an icon). The discovery of DNA-sequencing from museum

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[6] Ziarek, 72, 137.
[7] Peter Miller, "George Church. The future without limit.", *National Geographic*, 2 June 2014, Accessed on 12 December 2019, https://www.nationalgeographic.com/news/innovators/2014/06/140602-george-church-innovation-biology-science-genetics-de-extinction/
[8] Church, 204.
[9] Fletcher, 46.

specimens and some fossils of extinct species in the 1980s had led to the idea that it might be possible to bring extinct animals back to life, one of the most prominent advocators of de-extinction science, Stewart Brand, had remarked.[10] Swedish Palaeontologist, Svante Paäbo, only thirty years old at that time, obtained skin and bone samples from twenty-three mummies in the 1980s. In his paper, 'Molecular Cloning of Ancient Egyptian Mummy DNA' (1985), he had described his scientific attempts of sequencing the DNA from a 2.4000-year-old mummy of an infant boy.[11] In 2010, after he continued his inquiry on ancient human DNA-sequencing, he published a paper focusing on sequencing the Neanderthal genome. According to George Church, probably the most ambitious scientist in the field, this has led to more accurateness of the Neanderthal man.[12] Church had pointed at future possibilities of genetic engineering in his book *Regenesis* (2012): "Theoretically it is possible to convert those sequences into a physical, real-life genome by synthesizing short sequences (oglios) in DNA-synthesis machines and then stitching them together into chromosomes."[13] In 2010, a synthetic *Mycoplasma* bacterium was constructed by scientist Craiq Venter. The scientist accomplished to chemically synthesize an entire genome, however, the challenges of synthetically recreating something as big as an animal remain evident.[14] Parallel to these inventions had been the advent of cheaper genome-sequencing tools and the rise of synthetical biology which provided more accurate genome-editing tools since 2000.[15] One of George Church's colleagues from the Church Lab, Eriona Hysolli, had expressed the benefits of genome synthesis, since it "can help us further our understanding of how they evolve, by resurrecting ancient genomes or realizing the in-silico reconstruction of ancient genomes beyond physical DNA recovery."[16] In short, the first step to reverse the extinction of a

[10] Steward Brand, "De-extinction debate. Should we bring back the woolly mammoth?", *Yale Environment* 360, 2014, Accessed on 12 September 2019, https://e360.yale.edu/features/the_case_for_de-extinction_why_we_should_bring_back_the_woolly_mammoth
[11] Pääbo, 644 645.
[12] Church, 213.
[13] Ibid., 222.
[14] Ibid., 223.
[15] Brand. "De-extinction debate."
[16] Kohman, 4321.

particular creature is thus to assemble and sequence a genome from preserved remains of the passed creature.[17] The chances of success vary among different animals and types of organisms. Beth Shapiro, another leading scientist in de-extinction science, had written that it is important to collect and preserve tissues immediately after the decease of the animal, because DNA decay starts directly.[18] Triggered by this knowledge, Oliver Ryder founded the Frozen Zoo at the San Diego Zoo, a place where cells and DNA from endangered animals are preserved. Tissues of over a thousand species are now frozen, benefiting scientific research on the preservation and the protection of endangered species.[19]

Most generally, the techniques for resurrection attempts of an extinct species entail back-breeding, cross-species cloning, and genetic engineering. The strategy of back-breeding is a selective breeding technique from organisms that are genetically and morphologically close enough to the extinct species, a method used for the recreation of the aurochs for instance. This method aims to bring back the lost traits and makes the new species resemble the phenotype of the extinct ones.[20] This technique thus attempts to produce an animal as similar as possible to the lost species, though not genetically recreating the "original" species.[21] The other two techniques, cross-species cloning and genetic engineering rely on even more advanced technologies, to name CRISPR-Cas9, cloning, DNA-synthesizing, and genome reconstruction. The technology of cross-species cloning comprises the cloning of the extinct species through a nuclear transfer of a somatic cell. In this technique, the nucleus of a reproductive ovum from a living similar organism will be transplanted from another cell consisting of genetic material from the lost species, which will become a new embryo. This egg would be implanted into a living genetically closely resembling surrogate to produce an almost genetically identical copy of the extinct organism.[22]

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[17] Shapiro, 1.
[18] Ibid., 1.
[19] Brand. "De-extinction debate."
[20] Minteer, *The fall of the wild,* 103.
[21] Martinelli, 423.
[22] Minteer, 103.

In 1951, the first successes in animal cloning were booked when a Northern Leopard frog was cloned via nuclear cell transfer.[23] After that, several successful attempts were achieved. The Pyrenean Ibex or Bucardo, a type of mountain goat originally living in the Pyrenees, was once a widely hunted species. By 1900, only fewer than a hundred were left, and by 1999, Celia was the only living Bucardo left on earth.[24] Two biologists, Jose Folch and Alberto Fernández-Árias, were determined to prevent the extinction of the Pyrenean Ibex and collected tissue samples from Celia and only less than a year later, Celia passed away.[25] The biologists were ambitious to bring the Bucardo back through nuclear cell cloning, a technique that had also proved to be successful for Dolly the sheep. Dolly had also been cloned from preserved tissues of an already passed sheep. The cell that was used to (re-)create Dolly stemmed from a six-year-old ewe that had already died three years before Dolly was brought into existence. This achievement meant for George Church that Dolly had been "raised from the death," making him even more dedicated to his own projects.[26] After multiple unsuccessful attempts, on Wednesday July 30, 2003, a young female bucardo was born, and even though she had only been alive for seven minutes, for Church this moment designated that "extinction is no longer forever."[27]

Perhaps the most provocative potential project of de-extinction science would be the resurrection of a passed human species like the Neanderthal man. Though George Church is aware of the moral rejections and scientific challenges such a project provokes, he seems to be opportunistic. Because there do not exist any living cells of the Neanderthal man and the DNA is very fragmented and corrupted, de-extinction efforts would be challenging. However, because of Paäbo's research results and the rise of synthetic biology it might not be impossible, Church had written.[28] The draft genome that was sequenced by Paäbo exists only as strings of DNA-sequences in the computer, but Church points at the theoretical possibility of

[23] Church, 205.
[24] Ibid.
[25] Ibid.
[26] Ibid.
[27] Ibid.
[28] Ibid., 211.

converting those sequences into physical genomes by synthesizing short sequences in a DNA-synthesis machine and stitching them together into complete chromosomes.[29] Another means to recreate a Neanderthal man would be to reverse engineer the genome of the modern Homo Sapiens. George Church had proposed many possibilities and seems to be very ambitious. He had written: "Suppose that it was possible to recreate the physical genome of Neanderthal man in a stem cell, the next step would be to place it inside a human (or chimpanzee) embryo and then implant that into the uterus of an extraordinarily adventurous human female or alternatively into the uterus of a chimpanzee."[30] For George Church, the Neanderthal man is a cultural icon, "a fabled creature resembling brute figures like Godzilla or King Kong," but he also advocates the underestimated intelligence of the species.[31] Such a comment already brings up the idea that Church's projects are inflected with cultural ideas and desires.

One of Church's most important projects is the resurrection of the woolly mammoth. The project of the woolly mammoth is certainly a promising one due to the availability and (relatively) intact tissues preserved in the Siberian Permafrost. But that is not the only method. Another cause for potential success can be found in its still living close relative: the Asian elephant.[32] Formally, the resurrected woolly mammoth would be a hybrid of an Asian elephant egg-cell and frozen mammoth tissue and could be born out of an elephant surrogate mother. It would thus be a "mammophant". After successful births, selective breeding methods could be used to decrease its elephant traits and increase mammoth-type characteristics.[33] The Church Lab uses the CRISPR-Cas9 technique to replace loci of the elephant genome with the mammoth version of these sequences.[34] Besides from the discussed efforts in de-extinction science, other attempts in resurrection science have been made for

[29] Ibid., 222.
[30] Church, 211.
[31] Ibid., 204.
[32] Fletcher, 47.
[33] Martinelli, 423.
[34] Shapiro, 1.

bringing back the Moa, the Carolina Parakeet, the Yangtse River Dolphin, the Thylacine, the Passenger Pigeon, and the Gastric Brooding Frogs.[35]

The Pleistocene Park

If the woolly mammoth would be brought back to life, where should it be living? And what could its benefits be? The answers for these questions can be found in the Pleistocene Park in Yakutia. The Instagram-page of the Pleistocene Park promises the following: "The world's best plan to bring back a vanished ice age ecosystem and save the world from a catastrophic global warming feedback loop."[36] The Instagram-page is filled with photos of yaks, (imported) bison, Yakutia horses, and sheep roaming the icy lands of the Pleistocene park. The Pleistocene Park is a collaboration between the Church-lab and a Russian scientist and his son, Sergey and Nikita Zimov. The Zimov-family started a scientific research space located in Yakutia which they have named the Pleistocene Park. In this area, they want to turn the Siberian taiga into the grasslands of the vanished mammoth steppe. The program of the park wishes to restore the biodiversity of the Pleistocene and a rewilding of the arctic.[37] The members of the Church-lab and the Zimov's are determined to bring the woolly mammoth back in its original ecosystem. They have argued that it is necessary in order to combat climate change and for our survival on earth.[38]

For context, the Pleistocene epoch lasted from about 2.5 million years ago to about 10.000 years ago when the Holocene epoch started. The Pleistocene epoch was the age of glaciation and global cooling and during this era the lands were inhabited by megafauna such as the woolly mammoth.[39] For many species, this ice age led them

[35] Martinelli. 423.
[36] Pleistocene Park (official Instagram account). Accessed on 8 December 2019. https://www.instagram.com/pleistocenepark/?hl=en.
[37] Eriona Hysolli, "An American-Russian collaboration to repopulate Siberia with woolly mammoths … or something similar.", *Medium Science*, 2019. Accessed on 17 September 2019, https://medium.com/@eriona.hysolli/an-american-russian-collaboration-to-repopulate-siberia-with-woolly-mammoths-or-something-similar-9cbac4e985cb
[38] Ibid.
[39] Church, 209.

to be frozen into extinction, but the woolly mammoth appeared to be able to adapt itself to the cold habitats. According to Sergey Zimov, at the end of the Holocene epoch, the mammoth tundra steppe had vanished completely.[40] Zimov had written that during the Holocene warming, the mammoth disappeared due to "efficient hunting practices of humans."[41] Because of the loss of megafauna like the woolly mammoth, mossy tundra and forest tundra started to replace the grasslands of the Pleistocene era.[42] Originating from the Pleistocene epoch, Siberia is consistent of permafrost layers, a deep-soil level that is continuously under zero degrees Celsius. In this time of global warming, the permafrost layer is thawing because of the greenhouse-gas induced warming.[43] The soil of Siberia is very carbon-rich because of the great number of animals and plants trapped in the soil. Due to the increase of greenhouse gases because of global warming, the carbon that would be released from the permafrost soil would surpass the carbon-content of all rainforests, Zimov had argued.[44] Whereas the tundra landscape releases greenhouse gases, grasslands retain carbon.[45] For the Zimov-family, the members of the Church-lab, and other advocators like Stewart Brand, the solution would be to return to the steppe of the mammoth ecosystem. As Eriona Hysolli, colleague of George Church, had written, the mega-herbivores would trample the trees and the snow, penetrating the cold arctic temperature deeper in the soil.[46] The carbon-rich organic material trapped in the permafrost would then not convert to CO_2 and methane.[47]

De-extinction: Why and Why Not?

Many studies on de-extinction science approach the matter and its challenges from a utilitarian perspective by discussing the risks and benefits of the scientific practice.

[40] Zimov, 796.
[41] Ibid.
[42] Ibid.
[43] Ibid., 798.
[44] Ibid., 796.
[45] Brand, "De-extinction debate."
[46] Hysolli, "A Russian-American Collaboration."
[47] Ibid.

Most authors, both those who find it desirable and those who object to it, mention similar arguments. Professors of Law and Biosciences, Jacob Sherkow and Henry Greely, have systematically divided benefits of de-extinction science into five categories: scientific knowledge, technological advantage, concrete environmental benefits, justice, and wonder.[48] Whereas the first three categories appear to be more or less pragmatic, the latter two more explicitly reveal sociocultural values. Ambition for the increase of scientific knowledge and technological advantages is clearly embedded in George Church's ethos. His statements and writings are deeply entrenched with a curiosity for the limits of science and technology. Revitalizing certain ecosystems and expanding biodiversity are often-mentioned reasons for de-extinction science, of which the Pleistocene Park is a clear instance. Supporters of de-extinction science would be intrigued to witness extinct species being raised from the death. Stewart Brand had reasoned on sensible grounds that it could bring back creatures that people love, or creatures that symbolize endangered ecosystems as a whole. [49] He had written: "The pure thrill of the prospect of herds of mammoths […] or clouds of passenger pigeons once again darkening the sun."[50]

The challenges of and objections to de-extinction science vary from issues on a scale of the individual (a potential lack of resistance of the individual to contemporary diseases, animal suffering due to the genetic interventions resulting in stillbirths or misshapen offspring, and bio-objectification of the animal) to a macro scale (the potential danger for ecological systems and other organisms when introducing the new animal, a potential decrease of attention given to other endangered but still living species and traditional conservation strategies, and whether it is reprehensible to intervene in evolution this radically.[51] Like Ben Minteer, chairholder for the Arizona Zoological Society at the Arizona State University, had wondered: "Why worry about endangered species, if extinction is no longer a death sentence?"[52] The ambitious voices of de-extinction scientists are often

[48] Sherkow, 33.
[49] Brand. "De-extinction debate."
[50] Ibid.
[51] Minteer, *The fall of the wild*, 106 – 107; Martinelli (et al), 4; Church, 203 – 207; Sherkow, 32 - 33.
[52] Minteer, *The fall of the wild*, 106.

accused of a lack of hubris and immorality, which is, according to some, the very reason that got the world into the environmental crisis in the first place.[53] It further brings about the issue of how species are defined. Resurrection science it is not likely to bring back an entire species due to the lack of usable DNA and limited successes. It is even challenging to bring just one resurrected woolly mammoth back to earth. If it would be achieved, it would consequentially mean that there would be a limited genetic diversity for the newly recreated individual and it would perhaps be sterile like other hybrid creatures usually are.[54] It could therefore be doubted if the goal of increasing biodiversity by means of de-extinction science is lucrative or not. Then, the question arises: what do scientists like Church, Zimov, Brand, and Hysolli really wish to bring back, extinct animals and a long-lost ecosystem? Or a fantasy?

Defining Sociocultural Trends within the Theoretical Discourse

Extinction, and the current status quo of the world more generally, are often presented as a story of demise and it provokes a range of responses among those involved, emotionally, theoretically, and/or professionally.[55] Authors not uncommonly tend to dichotomize the attitudes in optimism and pessimism, dividing general views in either techno-optimism and eco-pessimism, bio-fascination and bio-phobia, eco-Soterians and techno-utopians (or the new Prometheans), technophiles and "musty" preservationists, and eco-pragmatists or eco-modernists and romantics.[56] These dualistic attitudes can be traced back to the dualism stemming from the Enlightenment ratio, in which there had started to exist a clear opposition in the nature-culture continuum.[57] These opposing attitudes were amplified during the modernization processes of the Industrial Revolution. In that time, the romantics

[53] Demos, 26.
[54] Church, 210.
[55] Banks, 2
[56] See for these dichotomies: Joanna Szurmak and Pierre Desrochers. "Eco-Pessimism versus Techno-Optimism", *Areo Magazine,* 6 August 2019, Accessed on 14 January 2020. https://areomagazine.com/2019/08/06/eco-pessimism-versus-techno-optimism/; Heise, 206; Demos, 26. Minteer, *The fall of the wild,* 10.
[57] Braidotti, 3.

favoured the untouched pristine wild over the urbanizing cities with their poor living conditions and cherished nostalgia for the past as an act of political resistance to the changing regimes. Stewart Brand had identified in his book *Whole Earth Discipline* three stereotypes in the environmental movement: romantics (who love nature, problems, and tragedies), scientists (who discover and analyse problems), and engineers (who solve problems).[58] The more cautious, traditional environmentalists are sometimes criticized to be romanticizing the tragedies of loss and condemned for not acknowledging the reality of the already dominant human influence on the landscape and evolution, whereas the techno-ambitious voices are accused of immorality and they ought to acknowledge that humans should not have unlimited power and control over natural systems.[59] Professor on Media Theory and Science at UCLA, Ursula Heise, had identified a similar tension: "For pessimists, the Anthropocene signals the enormous scope of negative human impacts on the environment; for optimists, it opens up the possibility of reimagining the nature of the future not as a return to the past or a realm apart from humans, but as nature reshaped by humans."[60] Wendy Grishold has traced this dualism back to the old Manichean worldview of an eternal war between good and evil.[61] Is the box of Pandora being opened with de-extinction science? Will it bring entropy? Or, will it indeed combat climate catastrophes?

Ben Minteer writes often about environmental ethics, conservation, and evolution and has paid attention to de-extinction sciences in several of his writings. His statements are clearly articulated in his book *The Fall of the Wild*, in which he is critical to the increasingly widespread appeal to "eco-pragmatists", whose thought celebrates human control over nature through technologies.[62] Minteer had identified moral tensions circulating through conservationism that had emerged "between our competing desires to save threatened species at all costs and to respect wildness in a

[58] Brand, *Whole earth discipline*. 325-326.
[59] Minteer, *The fall of the wild*, 11; Minteer, "Is it right to reverse extinction?", 261; Brand, 326.
[60] Heise, 202.
[61] Grishold, 9.
[62] Minteer, *The fall of the wild*, 10.

world that can get crushed in our grip or slip through our fingers."[63] Peter Banks and Dieter Hotchuli had imposed a status of martyrdom on extinct creatures and have argued that de-extinction science threatens this status. Ultimately, this would be a dangerous development for animal conservation.[64] They identified moral lessons in the finality of extinction, that might be forgotten when passed species can be raised from the death.[65] Others, however, found moral values in reviving extinct species. In their view, bringing back lock-lost individuals would be a justification of the harm done to these creatures by human beings. Brand, for instance, had written: "How fine would it be to reverse the founding human mistake that inspired modern conservation. It would mean that conservation biology has come to full circle."[66] This means, simply put, that humans are to be blamed for the extinction of multiple species, and if humans are capable of bringing these species back, then their faults would be resolved.

The tenseness of technological progress, human involvement in natural processes, morality, and ethics within the framework of de-extinction sciences is apparent, but there exists a general unity: a sensibility about extinction and nature at risk, and a societal strive to preserve biodiversity and the welfare of nature systems. Diversity is an often-returning value in theoretical articulations. George Church, for instance, had said in an interview with *Der Spiegel* that the goal of recreating the Neanderthal man would be to increase diversity. He had elaborated this argument by stating that: "The one thing that is bad for society is low diversity. This is true for culture or evolution, for species and also for whole societies. If you become a monoculture, you are at risk of perishing. Therefore, the recreation of Neanderthals would mainly be a question of societal risk avoidance."[67] A positive rhetoric of (bio)diversity and natural welfare might appear as moral, universal values. However, the study of Fernando Vidal. Nélia Dias, and David Sepkoski suggests that it is rather

[63] Ibid., 11-12.
[64] Banks, 1
[65] Minteer, *The fall of the wild,* 106; Banks, 3.
[66] Brand. "De-extinction debate."
[67] "Can neanderthals be brought back from the death?" *Spiegel*, 2013. Accessed on 3 January 2020. https://www.spiegel.de/international/zeitgeist/george-church-explains-how-dna-will-be-construction-material-of-the-future-a-877634.html.

a socio-culturally constructed value which they trace back to the end of the twentieth century when a set of political discourses was initiated that focused on the great amount of endangered species.[68] In the 1970s, broader awareness of the impact of humans on animal extinctions had started to rise, due to among many other reasons population growth, deforestation and urbanization, hunting and poaching, which resulted in feelings of guilt, mourning, and resistance. The appearance of these discourses was caused by a shift in the biological understanding of extinction, as David Sepkoski had written in his contribution to *Endangerment, Biodiversity and Culture*. This provoked a recasting of the threats of extinction.[69] Biologists departed from a "Darwinian View", a view of extinction as an inevitable, but fair, slow and gradual process fuelled by natural competition, to one that viewed extinction sometimes as catastrophic and caused by sudden events.[70] The teleological process of nature in the Darwinian rhetoric assumed that animal extinction would be succeeded with stronger species and therefore the weaker chains of evolution did not require any protection. Moreover, whereas biologists of the nineteenth century saw extinction as "a process that contributes to an endlessly renewing natural equilibrium," the new understanding showed that extinction could have permanent and possible dramatic ecological consequences, Sepkoski had written.[71] Consequentially, nature was not anymore seen as balanced, constantly renewing, and progressive by wiping out "unfit" individuals or species. The supposed fragility of nature and its species raised a sensibility of the protection of nature and biodiversity. Vidal and Dias explained the thriving forces of modern conservation strategies through the concept of "endangerment sensibility": a notion that stands for "a network of concepts, values, and practices dealing with entities considered threatened by extinction and destruction, and new techniques aimed at preserving

[68] Sepkoski, 62.
[69] Ibid., 71.
[70] Some scientists, like nuclear scientist Richard Firestone, believe in the possibility of extraterrestrial impact causing animal extinctions. According to Firestone he explosion of a Supernova would have led to a sudden extinction of woolly mammoths and other megafauna. See for more: R.B. Firestone, "Evidence for an extraterrestrial impact 12,900 years ago that contributed to the megafaunal extinctions and the Younger Dryas cooling." *PNAS* 104, (2007): 16016-16021, 16016.
[71] Vidal, 63.

them. These devices materialize values that inspire an urge to perpetuate, but they do so through the concrete objects and information they choose to archive, and the techniques they use to do so."[72] Ursula Heise had identified how culture reflects on and affects endangerment sensibility, as she had written that "the elegiac and tragic modes in which endangered species are often portrayed in film, photography, and writing are meant to convey this general sense of decline, of sweeping losses of life, diversity, knowledge, and beauty."[73] An interesting instance wherein the narrative of decline and endangerment sensibility come together is presented by *National Geographic* photographer Amy Vitale (fig. 1). *National Geographic* had invited its Instagram followers to vote on their favourite photo of the past decade. The highest rated photo was a picture taken by Vitale. She portrayed Joseph Wachira who shared the final moments with the world's last male northern white rhino, Sudan, just seconds before he passed away. Vitale had written about this photograph that:

"Watching a creature die one who is the last of its kind is something I hope never to experience again. It felt like watching our own demise. The northern white rhinos may not survive human greed, yet there is a tiny sliver of hope. […] We are witnessing extinction right now, on our watch. Poaching is not slowing down. If the current trajectory of killing continues, it's entirely possible that all species of rhinos will be functionally extinct within our lifetimes. Removal of a keystone species has a huge effect on the ecosystem and on all of us. These giants are part of a complex world created over millions of years, and their survival is intertwined with our own. Without rhinos and elephants and other wildlife, we suffer a loss of imagination, a loss of wonder, a loss of beautiful possibilities. When we see ourselves as part of nature, we understand that saving nature is really about saving ourselves. Sudan taught me that."[74]

[72] Ibid., 1.
[73] Heise, 12.
[74] Amy Vitale, "What I learned documenting the last male northern white rhino's death.", *National Geographic*, 2019, Accessed on 28 December 2019. https://www.nationalgeographic.com/animals/2019/09/life-changing-lessons-of-the-last-male-northern-white-rhino/

The extinction of the white rhino is emblematic for what appears to be wrong in the contemporary world; human greed causes the demise of the natural world. The picture acts as a warning to future extinctions and aims to increase valuation for wildlife and animal diversity and an urgency for their preservation; it shows a sense of nature at risk which is dominantly present in many media-articulations. Stewart Brand had remarked that such narratives of decline, in which nature is seen as very fragile or already broken, could be originated in the romantic movement and their love for the tragedy of nature.[75] In fact, several scholars argue that nature, as understood in romantic terms, already has disappeared.[76] This idea is showed in some detail by Bill McKibben in *The end of nature* (1989). He had written that:

"We have changed the atmosphere, and thus we are changing the weather. By changing the weather, we make every sport on earth man-made and artificial. We have deprived nature of its independence, and that is fatal to its meaning. Nature's independence is its meaning; without it there is nothing but us."[77]

What he aims to explicate, in other words, is that we are depriving nature of its auto-poietic force by intervening in every (traditionally) natural system. Due to this radical reshaping of nature, one can wonder: what is nature if its core traits are undermined? George Church had said in a symposium on The Future Of Genomics and Synthetic Biology (September 19, 2014) that: "We have a love affair with the idea of the 'natural' even though we as a species are about as unnatural as you can imagine."[78] With this statement he pointed at human enhancement, the falling barriers of species due to hybridization, and other radical genetic modifications and aimed to make his audience rethink their view of nature. A view of nature as a separate realm overlooks

[75] Brand, *Whole earth discipline*, 329.
[76] Heise, 9.
[77] Mckibben, 60-61.
[78] George Church, "On the future of human genomics and synthetic biology." *Genomic Engineering and Society Center Symposium Address on the Future of Genomics and Synthetic Biology*. September 2014, https://www.americanrhetoric.com/speeches/georgechurchgenomicsandsyntheticbiology.htm, 1:08 1:12.

the dramatic influence of humans over nature which is occurring already since the advent of agriculture. Moreover, it would mean that humans are distinct from nature.

The rhetoric of the climate crisis and the losses of species and plants resounds feelings of powerlessness evoking an urgency to increase control in one way or another. Therefore, de-extinction science could be viewed as an act of resistance to the sense of looming destruction where cultural values, desires, and fears come together with scientific possibilities. The idea of loss and destruction of an untainted nature under the impact of modernization processes could result in both an increasing demand of control over nature (as present in de-extinction projects) and a critical rethinking of the role and position of human beings on earth. Conquering the melancholy of the lost creatures by resurrection science operates as a promissory counter-narrative how clever human interference could atone for the ecological harm that has been done. These narratives evoke sensations of mourning and anxieties of a beautiful nature slipping through our fingers and a correlating urgency to combat this loss. The following chapter will explicate and deconstruct the de-extinctionist gaze by offering a deeper sociocultural reflection on the particular case of the woolly mammoth in the Pleistocene Park.

2. A Hermeneutical Analysis of the Pleistocene Park

Many are probably familiar with the anecdote of the German painter and printmaker Albrecht Dürer who created a woodcut of an Indian rhinoceros in 1515 (fig. 2). The woodcut was an interpretation based on what he had heard and read about it. He had never seen the creature in real life, but still his representation was adapted by many other artists in Europe. Due to the lack of facts, false representations, and thereby false ideas, of rhinoceros circulated through Europe only till around 1750 when a few Indian rhinoceros were shipped to the continent.[1] This, sometimes referred to as "the rhinoceros-syndrome" exemplifies how the misunderstanding of something can lead to a chain reaction. Another anecdote illustrates how cultural storytelling can inspire real life actions. It tells the story of ornithologist Eugene Schieffelin who, as a homage to Shakespeare, released all the birds present in Shakespeare's plays. One species, the sparrows, started to multiply extensively and are now seen as one of America's most invasive birds causing irreparable crop damage.[2] Both stories show how culture can distort perceptions. Therefore, it is both important and interesting to hermeneutically analyse the concept of the resurrected woolly mammoth in order to better understand what de-extinction scientists are actually trying to introduce to this world. This chapter is aims to clarify how our idea of the woolly mammoth is situated in culture. It brings up questions like: To what extent do we understand what these scientists try to bring back? We have never interacted with a living woolly mammoth and still we have clear image of how they look like and even how they would act. What kind of knowledge mechanisms

[1] "A Rhinoceros." *Royal Collection Trust*, Accessed on 14 January 2020, https://www.rct.uk/collection/800198/a-rhinoceros

[2] Juliet Lamb, "What If We Had All the Birds from Shakespeare in Central Park.", *JSTOR Daily*, 9 June 2016, Accessed on 8 December 2019, https://daily.jstor.org/all-the-birds-from-shakespeare-in-central-park/

determine this image? How can the woolly mammoth be understood as a cultural event?

The first chapter explored what is going on in the world of de-extinction science and worked toward disclosing cultural driving forces. This chapter aims to create a deeper hermeneutical understanding of de-extinction science and especially of the woolly mammoth and the Pleistocene Park. Firstly, the woolly mammoth will be analysed in context of cultural memory in order to decipher the cultural landscape that might have been constructive for the desire to bring the creature back. Secondly, issues concerning the status of the resurrected woolly mammoth will be explored. This will show ethical and practical complications for the revived individual. It will further elaborate the technological and molecular gaze in context of the woolly mammoth. Thirdly, special attention will be paid to the language of de-extinction scientists. It questions the ontology of the being that would be created. Finally, the Pleistocene Park will be culturally reviewed. This chapter wishes to obtain a clearer image of the driving sociocultural forces.

The Event of the Woolly Mammoth in Cultural Memory

Winsor McCay, often referred to as the father of animation, created *Gertie the Dinosaur* in 1914. In this animation, the artist bets George McManus that he can resurrect the dinosaur through a series of cartoons. In the short movie, interactions with Gertie are depicted through "live action" film and animation. By doing that, the lines between the created object and the "real" world became blurred. After around thirteen minutes, a woolly mammoth named Jumbo makes a special appearance in the animation, thereby exposing McCay's interest in this particular creature (fig. 3). The clip presents an early artistic curiosity in the resurrection of extinct creatures, by fictionally blurring the boundaries between the mysterious world of the distant past and the real world. It shows an early example of the embedment of extinct creatures, like the dinosaur and the woolly mammoth, in cultural memory. The presence of the woolly mammoth in visual culture and commodities is

unquestionable; the animal has attracted attention of the cultural and scientific field and is articulated in a broad number of objects, artworks, books, documentaries, feature films and go on. Visit the e-commerce website Alibaba, for instance, search for "mammoth" and there will appear more than 1,500 product hits.

Already 42,000 years old, the woolly mammoth calf Lubya is a well preserved specimen whose images circulate the world. Amy Fletcher had written in *De-extinction and the Genomics Revolution* (2019) that Lubya is an important cultural entity that connects the Pleistocene era to the Anthropocene and back.[3] She believes that specimens like Lubya and Dima, another calf specimen discovered in a northern Siberian gold mine in 1977, work as embobiments of the enduring mysteries and fascinations of the past.[4] Recreating the mammoth genome could thus be viewed as an effort to unravel secrets of former times. The 3D movie 'Titans of the Ice Age' (2013) follows the herd of the calf Lubya and explores the world of the Pleistocene era. Lubya is thus appropriated and granted the status of a representative icon for the extinct woolly mammoth through which the past times of the Pleistocene era are contextualized, materialized, and narrated while bridging the present to the past and back.[5] George Church had written about the frozen mammoth corpses that "the mammoth almost cries out for resurrection. Some specimens unearthed from permafrost are so lifelike that they appear to be merely sleeping, not dead, much less extinct."[6] He thereby shows how the material availability of the woolly mammoth nurtures his desire to recreate the woolly mammoth. The view of the woolly mammoth as an icon is specified by Fletcher, she had argued that the woolly mammoth is often seen as the "archetype of everything icy and Palaeolithic."[7] Of course, the fact that the woolly mammoth is viewed as such is not an ontological or universal fact, but rather an imposed status brought into being by cultural mechanisms. Fletcher had noted that several scientific platforms that advocate resurrection science deploy the image and the legendary identity of the woolly

[3] Fletcher, 51.
[4] Church, 209.
[5] Fletcher, 52.
[6] Church, 209.
[7] Fletcher, 47.

mammoth blending facts and hopeful fantasies.[8] It is then interesting to pay attention to Roland Barthes' cultural theory of mythologies. Roland Barthes had identified mythologization in popular culture in his bundled essays *Mythologies* (1972). He had remarked that the myth is not defined by the object itself more importantly, "by the way it utters its message. Every object can pass from a closed, [...] to an oral state, open to appropriation by society."[9] For the woolly mammoth the question arises: what defines the "object" of the woolly mammoth? The specimens? Its representations in the media? There might not be a suitable answer to this question, but that might be exactly why the woolly mammoth has such a great operational force for de-extinction scientists. Since, what is easier to appropriate and impose meaning onto than something that does not exist anymore in living shape?

Jan Assmann, one of the founding theorists of cultural memory, had argued that cultures have a connective structure that underlies myths and histories, "objectified in symbolic forms of myths, texts, and pictures."[10] By repetition of patterns through articulations of culture, the cultural meaning of events becomes recognizable for collective memory. For the woolly mammoth its identity is determined by cultural articulations and representations, rather than by the physical creature itself since there is no living representative of the creature on earth. Differently put, no one currently living on earth has ever encountered a woolly mammoth in living shape and still many people have a sense of the identity of the woolly mammoth and it thereby remains alive. The absence of "real" living representatives affects symbolism which is used to fill the voids that mysterious extinct creatures have left behind, Ibbotson had argued.[11] Therefore, the raw material the specimens provide can be viewed perfect tools for appropriation to those who want to articulate a particular meaning through the cultural event of the woolly mammoth. Apparently, processes of objectification are even possible for "non-existing" beings. The circulating visual language of the woolly mammoth is a product

[8] Ibid.
[9] Barthes, 107.
[10] Assmann, 71.
[11] Ibbotson, 84.

of efforts to reconstruct a historically shaped consciousness, an endeavour that Dietrich Harth had conceptualized as "invented cultural memory."[12] Differently put, by means of the creation of the event of the woolly mammoth in cultural memory in all its manifestations, the creature remains alive. In this context, the representations of the woolly mammoth, both in the shape of specimens and in the visual discourse, contribute to the mystification of the woolly mammoth. Using Dietrich Harth's terminology, the cultural memory of the woolly mammoth is not "an invention *ex nihilio*"; rather, it should be related to the philosophical concept of *bricolage* introduced by Claude Levi-Strauss.[13] The bricoleurs, the de-extinction scientists and their followers, construct a language and transfer meaning by appropriating already existing objects and impose new meanings onto them. Their final product, the revived woolly mammoth, would thus be a materialization of a rather metaphysical event.

Deciphering the Status of the Resurrected Woolly Mammoth

Photographer Kirsten Luce had portrayed the darker sides of anthropomorphising animals. The process of anthropomorphising occurs often almost automatically when one tries to make sense of animals, and is, when its occurence is recognized, often viewed as a negative process. Luce photographs captivated animals that are used as models for touristic holiday photographs and that are often dressed and trained to behave and pose in far-fetched, anthropogenic ways while being chained for most of their lives (fig. 4 and 5). She had recently published an article on the website of *National Geographic* in which she documents her photographic journey in Ban Ta Klang, locally known as "the elephant village". The village holds around 300 elephants in captivity and the animals are bred to perform and interact with tourists.[14] Her photographs can make the beholder feel uneasy. The uncanniness of the

[12] Harth, 87.
[13] Ibid.
[14] Kirsten Luce, "In this Thai village, life revolves around 300 captive elephants.", *National Geographic*, 2019. Accessed on 30 December 2019. https://www.nationalgeographic.com/animals/2019/10/inside-ban-ta-klang-thai-elephant-village/ .

anthropogenic ways the animals are forced to act, is not something only few have witnessed, let alone have been complicit to enjoying it. Her work is a clear instance of the commodification and instrumentalization of animals, which might be seen, at least from the perspective of animal lovers, as a negative product of the anthropocentric hierarchy. In addition, Luca Martinelli (et al) had written that de-extinction science illustrates the process of bio-objectification, which is "a process by which life is made an object by human beings."[15] In her opinion, resurrection science is a pure instance of bio-objectification since the preserved tissues and the subsequent newly created entities are appropriated for human desires and their use ranges from animal conservation and scientific discoveries to entertaining the curiosa in zoos and exhibits.[16] Moreover, she had said that the resurrected organisms are bio-objects because their entire existence is human controlled and they can like objects be used as instruments, be possessed, and be traded.[17] From this perspective, resurrected creatures can be viewed as a product of commodification whom status and welfare is determined by its human possessor. Like the elephants of Ban ta Klang, the woolly mammoth would be bred for human purposes and desires and would not exist for itself. In addition, the bodies of the woolly mammoth specimens become assessed in either usable or not applicable genetic material, thereby being a nonhuman instance of genetic reductionism. The molecular gaze also paved the way for a disembodied science. Consequentially, this makes it easier to distance one from the other and feel little ethical responsibility, since there might be less personal or emotional engagement with the body on a molecular level. Moreover, dramatic intervention in evolution processes and the effort to reverse extinction show clear instances of an exacerbation of human-animal power differences. The tendency of having more influence in animal evolution in combination with bio-objectification and the molecular gaze might have unethical outcomes. Amy Fletcher had defined the status of the resurrected creature as as "both animal and machine, as wild creature and possibly patentable object, raising complex issues of ownership,

[15] Martinelli, 424.
[16] Ibid., 424-425.
[17] Ibid., 425.

commodification, and governance."[18] Through this statement, Fletcher had shed light on practical complexities that relate to techno-capitalist oriented views. The resurrection of the woolly mammoth brings up many questions concerning the status of genetically modified creatures and animals in general and how we ought to engage with them. Philosopher Dominique Lestel had shown complexities of human-animal relationships in his contribution to *Signs of Life* by noting that "to consider an animal a person and that therefore should not be manipulated by humans under any circumstances, presupposes without ever proving it that the status of a 'person' is a natural status and not a cultural artefact that can be applied to humans and animals alike," and therefore "a person can only be understood in a larger context in which the mechanisms of natural evolution and cultural history gives rise to individuals."[19] Hereby, he clarifies that personhood is a constructed, elevated status that defines human-animal power differences. Moreover, even if an animal would acquire the status of a person, it would thus still be subjected to the laws of the anthropocentric subject who imposed that particular status on the creature. For the woolly mammoth a fate of exploitation might be lurking. Rosi Braidotti had noted in *The Posthuman* (2013) that creatures like Dolly and the Oncomouse are often used as metaphorizations, thereby showing that the status of the recreated organism is not only a matter of practical issues, but most probably also will be used to reflect on and create a better understanding of the shifting landscapes of the contemporary. The Oncomouse, for instance, is frequently seen as a Christian-type martyr that sacrifises itself for the bigger cause of curing cancer. This metaphor is for instance deployed by Bryan Crockett who recreated with his *Ecce Homo* (2000) the iconography of Christ on the cold stone in the body of an Oncomouse sculpture. Drawing on these insights, the resurrected woolly mammoth, the Other, could thus be viewed as an instance to better understand the self, as we only appear to understand ourselves in relation to the Other.

[18] Fletcher, 47.
[19] Letsel, *Signs of life*, 154.

The De-extinctionist Gaze in Representations of the Woolly Mammoth

As Ibbotson had noted, the visual discourse of the woolly mammoth in de-extinction science represents what cannot be seen because it does either not exist anymore in living shape, or because it is too microscopic for the naked eye.[20] In this part, there will be focused on the representations of the woolly mammoth. On the websites of the Pleistocene Park and the Revive & Restore Project, depictions of herds of woolly mammoths can be found (fig. 6 and 7). The mammoths are portrayed as majestic creatures, roaming the icy lands of the Pleistocene era. The images carry a great degree of verisimilitude because the woolly mammoths appear animated, resembling a photograph of a living creature. They thereby carry an association of truth which semiotically attracts power to convince the beholder, even though, following Ibbotson, the accuracy of the images can be doubted.[21] Moreover, the scientific processes that precede the final corporealization of the woolly mammoth are neglected; its technological ontology is presented under the veil of pristine woolly mammoths inhabiting a Pleistocene climate. In an image taken from the website of the Revive & Restore Project (fig. 7), a herd of woolly mammoths is depicted frontally and the beholder encounters the creatures from an average human-height position. In other words, through this choice of perspective, the beholder instantly, but often subconsciously, views the creature from a human perspective. This act of gazing constructs an anthropocentric point of view; the anthropocentric gaze. Because the creatures are depicted from this perspective, the creatures appear to be exalted in relation in its relation to the human scale. Thereby, their fantastic features have become reinforced evoking senses of awe and nihility. The image thus evokes sensations of the technological sublime, however, under the smoke-screen of the natural sublime. Traditionally, drawing on George Gessert's definition, the sublime was found in a union of beauty and horror that produces exaltation or awe, "such as one might experience before snow-coverend mountain peaks, high waterfalls, or the

[20] Ibbotson, 84.
[21] Ibid., 87.

milky way."[22] For Ben Minteer, the sublime was used to be found in wild nature and it was an emotional response to "the power, mystery, and beauty of a world beyond human making, understanding, and control."[23] The sublime can thus be defined as a response that is evoked by something that goes beyond human comprehension and control by the fact that it lies exactly in the tension of thrill and fears, of astonishment and aversion. Today, by the increase of technological capabilities and control, the sublime can be evoked in different ways. Humans can, and have, become active agents in these mechanisms of thrill, fear, astonishment, and horror. Obviously, the sublime it is not reserved to the domain of nature or God anymore. Inteferring in natural processes this radically is often referred to as "playing God," both in negative and positive ways, and points to a desire to become as powerful as a God, and to a presence of Judaeo-Christian thinking rooted in the modern secularized mind.[24] In fact, the projects of Zimov, Hysolli, Church, Brand, and others show a perfect instance of a counteract to the one thing that would make us subordinate to a supposed God; the final mortality of existence. Through the de-extinctionist gaze, the sublime can be viewed as a mastery of nature and of technological control, as a championship of anthropocentric desires to reign over nature, control its forces and unwrestle the secrets it bears. Today, technological possibilities seem infinite, limitless, and if extinct animals would be raised from the death even the finality of death would be contested. Like Minteer had written: "Supporters argue that de-

[22] Gessert, 42.
[23] Minteer, *The fall of the wild,* 107.
[24] The traditional dual structure of the sublime can be traced from the dual construction of God, who is often viewed as and entity that is feared and loved, as omnipresent, limitless, and invisible. Oswald Spengler connected our anthropocentric strive to master nature to an "unstoppable craving to wrest the secrets of natural order from God — with the unconscious aim of controlling over human destiny, if not in fact, becoming God itself.'" The frequently mentioned narrative of 'playing God' is echoed in, among other publications, *Homo Deus* ('The God Man') by Yuval Noah Harari, Stewart Brand's quote "We are as Gods and we HAVE to get good at it", and *The God Species* by Mark Lynas. Theologian Ted Peters has paid attention to this subject in his book *Playing God*, in which he asks: "Is it a sin to act like God when we are in fact not God?" He clarifies this sin by stating that humans could play God in their own selfish and imperfect ways. Even though the world is secularizing, the Judaeo-Christian tradition — in the west — still remains at the cradle of most of our understanding. As Francis Fukuyama writes in *Our Posthuman Future* (2002), reflecting on human enhancement, "religion often intuits moral truths that are shared by nonreligious people, who fail to understand that their own secular views on ethical issues are much more a matter of faith as those of religious believers." From: Spengler, 411; Harrari, *Homo Deus*; Brand, *Whole earth discipline*, 18; Lynas, *The God species*; Peters, *Playing God*, 1; Fukuyama, 90.

extinction will evoke a powerful sense of wonder and awe as we witness species raised from the death and returned to the landscape."[25] Immanuel Kant's statement may have become even more valid it this time of technicity and the idea of the end of nature, as he wrote in his *Critique of Pure Judgement*: "Sublimity does not reside in any of the things in nature, but only in our mind, insofar we may become conscious of our superiority of nature within and thus also over nature without us."[26] Interestingly, Kant had rendered the sublime through the anthropocentric gaze and therefore, like George Gessert had observed, values assigned to nature would be anthropogeneously constructed.[27] The imposed subjective value of the sublime woolly mammoth is thus directed by the anthropocentric gaze and objectified in the woolly mammoth and can only be valued as such by the anthropocentric subject.

In *Woolly: The True Story of the Quest to Revive One of History's Most Iconic Extinct Creatures* (2017), Ben Mezrich wrote a dramatized and romanticized account of the current resurrection projects of Church and Brand. Even though the book proclaims to be based on "numerous interviews, multiple first-person sources, and hundreds of pages of articles", implying a certain objectiveness to the storytelling, the story employs an anthropomorphised image of "Woolly." Firstly and most obviously, the process of name-giving is a primal anthropocentric one (which also counts for Lubya and Dima) and this action might bring a more immediate, personal and emotional connection to the potentially revived creature. It instantly structures a relationship between the cultural receiver and Woolly. Secondly, Woolly is portrayed as a recognizable creature through its narratology in which human-like traits are attributed. For instance, on page 7, the text reads: "A little after 5:00 A.M., the calf opens his eyes. Even though his mother is only a few yards away, […] the calf feels strangely alone."[28] The anthropomorphization of the calf shows an ideological tendency to understand animals through our anthropocentric gaze. The anthropocentric gaze manifests itself as ontological reality, which directly constructs

[25] Minteer, *The fall of the wild*, 104.
[26] Citation in: Minteer, *The fall of the wild*, 108.
[27] Gessert, 42.
[28] Mezrich, 7.

a power-differentiation that subordinates the non-human "object" ("Other-as-Object:") to the human beholder ("me-as-subject). We appear to only understand and give meaning to the animal world only within the limits of our own emotional understanding. Correspondingly, Rosie Ibbotson had argued that the "species' sensory world is both falicitated and naturalised by an anthropocentric gaze, which also surpresses the subjectivity of nonhuman animals."[29] Such processes of anthropomorphisation complicate human-animal relationships. The personification of the inanimate nonhuman subject, the woolly mammoth, is deployed as an object to inspire and to be worshipped. In this sense, the woolly mammoth bears a deeper symbolic meaning of a fetishized and anthropomorphised mirror image of the self in the resurrected creature, that shows in its reflection human abilities and desires. The discourse of de-extinction proponents thus possesses a distorting ideological agenda in which its scientific, technological and anthropocentric desires are feigned by verisimilitude and storytelling. By the act of gazing, the cultural event of the woolly mammoth becomes objectified which instantiates and increases power differences between the human and animal. The objectified woolly mammoth cannot look back; its identity is framed in the representations of de-extinction scientists.

The Fantastic Pleistocene Park

A closer look at the Pleistocene Park quickly brings up parallels with movies and series like *Jurassic Park* (Steven Spielberg, 1993), and entertainment parks like zoos and Disneyland. *Jurasssic Park* presents a spectacle of genetically engineered, wild creatures out of control. Such cinematographic narratives expose underlying fears of worst-case scenarios and total chaos due to technological misuse. The Pleistocene Park is an obvious reference to *Jurrasic Park*, with both parks being named after the era the parks represent. Some fear that the seeming limitless of technology could bring such a disastrous spectacle to the everyday world as shown in the movie. Popular culture reveals an exchange between scientists and the public and a

[29] Ibbotson, 98.

questioning of the scientific status quo and its ethos. As explained, the recreation and introduction of the woolly mammoth in the Pleistocene Park is legitimized under the argumentation of combating climate change, while the creature actually faces the threat of being exposed and exploited as a curiosa for entertainment. In fact, George Church had written that a successful resurrection of the woolly mammoth would turn the Pleistocene Park into an "adventure tourist destination, […] the park would be in effect a mammoth zoo."[30] Such a statement sounds troubling since it has little ethical regard for the welfare of the creature and much regard for exposing the resurrected animal to interested tourists. It subjects the creature instantly under the anthropocentric gaze on which zoos are build. In other words, the anthropocentric gaze is explicit in zoos, since the animals are presented to be looked at by the human beholder. Zoo-captivated creatures can (sometimes) look at the human beholder, but only from their inferior perspective in their locked environments. A zoo can be defined as a human-build and -regulated space where animals live in captivity under human control and under human determined conditions, thereby being a clear instance of the technological and anthropocentric gaze. They serve as spaces for study and spark interest in animal wildlife, for both conservation and entertainment. Specific choices that are made for particular zoos, like for instance the degree of animal welfare, are, of course, based on culturally determined values and dependent of certain times and contexts. Zoos are again, a clear instance of human-animal power differences and similar power-differences are present in the Pleistocene Park. This type of argumentation finds resonance in Michel Foucault's application of the gaze in *Discipline and Punish*. In this book, Foucault had explicated how surveillance and regulation make the gazer superior to the object of the gaze, e.g., how observation is used to discipline individuals, for instance in prisons and schools, and he had laid out that architecture is built "to permit an internal, articulated, and detailed control to render visible those who are inside it."[31] This power-oriented control by means of visibility can perfectly be applied for the animals behind the fences of the Pleistocene Park.

[30] Church, 228.
[31] Foucault, 170, 172.

It is interesting to further consider this analogy between zoos and the Pleistocene Park. The Pleistocene Park resembles a zoo in the intersection of interests in untamed wildlife (as presented in the visual culture) and anthropocentric desires to control everything. Like zoos, the park is built on the junction of entertainment parks, (pseudo-)nature, animal interest, and human supremacy. Both serve as an imaginative bridge between the general environment and the pristine romanticized wild. Like day trippers go to the zoo as an outing of escapism from daily life, the Pleistocene Park can be viewed as an instance of escapism to the long-lost past. Entertainment parks often present an idealized and utopian image of a world that could be. De-extinction scientists view their practices through glorifying goggles and the Pleistocene Park could therefore be interpreted as a utopian representation. To clarify this, the concept of utopia by Louis Marin is interesting to explicate. He had defined the concept as "the product of a process by which a specific system complete with spatial and temporal coordinates is changed into another system with its own coordinates, structures, and grammatical rules."[32] It shows an active alteration of a certain environment, reminiscent of the way the Pleistocene Park is treated. To a certain extent, this resembles the nostalgic utopia from Disneyland that is a tangible representation of childhood dreams. For Umberto Eco, Disneyland stimulates desires for a fake nature, which corresponds to daydream demands. According to his writings in *Travels in hyperreality* (1990), Disneyland is at once presented as "absolutely realistic and absolutely fantastic."[33] Disneyland manifests itself as a utopian representation of America. It is an obvious instance of pseudo-culture and thereby does not hide that it is a modelled imaginary place. In this sense, the Pleistocene Park appears to be more deceitful since it presents itself as something natural. The microcosm of the Pleistocene Park is presented as a new world that utters a message of a longing to a distant past in the shape of pseudo-nature, thereby stimulating desires for a constructed world however paradoxically being presented as "naturally real".

[32] Marin, 242.
[33] Eco, 95.

The Woolly Mammoth as a Simulacrum

Philosopher Julien Delord had described resurrection science as rendering apparent finite processes of extinction as more fluid and malleable.[34] He opted for a different view of extinction in which the concept is not reduced to "the simple death of individuals; it also has to account for the end of the recognition process of the transmission of information."[35] Extinction is then not limited to the death of species or individuals, but only occurs when the extinct creature is not present in cultural memory anymore. In this view, one could state that the woolly mammoth, or the Dodo for that matter, is not extinct because it has been kept alive in the public conscience. This finds resonance in view of the woolly mammoth as being alive in the metaphysical shape of a cultural event. Being then goes beyond a mere biological living materiality and initiates that there are multiple ways engaging to the concepts of being and living. This approach finds interesting acclaim, though it is not the same, in the analogy drawn by W.J.T. Mitchell between the image and living organisms. He sees images not as static, inert objects, but rather as evolving, dynamic, and animated beings and with an operative and constitutive force in reality.[36] It would signify, following Mitchell, "a second nature that humans have created around themselves."[37] Due to the advent of cloning and other non-sexual reproduction technologies, it became possible to corporealize an image. This view has become more relevant by the turn toward, following Mitchell, the "biopicture,": the animation of the icon by means of techno-sciences and information.[38]

It is now interesting to consider Jean Baudrillard's theory of the simulacrum in relation to the metaphysical event of the woolly mammoth. Jean Baudrillard had opened his 'The Precession of Simulacra' by citing the following from *Ecclestiates*: "The simulacrum is never what hides the truth it is the truth that hides the fact that

[34] Delord, 659.
[35] Ibid.
[36] See: Mitchell, *What do pictures want*, 11; Mitchell, *Cloning terror*, xvii.
[37] Mitchell, *What do pictures want*, xv.
[38] Mitchell, *Cloning terror,* 70.

there is none. The simulacrum is true."[39] Baudrillard believes that we live in a hyperreal society, a generation that is build on simulations of "a real without origin or reality."[40] In the postmodern era, the idea of the copy and the original have become disrupted and there is no direct connection anymore between the referent and the signifier, which means that the copies have come to represent the real world.[41] Formally, the resurrected woolly mammoth would be a mirror image of a non-existent subject, a replica or imitation without an original, a mimesis of the idea of the woolly mammoth that only resides in the human mind. This resonates with both Mitchell's and Rosi Braidotti's argument that Dolly the cloned sheep was a simulacrum: she is a being, a copy, without a parent, and without an original.[42] The cloned entity would signify an embodiment of a vivified inanimate subject. The revival of the woolly mammoth would then thus become, following W.J.T. Mitchell, a "personification and corporealization of the simulacrum."[43] Drawing on the logic of the simulacrum, the acknowledgement of the woolly mamoth as a simulacrum would then be the truth, as it would expose that the truth does not exist. The argument of entertainment parks as Disneyland being a simulacrum becomes even more valid in the case of the Pleistocene Park, a place that is determined to copy a supposed original and would be inhabited by creatures without an original. The idea of the woolly mammoth roaming the icy steppe of the Pleistocene Park represents an ideal pseudo-image; a place where a natural environment is recovered from the climate crisis and where humans are not a destructive force but are rather contributing to the recovery of the lost natural world. This fantasy world is build on simulations of the "real" and is fuelled by desires to situate this idea in the physical world. The woolly mammoth diverts attention from a story of a world in demise to a romantic one of the natural sublime, nostaglia and prosperous hope. These signs that are exploited by de-extinctionist advocators and show their ambition to make the simulacrum of the woolly mammoth part of everyday life. Daniel Boorstin's statement

[39] Baudrillard, "The precession of simulacra", 453.
[40] Ibid.
[41] Durham, *Media and cultural studies*, 447.
[42] Braidotti, 74. Mitchell, *What do pictures want*, 12.
[43] Mitchell, *Cloning terror*, 31.

from *The Image* (1984), "we are haunted, not by reality, but by those images we have put in place of reality," perfectly captures how the simulations of the woolly mammoth haunt us to bring the woolly mammoth back on earth. We are hunted by the vivid image of the woolly mammoth, that "cries out for resurrection." Hence, whereas nature has become deprived of its own autopoietic force, the precession of the simulacra consists its own autopoietic force that brings new creatures into being in the disguise of old acquaintances.

3. Artistic Positioning in Biogenetic Engineering Debates

In the past century, new types of art movements have started to emerge through which artists have sought to position themselves within a technologically changing world. The artistic ambition to break with the psychic and physical barriers between art and living reality is a long-standing one, however, the game has changed due to rapidly evolving scientific potentials like the CRISPR-technology and the increasing accessibility of high technology. Consequentially, these breaking technologies have become available to adapt for today's artists making the potential of creating new types organisms not a fictional one. The romantic rejection of technology and science, and the consequential separation between the artistic and scientific field, is now in a process of flocking. The intellectual, and often provocative direction in contemporary art this chapter is concerned with is called BioArt, which refers to an artform that works with living media and thereby provides cultural events capable of intercourse with their creators and their audience. Thereby, issues concerning biotechnology become encountered in a tangible way and by doing that, as Robert Zwijnenberg had remarked, art provides humanities direct access to life sciences.[1] As a result, the often-assumed separate realms of science and technology become communicated to other social, cultural, and political domains in tangible ways revealing possibilities, desires, fears, ambiguities, complexities, paradoxes, challenges, and issues. It therefore allows humanities scholars to participate in debates concerning science from their own perspective, thus breaking with the

[1] Zwijnenberg, *Art in the age of techoscience*. xvii.

seeming autonomy of science. Many BioArt institutes and collaborations have been established evidently showing that the gap between science and art is closing.[2]

The previous chapter had investigated the mechanisms of power structures by laying out how the gazes function in the framework of de-extinction science. In this chapter, there will be looked at how artists position themselves in de-extinction debates and the gaze is used again as a tool to deconstruct how relations between the observer and the observed being are build. In art, of course, gazing is essential since the works are created to be looked at and therefore the navigation of the gaze is often consciously applied to transfer certain messages. This chapter explores how the artists Eduardo Kac, Maja Smrekar, and Adam Zaretsky position themselves within debates about biogenetic engineering, what kind of ideas they express and how the gaze can be used as an epistemological tool. It will thus focus on art's transformative force and what art can bring outside of the scientific discourse.

The Naturally Artificial World

An artist who drives scientific potentials to the extreme is Eduardo Kac. Kac had received massive media attention with his *GFP Bunny*, a genetically engineered rabbit called Alba. The DNA of the rabbit was combined with a Green Fluorescent Protein, deprived from jellyfish DNA, making it glow green under blue light. Kac is curious about the future implications of biogenetic engineering. He had written in his book *Signs of life* that "with transgenic art, the animate and the technological can no longer be distinguished. The implications of this ongoing work have particular social ramifications, crossing several disciplines and providing material for further reflection and dialogue."[3] Herewith, he shows that the technological and the natural have blended together in one entity. He is contesting the boundaries of what is perceived natural and unnatural and criticizes the unsatisfactory idea that the natural

[2] To name a few: WAAG (Amsterdam, 1995), Bioart at Rensselaer Polytechnic Institute (2007), SymbioticA (2000), The Art and Genomics Center (Leiden, 2008), Finnish Bioart Society (2008), Synthetic Aesthetics (Edingburgh and Stanford, 2010), Bioart Lab at the School of Visual Arts (New York, 2011), BioTehna (Ljubljana, 2012).
[3] Kac, *Signs of life*, 163.

and unnatural still belong to separate realms. He mirrors in a tangible form the artificiality of the world we inhabit, a characteristic that is often still not acknowledged. By presenting an "obvious" transgenic creature, Kac makes clear that boundaries between the natural and the artificial are starting to erode. Further, Kac confronts us that the dualism (as indicated in the first chapter) overlooks the complexity of today's technologically mediated society, as he had written that *GFP Bunny* "does not attempt to moderate, undermine, or arbitrate the public discussion. It seeks to offer new perspectives that offers ambiguity and subtlety we usually only find affirmative ('in favor') and ('negative') polarity." [4]Moreover, Kac confronts his audience with ambivalent attitudes toward speciecism in context of genetic engineering. By withdrawing the genetically modified bunny out of its laboratory context, a rearranging of the gaze occurs. The bunny was first held captive in an "invisible" laboratory environment, now it has become both a media icon and a pet. Herewith, Kac has redirected the gaze and thereby empowered the bunny; now Alba can look you in the eye.[5] With Alba, Kac communicates questions of bioengineering to the public domain and offers topics for debates. What, for instance, would define the status of the transgenic creature? And how does its status differ from a domesticated non-transgenic rabbit? Kac wrote about *GFP Bunny* that it "highlights the fact that transgenic animals are regular creatures that are as much part of social life as any other life form, and thus are deserving as much love and care as any other animal."[6] *GFP Bunny* connects practices of science to artistic, social interpretations and disrupts frameworks of ethics and its paradoxes. In another text about transgenic art, Eduardo Kac expressed his interest in creating a transgenic dog: *GFP K-9*. This dog would also contain the Green Fluorescent Protein and it would become a new part of Kac's family.[7] Kac ambitiously wrote that *GFP K-9* would be "the founder of a new transgenic lineage."[8] One of the objectives for his transgenic dog project is to

[4] Ibid.
[5] Reference to Kac's title "Art that looks you in the eye." in *Signs of life*, 1 28.
[6] Eduardo Kac, "GFP Bunny.", 2000, Accessed on 23 October 2019, http://www.ekac.org/gfpbunny.html
[7] Kac, "Transgenic art."
[8] Ibid.

bring animal extinction to the public agenda and to advocate for possibilities to create new types of animals, as he had written: "With at least one endangered species becoming extinct every day, I suggest that artists can contribute to increase global biodiversity by inventing new life forms."[9] Through this statement, he had raised a creative urgency for the creation of new entities while touching upon the cultural value of diversity and endangerment sensibility as discussed in the first chapter. By critically revealing how we view ourselves as dominators of nature while also advocating for an active role in genetic engineering, he takes in an ambivalent position. With this act he appears to go against an oversimplifying dualistic black-or-white or human-non-human view and shows that life itself is complex and discrepant: there exists no pure dichotomy.

Obviously, it is no secret that Kac is ambitious about new types of interspecies creations. He had written that it "will yield the generation of beautiful chimeras and fantastic new living systems, such as plantimals (plants with animal genetic materials, or animals with plant genetic materials), and animans (animals with human genetic material, or humans with animal genetic material)."[10] For his artwork *Edunia* (2009), part of the series *Natural History of the Enigma*, Kac combined his DNA with that of a Petunia, thus creating a plantimal blending the domains of science, art, and society. He redefines the human and plant body, thereby raising the question of what the limits of the human and vegetal being would be in an age of biogenetic engineering. By means of his activism in evolution processes, Kac's works are not only reflections on today's world, they are situated in the "real" world and have therefore impact on the real world. Again, in this artwork Kac disrupts static visions of the natural-artificial distinction. By proposing new possibilities of being in the Other – his transgenic creatures – he shifts the traditional image we have of the Other and the self to a potential multispecies one. More importantly, with *Edunia,* he brings up the question of how to encounter with human-vegetal beings. Blending the genetic makeup of plants and humans might provoke resistance; plant-life evokes little empathy since they are viewed as non-sensorial beings and thus occupy a lower place

[9] Ibid.
[10] Ibid.

on the anthropocentric hierarchy. Even when empathy for plants is present, it is often envisioned through anthropomorphisation of plants; a human mimecry of emotions identified in plants. However, as Michael Marder had suggested "the feeling of empathy with plants disregards their mode of being and projects the constructs and expectations of the human empathizer onto the object of empathy."[11] His statement reveals the anthropocentric tendency to anthropomorphise the vegetal being and thereby neglects the possibilites of alternative ways of being that are other than human. Recent studies have revealed that plants do communicate through roots or by transferring bacteria, suggesting that plants might be more complex and social beings, though their interconnectedness and communication methods are different.[12] Kac therefore makes us rethink how we view other "non-natural" and non-human entities and how we figure our relationship with them. Kac is convinced that there has arisen an urgency to develop new models to understand this change of interspecies communities in which humans and transgenic creatures are going to live together.[13] *Edunia* can thus be read as a strive toward an alternative lens that goes beyond the anthropocentric gaze and which gives way for a non-human alterity.

Disclosing and Rearranging the Gazes

With his work *Genesis* (1998-1999), Eduardo Kac aimed to show a Judaeo-Christian origin of what is often viewed as the anthropocentric hierarchy of species by translating a sentence from the book of Genesis into Morse-code. The Morse-code was translated into DNA base-pairs and read: "Let man have dominion over the fish of the sea, and over the fowl of the air and over every living thing that moves upon the eart."[14] Kac had chosen this particular sentence for what it implies, namely, "the dubious notion divinely sanctioned of humanity's supremacy over nature."[15]

[11] Marder, 261.
[12] "Fungus network 'plays role in plant communication'.", BBC, 10 May 2013, Accessed on 22 January 2020. https://www.bbc.com/news/science-environment-22462855
[13] Kac, *Signs of life*, 180.
[14] Kac, *Signs of life*, 164.
[15] Eduardo Kac, "Detailed Description of Genesis."Accessed on 18 September 2019. http://ekac.org/geninfo2.html

Similarly, George Gessert had noted in *Green Light* that God was always found in the human figure throughout the course of western art history, and "the Bible and Christianity nourished a great flowering of anthropocentrism that continues to the present day."[16] In this artwork, Kac reveals the fundaments of anthropocentric concepts that have shaped modern thinking and how we engage with non-human life. In *The Eight Day* (2001), Kac further explores the relation between self-imposed human supremacy, religion, and animals (fig. 8). This artwork was an artificially-made ecosystem that was inhabited by transgenic fluorescent creatures living under a dome. The micro-ecoystem was populated by GFP plants, GFP amoeba, GFP fish, and GFP mice. The artwork echoes an anthropogeneous desire to remodel landscapes and other life. This is made more explicit by Kac through particular artistic choices he had made. Namely, by lighting the ecosystem with an internal blue light, he aimed to evoke the image of the earth seen from space.[17] He had used a video projector to project water on the floor, inviting the visitor "to walk on water" thus identifying the audience with Christ. In this work, Kac had cleverly navigated perspectives to make the subordination of the GFP creatures more explicit. Kac had directed a second gaze from the perspective of the creatures inside of the dome, placing the observer in a literal lower, subordinate, and non-human position.[18] The use of a dome creates an instant distance between the beholder and its crawling creatures, a strategy reminiscent of the gaze as a tool for control and subordination, a Foucauldian application of the gaze. The all-seeing gaze evokes power differences that are to a certain extent similar to the controlling gaze of the panopticon architecture. The captivated animals are, like the prisoners in the panopticon, positioned in a manner that they can constantly be observed. This powerdifferentiation is made even more explicit by the tangible separation the free human observer and the limited living space of the genetically engineered creatures. By doing this, the judeo-christian tradition of human superiority becomes clearly evident. Like an exalted God one looks over the tiny creatures that are manipulated

[16] Gessert, 133.
[17] Kac, *Signs of life*, 175.
[18] Kac, *Signs of life*, 176.

by the hands of humans. This artwork can thus be viewed as an extreme example of human control and animal subjectivation, therefore making the molecular, technological, and anthropocentric gaze explicit.

Another artist that is ambitious to disclose anthropocentric, technological, and molecular forces is Slovenian artist Maja Smrekar. In her work she is concerned with bio-instrumentalization, capitalism, and anthropocentrism. She had titled one of her performances *I hunt nature and culture hunts me* (2014), it is part of the series *K_9 Topology*, a statement that can be interpreted as how is culture fuelling our exploitative relation with nature. The performance consisted of spoken word, and at one point the voice spoke: "We smell death and feel comfortable in the uncanny valley of machined fur listening and knowing how much it will cost."[19] Through this sentence, she confronts the audience with forces of bio-instrumentalization and capitalism. In the performance, Smrekar was laying down on the floor and she was surrounded by hybrid wolf-dogs and wolfs.The artists was almost naked which reinforced a nude vulnerability and empowered the animals that were gazing at her. She thereby rearranged the power-relations between the human and the animal. Her nude state that was observed by curious animals which resembles Jacques Derrida's application of the gaze in *The Animal That Therefore I Am* in which he becomes aware of his nakedness in the presence of the animal. He had written: "I often ask myself, just to see, who I am and who I am (following) at the moment when, caught naked, in silence, by the gaze of an animal."[20] Derrida appears to derive his identity from the exchange of the gaze with the Other, the animal. The performance was accompanied with a monologue that cited texts of artists Joseph Beuys and Oleg Kulik and Smrekar herself. These texts opt for a decentring of the human subject, like Kulik had said: "There are all sorts of other knowledges outside of the center, if only one could create a new united culture of noosphere, an inclusive zoocentrist culture of the senses and of embodied perception."[21]Thus, Smrekar relocates her role as a human supresser

[19] Maja Smrekar,"I hunt nature and culture hunts me." 2017. Accessed on 4 December 2019. https://www.majasmrekar.org/k9-topology-i-hunt-nature-and-culture-hunts-me .
[20] Derrida, 3.
[21] Maja Smrekar, "I Hunt Nature and Culture Hunts Me.", 2014. Accessed on 7 January 2020. https://www.majasmrekar.org/k9-topology-i-hunt-nature-and-culture-hunts-me

and subjects herself to the gazes of the wolfs and wolf-dogs. After the performance, a panel discussion was held in which issues that were raised in the performance about human-wolf-dog relations and animal ethics were discussed.[22] In an interview with *We Make Money, Not Art*, she had said that *K_9 Topology* is about a "broader reflection around humanity, its presumption to have an innate right to rule over other entities and the consequences this self-centeredness is having on the very future of our planet."[23] Smrekar explores what it means to live in a time of climate crisis and capitalistic greed, but also what possibilities there are.[24]

These future potentials are explored in her artwork *ARTE_mis* (2017). With a similar curiosity for new types of transgenic creatures and expanding the traditional limits of the body (both philosophically and physically), like Kac's works, Smrekar looked at the potentials of a co-evolution of humans and other species. In this work, she created a hybrid of a human (herself) and a dog. One of her ova was ennucleated and the nucleus was replaced with a somatic dog cell. The fused cells were frozen, and, by doing that, she froze them in time. Like *Edunia*, it is about the blurring boundaries between humans and other non-human living beings, a curiosity that has arisen from biotechnology. She looks at possibilities of becoming other than human, namely, by proposing the possibility of interspecies communities. She suggests a relocation of the role of humans in relation to other forms of life, and rather than elevating them as supreme or valuing them inferior she paves the way for a post-anthropocentric gaze and a reframing of possibilities. In this context, it is interesting to mention George Gessert's statement that "no evidence exists that one form of life is more exalted than another, or that life is objectively superior to nonliving entities, or even to emptiness. Life, from a rigorously scientific, twenty-first-century perspective, is a phenomenon that, like crystals or solar flares, can appear beautiful or wonderful only when seen through the eyes of a human observer."[25] It shows how

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[22] Ibid.
[23] "K-9 _Topology, on the human/ dog co-evolution. An interview with Maja Smrekar.", *We Make Money Not Art*, 2018. Accessed on 5 December 2019. https://we-make-money-not-art.com/k-9_topology-on-the-human-dog-co-evolution-an-interview-with-maja-smrekar/ .
[24] Maja Smrekar, "ARTE_mis.", 2017. Accessed on 4 December 2019. https://www.majasmrekar.org/k-9-topology-artemis .
[25] Gessert, 42.

everything on earth is mediated, and thus distorted, by the anthropocentric gaze and therefore the question arises how one could liberate oneself from this distortion. Characteristic for the post-anthropocentric gaze would be an ontological, non-human turn resulting in a "multispecies ethnography". Like George Church had written: "The interspecies barrier is falling faster than the Berlin Wall did in 1989."[26] Church wonders whether we will become a new species to what he refers to as *Homo evolutis*, *transhumans*, *posthuman*, *parahuman*, *H+*.[27] Even though Church is curious about different types of being human, his views remain subjected to the anthropocentric gaze and are thus clearly different from the views of Kac and Smrekar. Some theorists have argued that we are already posthuman. Cary Wolfe, for instance, had argued that our status is posthuman since, as written by Eben Kirksey, our "mode of being is dependent on complex entanglements with animals, ecosystems, and technology."[28] The traditional anthropocentric grounds of engaging with other life thus probably will not be sufficient anymore in the future, and therefore new frameworks are necessary. Rosi Braidotti rejects the dualism of classical opposition and moves toward matter-realism, which is a post-structuralist anti-humanism and views life as a "non-essentialists brand of contemporary vitalism and as a complex system."[29] It is a deconstructive shift toward an approach of life beyond the static limitations of "species" and the imparted hierarchy, and, moreover, it "inflicts a blow to any lingering notion of human nature."[30] Rosi Braidotti had proposed a radical answer to the so-called crisis of the Anthropocene: a zoe-egalitarian turn, which would mean a shift from the "anthropocentric exodus" in which humans are seen as the kings of creation, to a "colossal hybridization of species."[31] This turn encourages a more equitable relationship with animals that bypasses the dialectics of otherness.[32]

[26] Church, 381.
[27] Ibid., 137.
[28] Kirksey, 3.
[29] Braidotti, 158.
[30] Ibid., 65.
[31] Ibid.
[32] Ibid., 71.

A Spectacular Cruelty

While working on *The Workhorse Zoo,* Adam Zaretsky accidentally released a multitude of mutant fruit flies. These mutants, called antennapedia, have legs instead of antennae growing out of their heads. After informing his fellow colleagues about the enscaped GMOs (Genetically Modified Organisms), he had learned that GMOs escape their laboratory environment quite often.[33] According to Eben Kirksey, author of the book *The Multispecies Salon* (2014), Zaretsky had used this unintentional release afterwards to question laboratory life and captivity.[34] In his artwork *The Workhorse Zoo* (2002), he let several types of creatures – both laboratory bred and non-laboratory bred – run wild. The creatures were starved and as a result started to eat each other; an artistic choice for Zaretsky to set up his own spectacle that was gazed at by the human beholder. Following Zwijnenberg, this work visually confronts us with issues of bio-engineered animal, namely, by dismantling such a spectacle, Zaretsky posed questions about wildlife, animal cruelty, and inhumanity.[35] In this work, Zaretsky discussed the gap between nature and and culture, and the relation between the human and the non-human, while also critically looking at the conditions of laboratory life.[36] In an even more dramatic way than *The Eight Day*, the powerdifferences between humans an animals become explicit and by exposing animal cruelties the work touches upon voyeurism. *The Workhorse Zoo* is about interactions with other types of life and shows the potential chaos of different animals entering each others environment. His work shows the distinction of order and chaos and illustrates how great chaos can unfold under human control.

For his *The GloFish® Freedom and Reconcilation Project* (2010), Zaretsky bought some genetically engineered fishes at a local pet store, GloFish®, which he released into the Gulf of Mexico. The genetically engineered fish show a perfect instance of bio-commodification (fig. 9). In this project, he brought up ethical questions about

[33] Kirkskey, 197.
[34] Ibid., 197.
[35] Zwijnenberg, "Human dignity", 145.; Adam Zaretsky, "The Workhorse Zoo Art and Bioethics Quiz." Accessed on 14 October 2019. http://emutagen.com/wrkhzoo.html
[36] Zaretsky, "The Workhorse Zoo art and bioethics quiz."

the introduction of GMOs into the general environment and its potential negative ecological consequences. He explores domains of "risk assessment" and animal rights.[37] Some people have expressed fears for the potential ecological treats that genetically engineered creatures can pose when released or escaping into the general environment. In fact, Zaretsky did not release the GloFish® at an arbitirary place; he released them in the Gulf of Mexico. The Gulf of Mexico was victim of the largest oil spill disaster in our history which occurred in 2010; it was an extreme anthropogenic environmental catastrophy. Of course, the oil disaster was not an unfortunate exception to human-induced climate pollution, and still, there are people proclaiming fears about pollution by transgenic creatures, that are, as paradoxical as it is, created by human hands. In the spirit of Artaud's *Theatre of Cruelty*, Zaretsky wonders if the creation of a toxic Gulf of Mexico can be considered as art; a statement that shares similarity to Karl Stockhausen's controversial remark that 9/11 could be considered as the greatest work of art ever.[38] Is immense human ecological destruction a sort of *art brut*?[39] The responses he aims to evoke resemble the intention of shock art artists. Robert Rawdon Wilson, for instance, had written about modern shock art that it "has been a way of disturbing smug, complacent and hypocritical audiences either by showing them what they find offensive (but the performers do not) or by representing their own bourgeois assumptions to them in a display of physical alternatives, scenes strikingly conceived to embody the very opposity of received values or the dominating ideology of the socio-cultural elite."[40] Today, the horrors of the annihilating fires in Australia (fig. 10), potentially due to global warming, and the resulting global media spectacle could also be pointed as an event of chaos, horror, and destruction that fits the aesthetical appreciation of Stockhausen. In Stockhausen's reasoning, such a performance of horror is a spiritual "Sprung aus der Sicherkeit," a jump out of everyday life, leading to sensations of

[37] Zaretsky, "Provocation", 1.
[38] Zaretsky, "Provocation", 3.
[39] Zaretsky, "Provocation", 3.
[40] Wilson, 27.

boundless chaos that could totally destruct the regularity of everyday life.[41] Aestheticizing such a violent act shares an avant-garde spirit of destructing the existing social, political, and cultural systems. Is is then interesting to dive into Kant's assertion of the sublime that is "in its chaos, or in its wildest and most irregular disorder and desolation provided it gives of magnitude and power … chiefly excites the idea of the sublime."[42] Apocalyptic photographs of the dramatic bushfires in Australia have gained massive media attention leaving many people frozen with feelings of powerlessness. These representations serve as a visual articulation of the horrors of climate out of control inflicting feelings of guilt and mourning on the beholder, as previously discussed. On the one side, Zaretsky's work raises awareness of how the media navigates our opinions and disrupts these views to make one more critically aware of the spectacles organized by the media. On the other hand, Zaretsky exposes ambiguities of the contemporary world and the following questions can be derived about the status and role of the creatures: Does laboratory "new wild" creatures pose an ecological threat when released into the "natural" wild? Are they worthy of running wild like non-laboratory creatures? In other words, is the "new wild" worthy of the natural wild? Zaretsky had written that "transgenic life should have a chance to run wild for its own sake, not for the sake of profit."[43] Eben Kirkskey had reflected on the performance that "Zaretsky posed a critique of laissez-faire approaches to bio-capitalism and a libertarian manifesto for modified organisms. Moreover, he highlighted tensions between environmental risks and 'mutant animal rights'."[44] His commentary on anthropocentric, capitalist actions becomes even clearer, as Zaretsky writes: "Humans have forced added value upon the GloFish® by jamming the flow of hereditary mutation upon them in accordance with

[41] Osborne, W. "Documentation of Stockhausen's comments re: 9/11." 2001. Accessed on 28 December 2019. http://www.osborne-conant.org/documentation_stockhausen.htm
[42] Translated by Ernst Behler (p.203). Original quote: "Aber in dem, was wir an ihr erhaben zu nennen pflegen, ist sogar nichts, was auf besondere objektive Prinzipien und diesen gemäße Formen der Natur führte, daß diese vielmehr in ihrem Chaos oder in ihrer wildesten regellosesten Unordnung und Verwüstung, wenn sich nur Größe und Macht blicken läßt, die Ideen des Erhabenen am meisten erregt." In: Kant, *Kritik der Urteilskraft*, 167.
[43] Zaretsky, "Provocation", 2.
[44] Kirkskey, 198.

anthropocentric desires and other equally sick pleasures."[45] This shows a clear rejection of bio-objectification, or commodification of bio-engineered life forms, which is, for Braidotti, at least, a result of opportunistic capitalism.[46] His work is thus an instant critique on the technological gaze, in terms that this gaze degrades everything on earth to usable, manipulable and consequentially merchantable matter. To clarify, Hannah Landecker had identified in *Culturing life* (2007) that the contemporary cell is an important economic entity.[47] The techno-molecular gaze therefore estimates the body – both human and non-human – in a economic way. Everything on earth, from cells to entire ecosystems are figured as resources and potentials for economic profit. *The GloFish® Freedom and Reconcilation Project* is thus a tangible envisioning of the complicated relationship between the technological gaze, the new wild, and non-modern ideas of nature and preservation. Zaretsky has drawn attention to responses to climate polution, genetically engineered creatures, and a total spectacular chaos to the extreme in his artworks, thereby more explicitly revealing underlying fears and ambiguities.

[45] Zaretsky, "Provocation", 2.
[46] Braidotti, 72.
[47] Landecker, 2.

Conclusion

This researched aimed to disclose sociocultural forces that are at the basis of de-extinction science in order to expand its current epistemology. The first part of chapter one provided contextual insights on the practice of de-extinction science. From the second part of chapter one, the study aimed to transcend the theoretical discourse and hermeneutically analyse the matters. Thereby, the study provided new insights that showed an entanglement between science and culture and how much of scientific desires and ambitions can be derived from culture and the other way around. The theoretical application of the gaze was used as a hermeneutical tool to expand the epistemological system of de-extinction science.

The sociocultural trends within the theoretical discourse touch upon societal values of endangerment sensibility and narratives of the world in demise (in all its manifestations). Influenced by the de-extinctionist gaze, one is confronted with these narratives and seeks for alternatives. De-extinctionist scientists obviously romanticize the idea of past times and lost creatures, as Church, for instance, had written that the reintroduction of the woolly mammoth in the Pleistocene park "would be the closest thing to time travel: a return of the flora and fauna of the Pleistocene Epoch, a sort of latter-day Siberian Eden."[1] His desire is a nostalgic re-imagination of a distant past. As an act of resistance to the tragedy of loss, de-extinction scientists wish to grasp and control former times. The de-extinctionists gaze thus seeks for alternatives to the story of demise, of uncontrollable chaos and horror, of mourning and guilt, and of feelings of powerlessness. It is a refusal of acceptance of the undesirable faith of trancience, of animal losses and of climate destruction, resulting in a tenacity of lost times, increasing control, and an utopianized view of how ecosystems could be controlled by the hands of humans.

[1] Church, 228.

Therefore, bringing back the woolly mammoth would offer a sense of stability and security, a desire that is perhaps resulting from the instability from the rapidly changing world and the shifting landscapes of the present. The woolly mammoth, a familiar creature, would offer some stranglehold in a time that is not understood by the de-extinction scientists themselves. The de-extinctionists find themselves in a forcefield of order and chaos, a tension of fears of uncontrollable chaos due to the global climate crisis and in an increase of control to counteract the loss the climate crisis brings.

The hermeneutical tool of the gaze had shown that there are three dominant types of gazes are present within the framework of the de-extinctionist gaze: the molecular gaze, the technological gaze, and the anthropocentric gaze. The way these gazes are proliferated in the language of de-extinction scientist distorts how reality is perceived and increases and celebrates human-animal powerdifferences and technological ingenuity. A metaphysical, technological idea is presented as a natural being, in other words, in the disguise of a woolly mammoth. This shows exactly the distortion of the de-extinctionist gaze that troubles society as a whole: namely, it presents a static and oversimplified view of the world in which there would still exist a strict dichotomy between nature and culture. The resurrected creature's technological ontology is overshadowed by the display of a romanticized, sublime creature situated in an icy natural landscape. The mere nostalgic and sometimes naïve de-extinctionist gaze casts a shadow on how science is altering, theoretically and physically, ways of being of human and nonhuman life. Thanks to the extensive available material of the woolly mammoth that had contributed to the process of iconization and objectification of the creature, the precession of the simulacrum has gained an autopoietic force that strives for a corporealization of the simulacrum. The de-extinctionist gaze deceits since it cheers for the simulacrum.

Zaretsky has acted as an evil double that mirrors the optimist sublime of the de-extinction scientist in a dark counterimage of cruelty and uncontralleable chaos. He thereby breaks with the obscuring de-extinctionist gaze. For de-extinction scientists the ultimate goal would be to create an animal that resembles the extinct "pure" one it copies as much as possible, genetically and physically, thus, to build a

"mammophant" in the disguise of a mammoth. Kac and Smrekar explicitly propose new types of offspring and wish to relocate the human position on earth. Moreover, they have disclosed the distorting abilities of the gaze by redirecting it. They explicitly reveal the characteristics of today's anthropocentrically and technologically mediated world, make the impacts of the post-evolutionary era visible and tangible, and opt for an ontological turn. The discussed artists brought nuances to the strict dichotomies and have revealed the way reality becomes distorted by gazes by either drawing it to the extreme or by rearranging the gaze. They have proposed new alterities of being that decentre the human subject and empower the nonhuman subject. The artists work toward a post-anthropocentric turn that discloses with the distortion of the anthropocentric, technological, and molecular gaze. It would break with the anthropocentric supremacy while acknowledging the technicity of being. They seem to be concerned with Rosi Braidotti's question: "What comes after the anthropocentric subject?"[2] Re-evaluating the human position from a post-anthropocentric view, deconstructs human's self-imposed supremacy, but at the same time brings up an ontological crisis of what our role on earth should be; how could we actually live post-anthropocentrically?

[2] Braidotti, 58.

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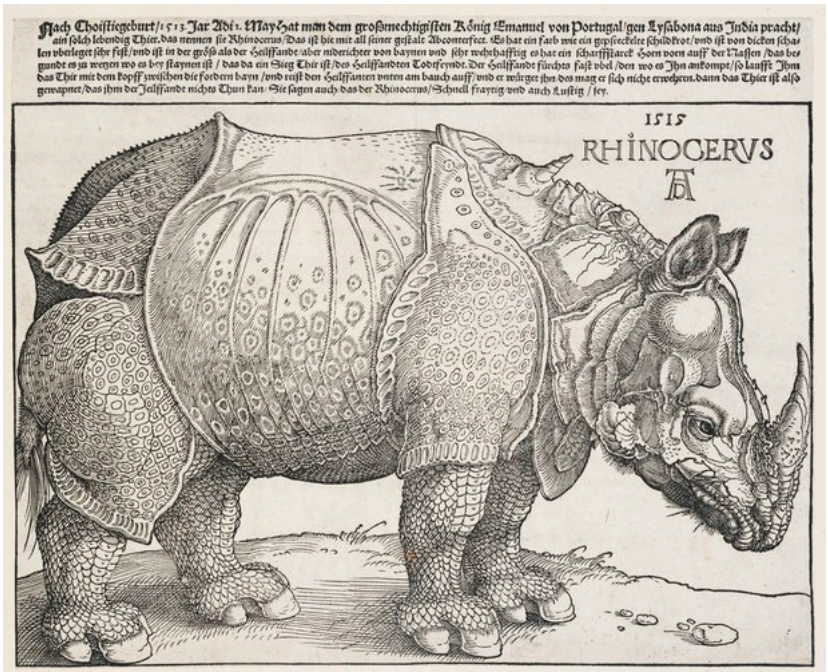

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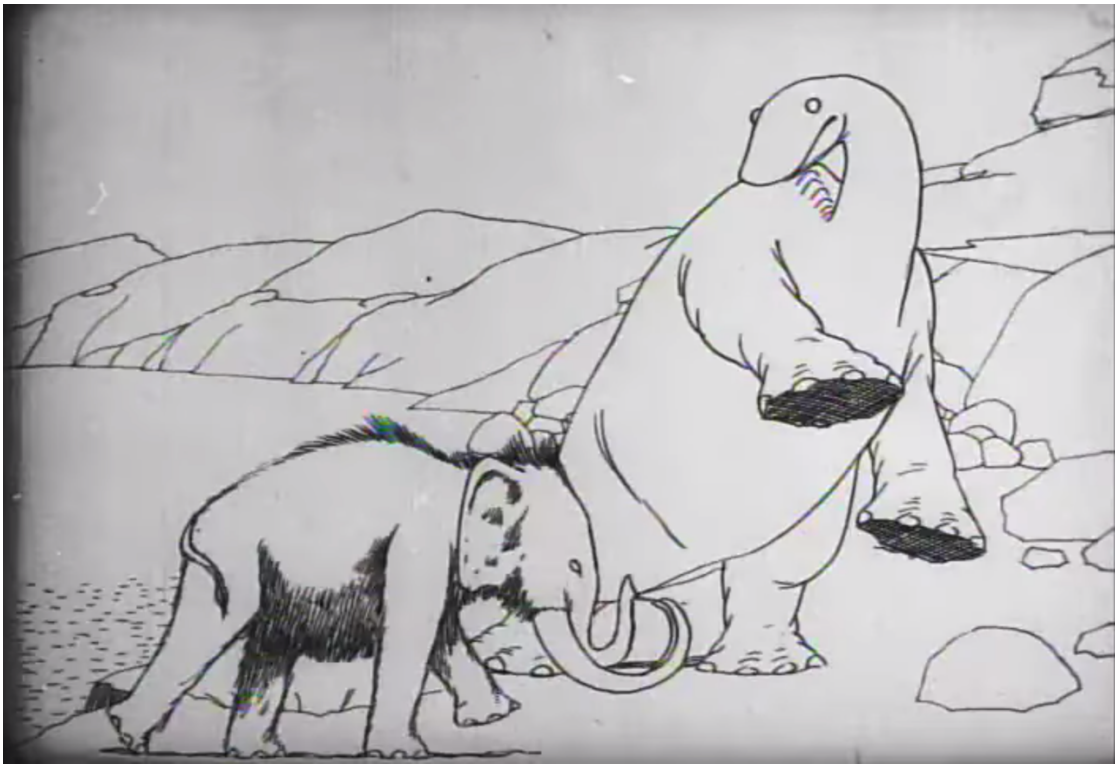

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Fig. 8, Eduardo Kac, *The Eight Day*, October 25, 2001, to November 2, 2001, transgenic artwork (Arizona State University). Source: Eduardo Kac.

Fig. 9, screenshot from GloFish® Webshop. Source: GloFish®

Fig. 10, Matthew Abbot, *A kangaroo rushes past a burning house in Lake Conjola*, 2019, photograph. Source: New York Times.

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