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THE GHOST OF THE LAKE CITY
Gaming and the crisis of survival in Mexico City

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Declaração de autoria

Eu, Andrés Azzolina Webster, declaro que a presente dissertação / trabalho de projeto de mestrado intitulada “The Ghost of the Lake-City”, é o resultado da minha investigação pessoal e independente. O conteúdo é original e todas as fontes consultadas estão devidamente mencionadas na bibliografia ou outras listagens de fontes documentais, tal como todas as citações diretas ou indiretas têm devida indicação ao longo do trabalho segundo as normas académicas.

O Candidato

(Andrés Azzolina)

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Resumo

“The Ghost of the Lake City” é um projeto artístico teórico-prático. Por um lado, o trabalho consiste na produção de um videogame sobre a crise de sobrevivência no Vale do México. Por outro lado, o projeto é acompanhado por uma investigação científica sobre a cosmotecnia do Vale do México e as perspectivas de um desenvolvimento tecnológico resiliente na região.

O videogame explora as condições culturais e tecnológicas que definiram diferentes momentos históricos na região e cenários hipotéticos em diferentes direções para o futuro. Estas cenas serão apresentadas através de "mini-jogos". O objetivo do jogador será o de juntar as peças e dar sentido a uma situação complexa.

A investigação teórica dará uma visão abrangente do que entendemos como uma "crise de sobrevivência": a relação histórica da cidade com os lagos sobre os quais foi construída, as atuais dificuldades de abastecimento de água, as condições geográficas e os desafios das alterações climáticas.

Palavras-Chave:

Cosmotecnia, Videogames, Ficção Especulativa

Resumo desenvolvido

Esta investigação é o marco teórico para a criação de um videogame intitulado *La ciudad lago* (A Cidade do Lago). Cada capítulo aborda diferentes elementos que são importantes para o desenvolvimento conceptual deste projeto. Algumas ideias são desenvolvidas de um capítulo para o outro, no entanto, a maioria dos capítulos têm abordagens diferentes e provêm de disciplinas diferentes. Isto é muito inspirado por uma perspectiva não-linear.

O primeiro capítulo, *Ghost Communication*, explora a interação e relação entre os fantasmas e os meios de comunicação. Tenta estabelecer um contexto tecnológico atual em que os meios e a informação têm uma qualidade espectral. A informação *medeia* literalmente a nossa experiência subjectiva.

Esta ideia vem principalmente da análise de José Luis Brea sobre o papel das imagens na cultura contemporânea encontrada na sua obra *Las tres eras de la imagen*. Aqui ele traça o caminho das imagens desde o material ao filme, e depois ao digital, e nota a forma como as imagens onipresentes vêm de mãos dadas com a economia da informação. As imagens servem então de dimensão espectral entre o capital e o desejo. Além disso, à medida que a imagem digital perde a sua materialidade, torna-se indistinguível da própria informação, trazendo o espectral mais para o primeiro plano.

No entanto, o excesso de significado que excede a comunicação simbólica em contraste com as limitações da nossa experiência subjetiva, torna-se uma janela para uma dimensão não humana, mais do que real, que nos assombra e persegue. Os aspectos estéticos e sensoriais das imagens excedem as limitações da linguagem, e através desta qualidade espectral somos capazes de olhar para as possibilidades para além da nossa atual disposição sistémica.

Esta possibilidade surge no contexto de uma crise de sobrevivência, devido às consequências do projecto de Modernidade. A Modernidade, como será discutido no próximo capítulo, coloca o sujeito masculino branco como o centro de um mundo que está engolfado pela sua racionalidade e, portanto, convertido em recursos para um projeto colonial que precisa da exploração da natureza e outras populações para se manter sempre em crescimento, e em constante expansão.

Finalmente, *Ghost Communication* coloca a questão de como abrir o canal para enviar e receber informação através de um tempo não linear. Isto significa uma intenção de evitar ou trabalhar em torno da ideia de progresso e crescimento da Modernidade, e serve como a questão inspiradora que será explorada através da ficção científica no videogame.

The Solarpunk Perspective visa estabelecer o raciocínio por detrás da escolha do videogame como meio de comunicação. Aqui compreendo o videogame no contexto da Multimédia, Intermédia e Arte Transmídia. Estas três categorias referem-se, no meu entender, a diferentes descrições históricas da desmaterialização da obra de arte. Muito de acordo com a dimensão espectral das imagens, o que acontece nestas categorias, e particularmente na Arte Transmídia, é que as fronteiras entre ficção e realidade se tornam confusas à medida que as narrativas são exploradas não só através de vários meios simultaneamente, mas também através de processos dentro e fora do espaço ficcional.

Depois, mergulho no género de ciência ficção Solarpunk, que especula com a possibilidade de criar uma tecnologia sustentável, e ligo-o ao conceito de “contra-dispositivo” para estabelecer uma dimensão política para este trabalho, uma vez que os videogames podem ser utilizados para disseminar conteúdos críticos nos principais meios de comunicação social. Inspirado no conceito do dispositivo do Michel Foucault, no qual um objecto cultural trabalha como agente para reforçar formas ideológicas de controlo, aqui o pensamento crítico através dos videogames revela um potencial para uma operação inversa, uma vez que proporcionam uma dimensão interativa na qual a acção narrativa e discursiva é executada pelo jogador. No caso do Solarpunk, a dimensão interativa do jogo, no contexto dos processos Transmídia, que estão simultaneamente dentro e fora da ficção, acabam por produzir uma acção narrativa que é ao mesmo tempo simbólica-metafórica, mas em alguma medida também participam na criação daquele futuro sustentável.

O seguinte capítulo, *The Ghost of the Lake* é simultaneamente um mergulho profundo e uma revisão sintética da história do Vale do México através de uma perspectiva tecnológica. Aqui utilizo o conceito de cosmotecnia de Yuk Hui para identificar as diferentes perspectivas ideológicas que têm mediado a tecnologia na região ao longo dos séculos.

Tomo a domesticação do milho, que levou à criação de assentamentos agrícolas, e eventualmente à formação de cidades e impérios, como ponto de partida e espinha dorsal do complexo tecnológico na Mesoamérica, a maior região cultural da qual o Vale do México faz parte.

O milho foi domesticado através de milénios, utilizando a tradição oral como dispositivo de transmissão de conhecimento. Isto entrelaça o técnico com o espiritual, uma vez que muito do entendimento da agricultura e da natureza era indivisível da mitologia e de uma cosmovisão particular.

A domesticação do milho também proporciona uma janela para um complexo tecnológico que explica como a cidade do México-Tenochtitlan, que é agora a Cidade do México, foi construída sobre um lago e tornou-se uma capital imperial ao longo dos séculos anteriores à invasão espanhola e Vice-Reino. Isto foi possível através das práticas da Milpa e Chinampa. Milpa é um sistema de cultivo em que a planta alta e forte de milho serve de apoio à planta pequena, trepadeira e fixadora de azoto do feijão. Depois, abóboras com folhas grandes são plantadas entre os milhos, tirando partido da luz solar restante disponível, e fornecendo proteção ao sistema de cultivo contra pragas.

Este sistema de cultivo estava presente na maior parte da Mesoamérica. Mas no México-Tenochtitlan, Milpas foram plantadas em Chinampas, parcelas artificiais de terra que foram construídas no topo do lago, criando ilhas agrícolas que foram então organizadas para formar uma grande cidade capaz de coexistir com o seu ambiente natural, sendo uma das maiores e mais povoadas cidades do seu tempo.

Depois, o choque desta cosmovisão com o projecto de Modernidade trazido pelos colonizadores, transformou profundamente o território. A Modernidade, como já foi referido, estabelece a subjetividade individual do homem branco europeu como o universal, e se vale da violência e exploração para o desenvolvimento duma narrativa de expansão e progresso linear numa temporalidade unidirecional. No decurso dos séculos seguintes, a cosmovisão da região deslocou-se para uma subjetividade ocidental-moderna em que a terra se tornou território e recursos, e foi racionalizada para extração. Embora alguns elementos da cosmovisão anterior sobrevivam, principalmente através do sincretismo, verificamos que a maioria das acções seguintes do Vice-Reino e depois do Estado

mexicano, envolveram a exploração da terra e das comunidades indígenas como o seu objectivo central.

Podemos ver isto claramente na forma como a Cidade do México teve de drenar os seus lagos e encurralar os seus rios em betão durante o século XX. Aquilo que outrora foi uma cidade relativamente sustentável construída sobre um lago, tem agora de importar 30% dos seus recursos hídricos de uma rede de sistemas de extracção que se estende por mais de 300 km, privando as comunidades circundantes do acesso à água.

Depois, o capítulo *The Fungi Approach* é inspirado pela teoria de Gaia e da evolução simbiótica de Lynn Margulis, e tenta especular sobre como uma compreensão da vida que não estiver centrada em torno da excepcionalidade humana poderia conduzir a um resultado tecnológico diferente e poderia mesmo inspirar uma nova cosmotécnica.

A teoria de Gaia, desenvolvida por Lynn Margulis e James Lovelock, compreende a Terra como uma rede complexa que entrelaça condições geológicas com organismos vivos. Lovelock percebeu que a atmosfera da Terra não é uma condição a-priori dada, mas foi tornada possível através da ação em grande escala de bactérias. Então, Margulis descobriu que a maioria das formas de vida complexas replicam simples comportamentos bacterianos. Desta forma, o conceito de indivíduos é desafiado, pois o que consideramos uma única criatura, pode também ser um arranjo de comunidades bacterianas.

Margulis também reconhece as relações simbióticas, que vão desde parasitas a mutualistas com um grande intermediário, como o motor motor da evolução. Isto contrasta com as teorias darwinianas e neodarwinianas que dão prioridade à competição como o principal motor da natureza.

Levamos então isto em conta para imaginar como podem estas teorias aplicar-se a uma fragmentação da subjetividade individualista da Modernidade e, portanto, outra cosmotécnica. Poderá uma compreensão diferente da natureza, da vida e da evolução, trazer novas tecnologias que nos possam ajudar a viver melhor na Terra?

Finalmente, *The Game's Path* descreve brevemente o processo de desenvolvimento do videojogo ao longo do meu tempo na Faculdade de Belas-Artes da Universidade de Lisboa.

Abstract

"The Ghost of the Lake-City" is a theoretical-practical art project. On the one hand, the work consists of the production of a video game about the crisis of survival in the Valley of Mexico. On the other hand, the project is accompanied by research into the cosmotechnics of the Valley of Mexico and the prospects for resilient technological development in the region.

The video game explores the cultural and technological conditions that have defined different historical moments in the region and hypothetical scenarios in different directions for the future. These scenes will be presented through "mini-games". The player's goal will be to put the pieces together and make sense of a complex situation.

The theoretical research will give a comprehensive overview of what we understand as a "crisis of survival": the historical relationship of the city with the lakes on which it was built, the current difficulties of water supply, the geographical conditions and the challenges of climate change.

Keywords:

Cosmotechnics, Video Games, Speculative Fiction

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Foreword

I am very happy to present this work, which is the product of a two year process. Starting during the COVID-19 lockdown, having just arrived in a new city, it was definitely a challenging experience, so it feels very special to see it come to fruition.

Studying this Master would not have been possible without El Fondo para el Desarrollo de Recursos Humanos (FIDERH) of the Banco de México, my family's support, and additional part-time and freelance jobs that I did on the side, but which nurtured my process. I will mention them since I feel they were all, in a way inspiring to keep going during this period.

All through 2021 I was a Customer Care Agent at a company named 5CA. I felt it was a very performative job and even made my Transmedia Lab project about it, where I made some paintings, videos and music based on being an *Agent*.

Thanks to professor Dr. Patricia Gouveia I was put in touch with both professors Dr. Margarida Abreu from Instituto de Geografia e Ordenamento Técnico (IGOT) and Engineer Dr. Rui Prada from Instituto Superior Técnico (IST). For IGOT we produced a ten minute documentary about the work of the National Support Network for Victims of Domestic Violence (Rede Nacional de Apoio às Vítimas de Violência Doméstica, RNAVVD), in collaboration with my colleagues Renata Torralba and Felipe Salazar.

For IST we designed a public sculpture for a scientific project, in collaboration with colleagues Mariana Carvalho and Felipe Salazar, and we also did creative consulting for the development of a lab that aimed to bring STEM knowledge to the general public.

Finally, during the last few months of this process, I have been working as a Multimedia Officer for the Instituto de Medicina Molecular (IMM), located at the Medicine Faculty of the University of Lisbon. During this process I have been producing content for different aspects of this Institute, such as scientific events, paper publishing, and internal communication.

All these experiences have provided my process with very different, relevant and sometimes confronting perspectives that have definitely expanded my vision and enriched my experience.

Obviously, it should be noted that the Master's degree itself was quite a nurturing experience, and I want to thank my professors for sharing their perspectives. I have to say that, coming from an audiovisual production professional experience, the core value I learned during this time was a way of structuring artistic projects and designing processes that could help me achieve long-term goals with slow and steady constant production. It was also quite enriching to see my colleague's processes, and witness the way different artists develop their thought and practice through time.

Overall, I believe these last couple of years have helped me grow as an artist/producer and person. My main goal entering the Master's degree was to develop new skills, try working on media that were unknown to me, network and meet fellow artists, and have a process that could help my work mature. I feel like these goals were definitely accomplished during these last two years, and I feel very grateful for the experience.

Introduction

This research is a frame of reference for the creation of a videogame titled *La ciudad lago* (*The Lake City*). Each chapter will address different elements that are important for the conceptual development of this project. Some ideas will be developed further from one chapter to the next, however, most chapters have different approaches and come from different disciplines. This is very much inspired, as the text will tell, by a nonlinear perspective. Readers should then treat it as a process of adding contingent elements that would create a context, rather than a single idea being unfolded through the chapters.

The first chapter, *Ghost Communication*, explores the interaction and relationship between ghosts and media. It tries to establish a present technological context in which media and information have a spectral quality. Information literally *mediates* our subjective experience. However, the excess of meaning that exceeds symbolic communication in contrast with the limitations of our subjective experience, becomes a window into a non-human, more-than-real dimension that *haunts* us.

The Solarpunk Perspective is aimed towards establishing the reasoning behind choosing Gaming as a medium. Here I understand Gaming in the context of Multimedia, Intermedia and Transmedia art. Then, I dive into the Solarpunk genre and link it with the concept of *counterapparatus* to establish a political dimension for this work, as videogames can be used to disseminate critical content in mainstream media.

The Ghost of the Lake is both a deep dive and a synthetic review of the history of the Valley of Mexico through a technological perspective. Here I use Yuk Hui's concept of *cosmotechinics* to identify the different ideological perspectives that have mediated technology in the region throughout the centuries.

The Fungi Approach is inspired by Lynn Margulis' theory of symbiosis, and tries to speculate on how an understanding of life and evolution that would not be centered around human exceptionalism could lead to a different technological outcome and could even inspire a new cosmotechinics.

Finally, *The Game's Path* briefly describes the process of the development of the videogame throughout my time at Faculdade de Belas-Artes da Universidade de Lisboa.

1. Chapter I

Ghost Communication: *Media and human extinction*.¹

Ghost Communication is a concept developed during the first two semesters of the Multimedia Art Master's degree at the Lisbon University Fine Arts Faculty [Faculdade de Belas-Artes da Universidade de Lisboa, FBAUL]. It aims to produce a framework to understand our current relationship with images, in the context of human-induced extinction.

Ghosts as an object of study can often be very elusive. Their key characteristic is partial, or even non-presence. They are always and/or, both/and. It is in their nature to go against linear thought. They have been around since the beginning of culture, but have always contained an experience that goes beyond human understanding. This form of being as otherness is in fact very relevant nowadays to understand images and technologies.

1.1 Animism

Animism is the notion of a cosmos in which theoretically everything is alive and communicating. On the *Posthuman Glossary*'s entry on *Animism*, Rosi Braidotti and Maria Hlavajova bring up the following question:

“Animism, derived from the Latin *anima*, inextricably links the questions of communicability and media with long-embattled questions over the soul and its relation to materiality. Is the soul an enclosed property of human beings alone or a realm of mediality, the condition of possibility to be-in-a-medium-of-communication?”²

Ghosts can be traced back to the origins of visual representation. It is a common interpretation for prehistoric cave paintings that images served a ritual or magical purpose. Gombrich claims that cave paintings representing animals helped hunters obtain power over their prey, as if images were connected in some way to the soul.³

¹ An early version of this text was presented at the 2021 Spring Seminar of Universidade Católica Portuguesa (UCP) Porto.

² Braidotti, R., & Hlavajova, M. (2020). *Posthuman Glossary* (1st ed.). Bloomsbury Academic, London. p. 39.

³ Gombrich, E. H. (1995). *Historia del Arte* (15th ed.). Editorial Diana, Mexico City.

Contemporary semiotics would explain this magical relationship with the image as an example of the bilateral sign: a signifier that is unable to contain the wholeness of the signified. In this sense, the image attempts to capture something from the animal, in the example of the cave, that is beyond its physical form. This attempt, the performance of the symbol, is revealing a fully developed cosmotechnic. As Braidotti and Hlavajova continue on their entry on *Animism*:

“‘Spirits’ appear to categorically escape the objectification methods of Western epistemology. Within their respective systems of knowledge and disciplines, most authors are incapable of acknowledging their ontological status as ‘real’, and hence transpose them into other ontological designations - as phenomena of psychology, or even art. To talk about animism today still means to approach the limit of the matrix of Western thought. With this concept, modernity sought to differentiate itself from its other with a gesture of inclusive exclusion, assigning such otherness a place within its own matrix. The otherness of animism is simultaneously a horizon that circumscribes and encircles modernity and its civilizational discourse, from both the past and the future.”⁴

1.2 Technology and ghosts

According to Yuk Hui, cosmotechnics can be understood as the pairing of cosmology and technical devices that emerge from turning the environment into a milieu, and eventually rationalizing it⁵. In the case of the cave paintings, the cave itself is no longer a “natural” location but is now a “place”, which is a technical device. However, the ritual aspect of the symbolic performance reveals a central device that fully rounds up the cosmotechnic aspect of the cave painting: the idea of a soul.

⁴ Braidotti, R., & Hlavajova, M. (2020). *Posthuman Glossary* (1st ed.). Bloomsbury Academic, London. p. 40.

⁵ Hui, Y. (2020). *Fragmentar El Futuro: Ensayos Sobre Tecnodiversidad*. (T. Lima, Trans.) (1st ed.). Caja Negra, Buenos Aires.

We can think of the emergence of the idea of a soul as a technological event crucial for the development of culture. It implies an understanding of the existence of otherness and a dimension beyond. It is through the soul that a divide is created between experience and meaning, and therefore language and information are produced. In this sense symbols emerge not only from human will and intention, but also very much from their environment manifesting into the human experience.

However, an important element of cosmotechnics, as it is very much dependent on location, is the idea of a multiplicity of technologies⁶. Sure, the soul may be a constant technology in the emergence of language and culture, but the relationship that this produces with the environment could vary from milieu to milieu. To note this is very important as it will help us understand modernity as a technological framework that could be eventually unraveled, since it is not all encompassing, nor it is determining the way technologies could develop further.

Considering the example of the cave paintings, ghosts may not necessarily be the actual souls of the animals represented, but a phenomena of the performance of symbols. In this excess of experience that the signifier is unable to contain from the signified, there is a free-flowing element of ambiguity that “haunts” the process of representation. Ghosts are not necessarily souls, they have more to do with the fluidity with which they move beyond our grasp.

In this sense, ghosts are not necessarily unified entities, but an excess of meaning that circles through the earth due to the reverberation of symbolic performance. As words fail to contain the wholeness of experience, there is something that remains left out of the range of language, but has been summoned by the desire of communication. Ghosts are the echo of intentions.

This could explain why ghosts are usually believed to carry a message.⁷ Either revenge from actions in the past, or omens from the future, the ambiguity they produce with time is also a key element inherent to their nature. Ghosts can also be understood as glimpses of further dimensions of time that challenge our linear perception.

⁶ *Ibid.*

⁷ Han, B.-C. (2019). *Good Entertainment* (1st ed.). MIT Press, Cambridge.

José Luis Brea in his book *The three eras of the image* [*Las tres eras de la imagen* (Spanish Edition)] describes the way the development of images from material-based, to film, to digital, has shifted cosmologies over time, and therefore subjectivities, politics, etcetera. It is very interesting the way he describes the current state of digital images as spectres due to their ubiquity and infinite reproducibility potential.⁸

Brea sees the digital image as a collapse of the traditional representational model. We are no longer producing reality, or attempting to do so, through the performance of symbols. Instead data is a matrix of interrelations that produces subjects to play into its quantified reality. There is no longer an environment beyond information, as this interrelation intends to become the world itself.

1.3 Spectral modernity

However, the development of this technological state of things is very much related to modern thought, and its imperialist political project. The modern tradition of thought established a linear perception of time and history as a progressive evolution towards a “better” future through conquering the environment rationally.⁹

The Cartesian plane which champions rational-mathematical awareness as the basis of subjectivity is a foundational technology for the datafication of the world. This aims to establish the division between experience and meaning as the objective foundation of a single, monolithic truth that alienates humanity from its environment, and eventually turns the world into a “place” and nature into “resources”. In this sense, the world becomes a map, taking for granted its availability for exploitation, regardless of whatever otherness may be sharing the same environment. This inherently creates a totalitarian hierarchy of information over experience.

The political development of this technological approach has exploitation of otherness at its core. Ghosts can help us understand here how data, which is unable to capture the wholeness of experience, will always be biased towards an arbitrary intention of meaning.

⁸ Brea, J. L.. (2010). *Las Tres eras de la Imagen: Imagen-materia, film, e-image* (1st ed.). Akal, Tres Cantos.

⁹ Mignolo, W. D. (1998). *The darker side of the Renaissance* Univ. of Michigan Press, Michigan.

However, it is through this monolithic, apparently rational truth that the producers of data find a justification towards their expansion through the use of violence upon anything, being nature or cultures, that fall below their rational hierarchy.

Modern, eurocentric and patriarchal subjectivity is projected towards the world as a taken for granted universality. This is also the case with modern science. In her essay “The Ghost In/On The Machine: Magic, Technology and the ‘Modest Witness’”, Anne Cranny-Francis tells the story of how sharing a ghost encounter with a female scientist led her to understand the way the figure of the allegedly “Modest Witness”, which is an apparently unbiased, impartial subject extracted from the natural phenomena it studies, is in fact a form of discrimination towards what can be validated as “truly scientific” and what can be disregarded as “superstition”, “pseudoscience”, etcetera.¹⁰

We can understand through her research that there is nothing “Modest” about this witness. Instead, science can be an ideological device that works towards the further datafication of the world biased towards this imperialist subject.

Donna Haraway in her famous “Cyborg’s Manifesto” proposes hybridation as a form of resistance. In the center of hybridation relies awareness towards otherness. We cannot escape the technological panopticon that tries to impose a totalitarian data-regime towards our experience. We are forced to take part in this machine. However, we can reclaim our agency starting with our own bodies. She sees becoming a cyborg, part-human, part-animal, part-machine, as a way of unraveling the single narrative into a multiplicity through kinship and caring of others. In this sense empathy and radical tenderness can disrupt the totalitarian “objective truth”¹¹.

In this sense ghosts as fluid entities challenge our notion of subjectivity. Ghosts disrupt a data-driven world as glimpses of non-linear time, of non-rational knowledge, of non-human existence, of non-place environments. It is in their spectral and ambiguous nature that we can envision a form of subjectivity with otherness. One that acknowledges death up-front and creates accountability for violence.

¹⁰ Cranny-Francis, A. (2006) “The Ghost in/on the Machine: magic, technology and the ‘modest witness’” in *Technologies of Magic: A cultural study of ghosts, machines and the uncanny*. J. Potts & E. Scheer. Sydney: Power Publications, pp. 64-77.

¹¹ Haraway, D. J. (1990). *Simians, Cyborgs, and women: The reinvention of nature*(1st ed.). Routledge, London.

So what do contemporary images have to do with ghosts?

As ghosts exceed our symbolic intentions for meaning, contemporary ubiquitous images have created a spectral membrane that mediates our worldview. In the so-called “augmented reality” there is always more than meets the eye, quite literally. And while this in a neoliberal sense means that your every thought and action can be quantified and traced towards an attention economy, it is through hybridization and acknowledging of the presence of otherness, that we can find a dimension “even beyond” datafication.

It is through the excess of experience over meaning, in the realm beyond reality, that we can acknowledge our current cosmotech as finite and not a monolithic truth. It is through the presence of ghosts that we are faced up-front with our own extinction, at all times. Can we escape this fate in the long-run? Most likely not, but we can dream of a different end of the world.

For this, however, we should really question the way in which monolithic truth has co-opted technology towards a destructive agenda. The development of information technologies has a very promising potential for the empowerment of civil society or the autonomy of communities, but the tendency seems to point towards the opposite, what some authors call *Techno-Feudalism*.¹²

Why is that, with artificial intelligence almost reaching the point of abolishing work,¹³ we are selling water reserves in the stock market,¹⁴ on the expense of major droughts in the Global South?¹⁵

¹² Varoufakis, Y. (2021, July 8). *Techno-feudalism is taking over*. Project Syndicate. Retrieved August 25, 2022, from <https://www.project-syndicate.org/commentary/techno-feudalism-replacing-market-capitalism-by-yanis-varoufakis-2021-06>

¹³ Mason, P. (2017). *Postcapitalism: A Guide to Our Future*. Farrar, Straus and Giroux, New York.

¹⁴ Preston, C. (2022, April 14). *4 water stocks and etfs to consider as the global water crisis worsens*. Cabot Wealth Network. Retrieved August 25, 2022, from <https://cabotwealth.com/daily/dividend-stocks/water-stocks-etfs-global-water-crisis/>

¹⁵ Soto, J. (2021, May 14). *¿Por qué en México hay escasez de agua?* Greenpeace México. Retrieved August 25, 2022, from <https://www.greenpeace.org/mexico/blog/10163/por-que-en-mexico-hay-escasez-de-agua/>

Why do we envision technological progress as flying cars or space colonization, but not as the abolition of money and redistribution of wealth, obsolescence of fossil fuels, a truly open source knowledge database instead of intellectual property and a big etcetera?

In the context of art, the first step for ghost communication is to open up the space for ghosts to speak. At the moment, Art with a capital A is simply a reflection of the Free Market's data-driven regime that turns arbitrary assets into capital through collective speculation. Art has a place in our current system because it creates a discourse with which the market is able to expand its objective truth into that which science cannot understand. Things like intuition, taste, affection and emotion play into the Art market to create monetary value through the creation of stories.¹⁶

Contemporary art's emergence of the key figure of the curator is very symptomatic of this. Artistic devices need to be activated by entering a story, and curators are usually the storytellers that transport objects from the mundane to the sublime, from the ready-made to the auction room.

So how can ghost communication take place?

A good place to start could be storytelling. As I mentioned earlier, ghosts tend to appear with a message, an omen or a wish for revenge. Sometimes they can contain all of those together. If ghosts are manifestations of non-linear time, and they are ever more present in digital media, they must be trying to reach out to us. They must be wanting us to acknowledge that otherness is urgent, in the context of a totalitarian linear and objective, monolithic truth. In this sense, reclaiming time from its rationality should be the first step towards listening to ghosts.

In a non-rational sense, looking back to history is also a way of looking into the future. Can we make kin with otherness to unravel our cosmotronics out of their exploitative loops? What would art look like in a world without money? Can technological progress be more about participating in the Earth's ability to restore itself, rather than to dig deeper into its insides just so we can set them on fire? How can ghost communication take place?

¹⁶ Steyerl, H. (2017). *Duty free art*. Verso, Healesville.

2. Chapter II

The Solarpunk Perspective: *Gaming and Solarpunk as counter-apparatuses that combine social science questions, sustainability and speculative fiction in the context of Multimedia Art.*

In this chapter I will attempt to create a frame of reference to structure an academic research to accompany the production of the videogame “The Ghost of the Lake-City”, as a Master project in Multimedia Arts in FBAUL-ULisboa. This game aims to speculate about the role of technology in the Valley of Mexico, and specifically in the relationship between the cultures that have lived there and the lakes and river complexes in the region.

This relationship is determined in our present context by a sustainability and survival crisis in one of the densest populated regions of the world⁷. As I am looking for initiatives for the mitigation of the crisis within speculative fiction, I find affinity with the science fiction subgenre Solarpunk. This is why in this chapter I will argue that the relationship between Solarpunk and gaming can be a counter-apparatus that can bring forward notions of sustainability in the context of Multimedia Art.

To do this, I will first attempt to define one by one the following concepts: Multimedia Art, Counter-Apparatus, Speculative Fiction and Solarpunk. Then I will use examples from videogames and artworks to clarify what I mean by these counter-apparatus.

2.1 Multimedia, Intermedia, Transmedia Art

To contextualize this work I want to start with the article “Intermedia” by Dick Higgins (1966). In this text Higgins talks about a conceptual intention that he recognizes in art since the Renaissance to his times, in which the object of the work of art does not rely on the correct execution of the norms, conventions or canons from each specific media, but on the dynamic relationship between/with other media. His objective was to give art an action field beyond the market dynamics that emerged notoriously through the post-war era in the United States, particularly with the popularity of Pop and Op Art, where the

¹⁷ Chávez Sánchez, A., Rico Espínola, V. M., Tudela Rivadeneyra, E., *et. al.* (2020). *Ciudad Resiliente: Retrospectiva y Proyección de una Ciudad (In) Vulnerable*. Dirección de Resiliencia de la Secretaría de Gestión Integral de Riesgos y Protección Civil del Gobierno de la Ciudad de México, Mexico City.

object of the work of art was limited to being an object for decor with potentiality for capital speculation.¹⁸

In this text Higgins uses the concept “Intermedia” to understand artistic practices that were developing throughout the 60’s such as Performance Art, Happenings, Conceptual Art and many more. The appeal of Intermedia relies on the art object’s ability to go beyond its confined space and create new modes of existence. He uses as an example the ready-made objects from Duchamp, which are “somewhere between sculpture and something else”. That “something else” is a sort of ontologic “beyond”. Something similar can be seen with Magritte’s “Ceci n’est pas une pipe”, in which art has the capability to exceed the limits of symbolic representation.

It does not seem like a coincidence that this text emerged only two years after the publication of *Understanding Media* by Marshall McLuhan. In this book, considered one of the foundational texts in media theory, McLuhan argues that each time period is determined by the different communication technologies that are established, and how each of them inherits the dynamics and social, political and linguistic complexities from their predecessors. McLuhan mentions repeatedly how radio contains the printed press, how cinema contains radio, television contains cinema and so on, and how each era’s culture and politics are determined by these media.¹⁹

For Higgins, then, experimentation in the field of art is in itself a space to create new modes of production, and in that sense, Intermedia is also a political project. To understand this we can take a look at the development of the Fluxus group, from which Higgins was a founding member. Fluxus was an art group whose experimental practices were looking to dissolve Art with a capital A and liberate it from the sterile academic/institutional dynamics of its time and introduce it in everyday life. Through performances, publications, experimental music, video art and many other emerging practices, the influence of Fluxus is still relevant today.²⁰

¹⁸ Something Else Newsletter: Intermedia. No.1 / Dick Higgins ; Oldenburg C ; Rauschenberg R ; Corner P ; Cage J., 1966, CC-42476-44490. Ruth and Marvin Sackner Archive of Concrete and Visual Poetry: Periodicals, Sackner008. The Ruth and Marvin Sackner Archive of Concrete and Visual Poetry.

¹⁹ McLuhan, M. (2001 [1964]). *Understanding media*. Routledge, Oxfordshire.

²⁰ Kordic, A. (2016, May 11). *What is Fluxus ?* Widewalls. Retrieved January 3, 2022, from <https://www.widewalls.ch/magazine/what-is-fluxus>

If we think about the development of art from Dadaism to digital art, we can find a contradictory relationship of participation and criticism. This could be understood as a result of the success of Intermedia as a counter-apparatus: the ability to take art out of its condition of mere object and take it out to reality as an agent of problematization.

A concept that can help us better understand this relationship in our contemporary context is “Transmedia”. Considering the legacies of both modern and postmodern aesthetics (meaning, a hyper-specialized technical paradigm, and an inverse tendency to de-construct modernity), Transmedia instead comes as an alternative space for the hybridization of different modernities. Through Transmedia approaches, the role of art becomes a sort of mediator between traditions, disciplines, timelines. It creates bridges between once contradictory relationships, such as art vs. science or technology. This reflects a more fluid, *trans modernity*, where identity as an essentially political, hybrid and contradictory space is at the core of a technological-mediated art practice that aims to blur the boundaries between the real and the fictional world.²¹

Finally, in the mainstream conception of these art traditions, we could refer to “Multimedia” as a more accessible term, meaning simply, an art practice that is located at the intersection of different media. Of course, considering Intermedia and Transmedia, we can acknowledge that Multimedia is a much more general concept, and there are a lot more nuances to be considered.

2.2. Counter-Apparatus

The term “apparatus” was frequently used by Michel Foucault throughout his work to describe a system of power relationships that operates over specific and concrete actions. On the essay “What is an Apparatus”, Giorgio Agamben traces the etymological roots of the term back to the latin “dispositio”, which was used in Theology as a rational concept to explain how God is one ontologically, but a trinity at the same time as the disposition of its material project. In this sense the Apparatus “dispositif” is the technological implementation of the divine plan.²²

²¹ Gouveia, P. (2020). The New Media vs. Old Media Trap: How Contemporary Arts Became Playful Transmedia Environments. In C. Soares, & E. Simão (Eds.), *Multidisciplinary Perspectives on New Media Art* (pp. 25-46). IGI Global. <https://doi.org/10.4018/978-1-7998-3669-8.ch002>.

²² Agamben, G. (2009). *What is an apparatus?* Stanford University Press, Stanford.

In the context of Foucault and his critique of Biopolitics, the apparatus is an intention towards which the different power relations are pointed in a specific context. Foucault finds it again and again in his various analyses of madness, sexuality, language, etc., as the way in which different phenomena are united towards a normativity that is designed to control, and impose itself in a submissive culture.

However, the contribution that Agamben makes to the term is very important. First, he distinguishes apparatus from living beings, and defines them as:

“I shall call an apparatus literally anything that has in some way the capacity to capture, orient, determine, intercept, model, control, or secure the gestures, behaviors, opinions, or discourses of living beings. Not only, therefore, prisons, madhouses, the panopticon, schools, confession, factories, disciplines, juridical measures, and so forth (whose connection with power is in a certain sense evident), but also the pen, writing, literature, philosophy, agriculture, cigarettes, navigation, computers, cellular telephones and –why not– language itself, which is perhaps the most ancient of apparatuses.” (Agamben, 2009, p. 14)

According to Agamben, for Foucault the apparatus is an inevitable direction of the power relationships. However, the distinction with the “Counter-apparatus” has to do with the way in which certain practices that come from collective or counter-cultural movements are aimed towards dismantling, questioning or critiquing the hegemonic apparatuses.²³

From this perspective, what Higgins elaborated with Intermedia, and whose implementation can be seen through the development of the Fluxus group, can be considered a “Counter-Apparatus”. What we see with the development of Fluxus is precisely a system of relationships that operates contingently towards a specific intention in the context of Art.

We could keep a critical posture and consider that also the development of Fluxus operates as part of the “Art with a capital A” apparatus in the way in which experimental practices

²³ Anonymous. (2014, July 16). *Why the counter-apparatus?* the counter apparatus. Retrieved January 3, 2022, from <http://www.counterapparatus.com/blog/2014/7/16/why-the-counter-apparatus>

with an intention to elude normalization were eventually normalized. However, we can also confront this argument considering how critique and political problematization became fundamental axes for the development of the Art discourse.²⁴

However, the conclusion I am aiming towards here is that, even if for Foucault the apparatus seemed to be a single control mechanism from which there is no escape, in the context of Art since the Modern era, it is possible to identify counter-apparatuses in artists, waves, movements, practices and ideas that are introduced in the institutional discourse that end up changing its direction, dissolving it, and making it more complex.

2.3. Speculative Fiction

In *Staying with the Trouble*, Donna Haraway proposes the geological era “Cthulhucene” as a complementary concept in the face of the growing popularity of the concept of “Anthropocene” which dominates the discourse around the consequences of human activity on the Earth’s ecosystems.²⁵

For Haraway, the “Cthulhucene” is a speculative era in which the Earth’s survivors of the environmental catastrophe (humans and non-humans) finally find ways to live in balance with nature through “assemblages” and hybridization. The determining condition for this era to come through is that human beings must modify their extractive relationship with the Earth, and be able to become allies with the rest of the Earth’s critters in order to build new types of stories. In these new narratives, humans are no longer the protagonists, but just one of many characters on a complex plot guided by nature as an “infinite otherness”.

Haraway considers this project as “SF: science fiction, speculative fabulation, string figures, speculative feminism, science fact, so far” (Haraway, 2017, p. 2). Beyond being a type of fantastic literature, “SF” refers to the use of projection/prediction/speculation of futures in order to think about the present. This is why the book is titled *Staying with the Trouble*. The objective of the Cthulhucene as a non-linear temporality is to introduce through

²⁴ Steyerl. (2017). *Duty free art*. Verso, Healesville.

²⁵ Haraway, D. J. (2017). *Staying with the trouble: Making kin in the cthulhucene*. Duke University Press, Durham and London.

literature the needed complexity to unravel the plot of the Capitalocene/Anthropocene and start weaving new kinds of webs in complicity with the rest of the Earth's critters.

A similar idea is present in Timothy Morton's *Dark Ecology*. In this book, Morton speaks about the need to unravel a thread of thought that he traces back to the dawn of agriculture and that eventually led to the climate crisis. For this, he also appeals to speculation: only through play and pleasure will it be possible to dismantle the extractivist structures and open the possibility to a logic of co-existence with non-human beings. Here play is intended as a critical posture that enables participation-construction-destruction of reality models.²⁶

Both Morton and Haraway are appealing to destitute an universalist logic and introduce us to an era of ontological multiplicity. It is not about replacing a paradigm with a new one, but to take on reality as a network of specific complexities. In these new logic(s) participation is not only desirable, but a fundamental action axis.

This same principle is present in McKenzie Wark's *Gamer Theory*. Here she proposes the concept of "gamespace" to describe the way in which videogames contain the same logical premises that operate within late stage capitalism nowadays. "Gamespace" is a reality that looks ever more like a videogame. In this way, a "gamer" can become a critical agent by blurring the borders between "game" and "gamespace". The game becomes an open text in which participation can be mediated, but not fully determined. This possibility of intervention on the digital object enables the gamer not only to be trapped inside the simulation, but to participate in the construction of a-topias.²⁷

Wark speaks about a-topia as the type of apparatus of gamespace. If Utopia is Modernity's apparatus, an allegedly better future towards which we point our production and therefore reality; a-topia is on the other hand a complex algorithmic present in which we participate through gaming (taking part in the simulation). In a similar way as the Cthulhucene, a-topia uses the future as a mirror to warn us about the urgent matters of the present.

²⁶ Morton, T. (2018). *Dark ecology: For a logic of futurecoexistence*. Columbia University Press, New York.

²⁷ Wark, M. K. (2007). *Gamer theory*. Harvard University Press, Cambridge.

In conclusion, Speculative Fiction, or SF in all its versions refers to the intention of using literature or fiction in general to make possible an intervention in reality and finding alternatives to the inertia of modernist thought and capitalist extraction. From SF we can build bridges towards “other possible worlds”, and we can cross those bridges by thinking about, creating, sharing and living in these worlds.

2.4 Solarpunk

The subreddit [r/solarpunk](https://www.reddit.com/r/solarpunk) has the following description:

Solarpunk is everything from a positive imagining of our collective futures to actually creating it: aesthetics, afrofuturism, art, cooperatives, DIY, ecological restoration, engineering, speculative fiction, ecofuturism, gardening, geodesic domes, green architecture, green design, green energy, indigenous practices, intentional community, makerspaces, materials science, music, permaculture, repair cafes, solar power, sustainability, tree planting, urban planning, volunteering, 3D printing...²⁸ (A.A.V.V., 2014)

According to the Re-Des group “A Solarpunk Manifesto”:

Solarpunk is a movement in speculative fiction, art, fashion, and activism that seeks to answer and embody the question “what does a sustainable civilization look like, and how can we get there?”

[...] Solarpunk is at once a vision of the future, a thoughtful provocation, a way of living and a set of achievable proposals to get there.

[...] At its core, Solarpunk is a vision of a future that embodies the best of what humanity can achieve: a post-scarcity, post-hierarchy, post-capitalistic world where humanity sees itself as part of nature and clean energy replaces fossil fuels.

[...] Solarpunk embraces a diversity of tactics: there is no single right way to do solarpunk. Instead, diverse communities from around the world adopt the

²⁸ A.A.V.V. (2014, online). *R/solarpunk*. Reddit. Retrieved January 3, 2022, from <https://www.reddit.com/r/solarpunk>

name and the ideas, and build little nests of self-sustaining revolution.²⁹ (ReDes, n.d.)

Finally, YouTube user “SaintAndrewism” says the following in his video “What Is Solarpunk?”

“Solarpunk is a shining vision of a positive future, grounded in our existing world, that emphasizes the need for environmental sustainability, self-governance and social justice. It’s a movement dedicated to human-centric and eco-centric ends. It looks beyond the limitations of capitalism and beyond the current rift between humanity and nature. It’s a futurism that focuses on what we should hope for rather than what we should avoid.”³⁰
(SaintAndrewism, 2020)

On a 2008 post from the blog “Republic of the Bees” the term Solarpunk was proposed as a concept derived from Cyberpunk, but focused on renewable energies³¹. In 2011 the Brazilian science fiction and fantasy literature publisher Draco posted an open call for a short story Solarpunk anthology which was published in 2012.³² This was the first work published as part of the genre. Since 2014, the term acquired relevance online through the social media platform Tumblr.³³ This led to academic discussions³⁴ and virtual communities dedicated to organize and document the contents available about this genre.³⁵

Since then there have been some literary anthologies, novels and even some videogames under the Solarpunk genre. However, apart from the artworks that have been created consciously as part of the genre, the discussion in articles, videos and online communities

²⁹ ReDes. (n.d.). *A solarpunk manifesto (English)*. ReDes – Regenerative Design. Retrieved January 3, 2022, from <https://www.re-des.org/a-solarpunk-manifesto/>

³⁰ SaintAndrewism. *What is Solarpunk?* (2020). *YouTube*. Retrieved January 3, 2022, from <https://www.youtube.com/watch?v=hHI61GHNGJM>.

³¹ Anonymous. (2008, May 27). *From steampunk to solarpunk*. Republic of the Bees. Retrieved January 3, 2022, from <https://republicofthebees.wordpress.com/2008/05/27/from-steampunk-to-solarpunk/>

³² Lodi-Ribeiro, G., ed. (2013). *Solarpunk histórias Ecológicas e Fantásticas em Um Mundo Sustentável*. Ed. Draco, São Paulo.

³³ Missolivialouise. (2014, August 11). *Here's a thing I've had around in my head for a while!* Land of masks and Jewels. Retrieved January 3, 2022, from <https://missolivialouise.tumblr.com/post/94374063675/heres-a-thing-ive-had-around-in-my-head-for-a>

³⁴ Flynn, A. (2014, September 4). *Solarpunk: Notes toward A manifesto*. Project Hieroglyph . Retrieved January 3, 2022, from <https://hieroglyph.asu.edu/2014/09/solarpunk-notes-toward-a-manifesto/>

³⁵ @solarpunks. (2012, June 18). SOLARPUNKS. Retrieved January 3, 2022, from <https://solarpunks.net/>

constantly reference other artworks that were not necessarily created acknowledging Solarpunk, but fit in or relate to its themes and aesthetics.

For example, both Re-Des and SaintAndrewism mention the work of Japanese filmmaker Hayao Miyazaki, particularly *Princess Mononoke* (Miyazaki, 1997), as an example of Solarpunk media. In Miyazaki's films, nature and landscape play an important role, not only as scenery, but a lot of times even as characters. Such is the case of *Princess Mononoke*, in which a miner's village that has a weapon industry enters a war against the animals of the forest around it. The village's extractive activities threaten the ecosystem's survival, so the animals decide to defend the territory.

The conflict escalates up to the point in which humans organize a strategy to ambush and kill the God of the Forest, a magical deer that turns into a gigantic being by night and roams through the ecosystem creating a balance between life and death through the beings that cross its path. In the end, the god cannot be killed, and the consequences of the attempt end up radically transforming the territory, which forces the humans to find new ways to inhabit the forest³⁶.

Another popular example of the Solarpunk aesthetic is Singapore's "Gardens by the Bay", an urban garden designed to preserve and exhibit species of plants from different ecosystems. Its design includes renewable energies such as solar panels and electric plants that recycle the garden's waste and turn them into energy. This mega project is an example of how sustainability becomes an asset for urban planning and gives us an idea of the role that technology could play in an ecologically conscious city³⁷.

To wrap up this section, I would like to point out the diversity of definitions and examples that are included in Solarpunk. From what we have reviewed, it is not a genre with very strict guidelines, but mainly a problematization and an aesthetic. It is through this open-ended dimension of the genre that we can be generous with the term and review different artworks and videogames through its lense, as they do match its problems and aesthetics.

³⁶ Studio Ghibli / Buena Vista Home Entertainment. (2002). *Princess Mononoke* [DVD]. Japan.

³⁷ Gardens by the Bay. (n.d.). Gardens by the Bay. Retrieved January 3, 2022, from <https://www.gardensbythebay.com.sg/>

2.5 Solarpunk Counter-Apparatuses in Contemporary Art and Videogames

The following will be a selection of artworks that could be considered counter-apparatuses, in which media is used to invite users to participate in a critical vision of our context.

The first example is Hito Steyerl's installation *Power Plants*, presented in 2019's Venice Biennale³⁸. This work consists of a video projected on a transparent surface. By the end of the video the transparency is revealed and the viewer can see the room behind: a series of sculptures created from LED screens that project a combination of phrases that change constantly, and animations of flowers created through artificial intelligence.

The video takes place 0.4 seconds into the future and shows a reality that is constantly rendered through an AI that predicts what is going to happen in the next 0.4 seconds. Through this speculative idea, the artwork speaks about possible medicinal plants that will be genetically modified to cure contemporary diseases created by an authoritarian use of technology. Through these metaphors the artwork reflects on the role of algorithmic prediction in our lives and scale of the digital image as a control apparatus.

The next example is the videogame *Everything* created by artist David O'Reilly.³⁹ In this simulation game, the player can be any object in the Universe. The player's perspective can be translated from one object to another by pressing a button. This way, the game consists of an exploration of the Universe from its smallest units, the elementary particles, up until galaxies, passing through planets, cities, ecosystems, animals and cells. While this happens, the soundtrack combines a score by Ben Lukas Boysen and fragments of a conference by philosopher Alan Watts about consciousness and its relationship with the cosmos.

This results in an almost meditative contemplation in which the game conventions are subverted: there is no goal or objective, there is no way of winning, not even a correct way of playing, the game can play itself even without the gamer's input. In this way, technology is used with another purpose, that of representing a cosmovision, almost literally. The mechanic of transferring the player's perspective makes sense with both the ideas of

³⁸ Steyerl, H. (2019). *Power Plants* Serpentine Galleries, London. Venice Biennale; German Pavilion.

³⁹ O'Reilly, D. (2017, April 21). *Everything*. Computer software. Retrieved January 3, 2022, from <https://www.davidoreilly.com/everything/>.

“Intermedia” and “SF”: it is at the same time a representation of the “flux” quality of art, as well as a form of storytelling in which the human perspective is intertwined within a much more complex network of experiences and ways of existing.

The next example is a videogame mentioned by Donna Haraway in *Staying With the Trouble: Never Alone*, developed by Upper One Games and E-Line Media, in collaboration with the Iñupiaq Cook Inlet Tribal Council.⁴⁰ The game consists in helping a girl and her fox friend to acquire different ancestral knowledge that can help them end a snow storm that is threatening their community. Through the alliance with the fox, they are able to contact the spirits of the mountain that help them through their journey. At the end of each level, the player finds stories and knowledge that come from the Iñupiaq community.

The game’s language is Iñupiaq with English subtitles. The story is inspired by the oral tradition of this community. The production was done through a close collaboration with the community and part of the game’s revenue goes to an educational fund for young Iñupiaquis. In this way, the game is not only an example of the alliance between humanity and nature to tell stories that unravel the Anthropocene’s extractive narrative, but also its mode of production is in itself a strategic way to focus resources and technology to foster the survival of cultures and cosmovisions whose survival are endangered.

A similar example is the Brazilian game *Huni Kuin*, inspired by the Kaxinawá culture, and produced by the indigenous media collective Beya Xinã Bena. It explores the process of maturity of a couple of twins that have to go through their town and encompassing jungle to gather the knowledge needed to become *Huni Kuin*, which loosely translates as “real human beings”. Through this adventure the player encounters music and stories, spoken by the Kaxinawá themselves, revealing their cosmology through a playful experience.

According to the Beya Xinã Bena collective, this game was developed with the purpose of preserving and disseminating the Kaxinawá culture, while constantly mediating processes of cultural and technological mediums.⁴¹

⁴⁰ Upper One Games, & Cook Inlet Tribal Council. (2014, November 18). *Never Alone*. Computer software, E-Line Media. Retrieved January 3, 2022, from <http://neveralonegame.com/>

⁴¹ Beya Xinã Bena. (2014). *Acerca*. *Huni Kuin*. Retrieved August 25, 2022, from <http://www.gamehunikuin.com.br/es/abouthk/>

The last example is the videogame *Terra Nil*, developed by Free Lives and Devolver Digital⁴². At the moment only a demo version has been published. However, in this version we can already play the main mechanic. The goal of the game is to regenerate barren ecosystems. Through strategic building resource management, the player has to generate the conditions for the restitution of natural cycles, and eventually recycle all the materials used to leave no trace of human activity, leaving only the live ecosystem by itself.

From all the previous examples, this might be the most aligned to the Solarpunk ideas. The kind of technologies proposed by the game are interesting: eolic electric generators, pollination towers, rain generation systems, solar amplifiers, and many more. What is most valuable is the way in which the game uses existing and yet-to-exist technologies to propose the possibility of regenerating ecosystems as an industrial problem and at an industrial scale.

In the book “Postcapitalism”, Paul Mason argues that information technologies have the capability of producing a new economic model that can overcome the challenges and threats that capitalism poses for human survival nowadays⁴³. He talks about how open source technologies such as Wikipedia create other types of modes of production based on abundance instead of scarcity, in which new values such as collaboration and reproducibility of common goods replace old ones such as capital production.

In the conclusions Mason mentions that a fundamental step to create new modes of production is the creation of open source economic simulation models that can quantify and measure different factors in function of values that can be beneficial for communities and civil society. In this way, the open source movement is key to replace the extractivist direction of technology, and produce accessible tools that can be even more efficient, as they can be upgraded freely by the community. This has started to happen with many core infrastructure software, but in the context of games we see it with software such as Blender for 3D modelling and animation, and Godot for game design.

⁴² Free Lives. (2021, June 16). *Terra Nil*. Computer software, Devolver Digital. Retrieved January 3, 2022, from <https://www.devolverdigital.com/games/terra-nil>.

⁴³ Mason, P. (2017). *Postcapitalism: A Guide to Our Future*. Farrar, Straus and Giroux, New York.

This is how, the above mentioned examples can be understood as the first nodes on a larger network of counter-apparatuses that can weave a shift of direction in the use of technology in the face of the climate challenges of our times. Even if each of these works was created within their own models and contexts, we can find constants in the way technology, nature and humankind are intertwined in stories that use the future as a mirror to reflect a critical vision of our present.

3. Chapter III

The Ghost of the Lake: *How can the history of the lake systems in the Valley of Mexico define a cosmotechnic in the region, considering the different cultures and technologies that have inhabited it?*

In this chapter I will use the “Cosmotechnics” concept developed by Yuk Hui as a frame of reference to analyze different approaches to *technics* throughout the history of the Valley of Mexico, using the lake system and current hydrologic context as a guiding theme. For this, I will reference historical events on the local and national scale, since, as we will see, the Valley of Mexico has been a territory that has centralized the administration of the broader regions through centuries.

3.1 *Cosmotechnics*

The concept “Cosmotechnics” was coined by Yuk Hui through the necessity of pairing the “ontological turn” in Decolonial Anthropology with Technology Studies, in order to tackle the Anthropocene crisis from both ends. Referring to one of the most relevant texts on western philosophical analysis of technology, Heidegger’s “The Question Concerning Technology”, Yuk Hui tells us:

“Heidegger poses a rupture between what the ancient Greeks called “*techné*” and what he calls “modern technology”, since between them there is an essential difference. *Techné* has its essence in *poiesis* [creation, production], elucidated as a “bringing-forwards”, while modern technology is revealed as a “site structure” [*Gestell*] that treats everything as a stock of existence, as resources available to be exploited. But, if we may ask, where do Heidegger’s analysis come into place while studying the millenary technologies of India and China, of the Maya and Inca civilization, of the Nahuas, Mapuches, or the different Amazonian peoples? Clearly these technologies are not equivalent to modern technology, but can we assimilate them or reduce them to the Greek’s *techné*?⁴⁴

⁴⁴ Hui, Y. (2020). *Fragmentar El Futuro: Ensayos Sobre Tecnodiversidad*. (T. Lima, Trans.) (1st ed.). Caja Negra, Buenos Aires. p. 10.

Later on, referring to the Anthropocene crisis, Hui states:

The Earth and the Cosmos have been transformed into a huge technological system, the culmination of the epistemological and methodological rupture we call Modernity. The loss of the Cosmos represents the end of metaphysics in the sense that we do not perceive anything behind or beyond the process of perfecting science and technology. [...] [This] should be read within our current Anthropocene context as an invitation to develop a *cosmo-politics*, understood not only in the sense of cosmopolitanism, but also as a politics of the Cosmos. Picking up this invitation, I would like to suggest that in order to develop such cosmo-politics, we need to elucidate the question of cosmotechnics.⁴⁵

Finally, Hui defines the problematization of cosmotechnics through the following Kantian antinomy:

Thesis: Technology is an anthropological universal; it can be understood as an externalization of memory and liberation of organs, such as it has been elucidated by anthropologists and technology philosophers.

Antithesis: Technology is not an anthropological universal; it is possible and constrained by particular cosmologies that go beyond utility and functionality. Therefore, there is no single technology, but multiple cosmotechnics.⁴⁶

The relevance of this concept is key to face the consequences of the “development” of modernity, and therefore observe the environmental crises beyond the binaries posed by its logic (culture-nature; development-underdeveloped; etc)⁴⁷. While our reality looks ever more like a matrix of computable productive interrelations,⁴⁸ the concept of cosmotechnics offers us a possibility to fragment technology itself, opening a speculative door towards a possible technological diversity, that can take into account the problems posed by Decolonial Anthropology.

⁴⁵ *Ibid.*, p. 12

⁴⁶ *Ibid.*, p. 11.

⁴⁷ Miñoso, Y. E., Correal, D. G., & Muñoz, K. O. (2014). *Tejiendo de Otro Modo: Feminismo, Epistemología y apuestas descoloniales en Abya Yala* (1st ed.). Editorial Universidad del Cauca, Popayán.

⁴⁸ Brea José Luis. (2010). *Las Tres eras de la Imagen: Imagen-materia, film, e-image* (1st ed.). Akal, Tres Cantos.

This argument resembles what Débora Danowski and Eduardo Viveiros de Castro pose in “*Is There a Future to Come?*”, and Donna Haraway in “*Staying with the Trouble*”: briefly, the need to deal with the Anthropocene crisis through a change of ontological paradigm, towards a multiplicity of non-modern thought. We will come back to these ideas later, but first we will give some historical context for the Valley of Mexico.

3.2 Milpa Cultures⁴⁹

The Valley of Mexico is a geographic territory that occupies what today is Mexico City, and part of the State of Mexico. It is north of the Neovolcanic Axis, and is 2000m above sea level. Along with the valleys Cuautitlán, Apan and Tizayuca, they form the Basin of Mexico. In prehispanic times, it had great fields of fertile lands and important fluvial and lacustrine systems.⁵⁰

This territory is located in Mesoamerica, a superarea defined to study the cultures that lived there before the conquest. Mesoamerica goes from the rivers Sinaloa, Lerma and Pánuco in Northern Mexico, up to the river Motagua in Honduras and Guatemala, lake Nicaragua and the gulf of Nicoya in Costa Rica. The cultures that inhabited this superarea were very diverse, ranging from up to 16 linguistic families, and hundreds of different languages. However, these cultures were interconnected by commerce, alliances and war, and shared cosmological and technological elements, such as the cult and cultivation of corn⁵¹.

There are records of human presence in Mesoamerica since 35,000 BC, however, it was until 7,000-5,000 BC that corn began to be domesticated. This led a slow transition from hunter-gatherer populations towards sedentary agricultural cultures. This way, towards 2,500 BC, with the invention of ceramics, historians mark the beginning of the

⁴⁹ “La milpa” or The birthplace of maize is “a system where the different species coexist, sharing resources like water, light, soil and even ecological interactions, such as the nitrogen fixation provided by the beans. This traditional agricultural system continues to play an important economic and cultural role in our modern times (...).” In Ventura-Martínez, L. A. (2017), “A Mexican Legacy: “La milpa,” The birthplace of maize” Retrieved May 31, 2022, from

<https://allianceforscience.cornell.edu/blog/2017/10/a-mexican-legacy-la-milpa-the-birthplace-of-maize/>

⁵⁰ Luján, L. L., & Austin, A. L. (2001). *El Pasado Indígena* (2nd ed.). Fondo de Cultura Económica / Mexico, Mexico City.

⁵¹ Escalante, P., Martínez García Bernardo, Jáuregui Luis, Vázquez Zoraida Josefina, Guerra, S. E., Dantán Garcíadiego Javier, & Aguilar, A. L. (2008). *Nueva Historia Mínima de México* (1st ed.). El Colegio de México, Centro de Estudios Históricos, Mexico City.

Mesoamerican period, which is usually divided in Preclassic (2,500 BC - 200 AD), Classic (200 - 900/1000 AD) and Postclassic (900/1000 - 1521 AD).

While in this case we will focus on the cultures that lived in the Valley of Mexico, it is important to note that these civilizations had complex networks of communication and trade. That's why we cannot consider the cultures of the Valley of Mexico as exceptional or isolated from the rest, or on the contrary, homogenize Mesoamerica as a monoculture. On the contrary, this note helps us frame the rest of the discussion in the context of a cosmopolitical diversity, which is also aligned with the search for multiple cosmotechnics.

Having said this, we will make a brief historical summary from the book *El pasado indígena* by Alfredo López Austin and Leonardo López Luján, focusing on the central area of Mesoamerica from the Preclassic to the Postclassic.

Beginning with the invention of ceramics, the agricultural settlements were consolidated as egalitarian societies. Through a long and slow transition, societies eventually developed hierarchies. This led to the emergence of the Olmec culture in the Gulf of Mexico, which had its splendor and influence from 1200 to 600 BC. The cultures in the Valley of Mexico during that period were Loma Terremote, El Arbolillo, Tlatilco, Tlapacoya and Coapexco. It is in this period that the first recordings of chinampas appear in the lacustrine terrains.⁵²

Chinampas are artificial parcels of land built on lakes, which allows them to nurture the soil with minerals coming from the biodiversity that surrounds them. In them, as well as in the rest of agricultural spaces in Mesoamerica, there was a multicrop system in place known as Milpa. This system takes advantage of the particularities of each crop and combines them in mutual benefit.

The main crops of Milpa are known as “the three sisters”: corn, pumpkin and beans. Corn has tall stems and has to be planted leaving enough space between each plant. Corn's stems give support to the bean plant, which is a nitrogen-fixing vine legume, which in turn, nourishes with nitrogen the corn plant. Finally, the pumpkin plant grows in the spaces

⁵² Luján, L. L., & Austin, A. L. (2001). *El Pasado Indígena* (2nd ed.). Fondo de Cultura Económica / Mexico, Mexico City.

between the corn plants. Their big leaves not only take advantage of the remaining light and space, but they also protect the system from the invasion of plagues. Taking these crops as a basis, the Milpa can also grow other crops such as tomatoes or chilli, which adds important vitamins to the foods produced by this system.⁵³

This crop system tells us of a complex technological development. Not only this, but the cultivation of corn was closely associated with astrological and astronomical observation, and therefore to mythology. We should also clarify that corn is not a naturally grown crop. Its domestication implies a work developed through many centuries, meaning that the knowledge had to be passed on through generations by oral tradition. In the Mesoamerican context, the oral tradition is indistinguishable from spirituality and communal traditions. This way, the technological complex of Chinampa includes Milpa, mythology, oral tradition and calendars.⁵⁴

The first records of writing in Mesoamerica are dated around the year 600 BC in the city of Monte Alban, Oaxaca, where there is also evidence of the Solar and Ritual calendars. Throughout Mesoamerica there are records of a shared calendar system that used at least two parallel cycles to measure time. The first one, based on the Solar year, had 365 days, divided in 18 months of 20 days, with an additional 5 day ritual period.

Researcher Raúl González claims that the Mesoamerican calendar did not require a leap year. Instead, they were aware of a longer cycle of 1508 years, named a cosmogonical age, which is the time it takes for the 365 count to match exactly the same astronomical cycle again. In fact, it has been argued that the gregorian correction of the western calendar in 1582 was influenced by suggestions made by mexica astronomers to the spaniards, since they noticed the spring equinox did not match the dates when it was supposed to happen.⁵⁵

As for the second cycle, the ritual calendar was calculated by combining the observation of Moon and Venus cycles. This calendar consists of 260 days, divided in 20 weeks of 13 days. Both these calendars were combined using a set of 20 symbols and numbers, leading to 260

⁵³ García-Castañeda, V. G. (2021). Tecnodiversidad y maíz. Sugerencias para la búsqueda de una cosmotécnica mesoamericana. *Technophany*, 1(1). <https://doi.org/http://journal.philosophyandtechnology.network/>

⁵⁴ Rodríguez Roberto Cintli, & Hernandez Veronica Castillo. (2014). *Our sacred maíz is our mother = Nin Tonantzin non Centeotl: Indigeneity and belonging in the Americas* (1st ed.). University of Arizona Press, Tucson.

⁵⁵ González Cortés, R. (2015). *1508, Los fuegos del tiempo* (1st ed.). Raúl González Cortés, Mexico City.

unique names for each day, and a long cycle of 52 years, called a new fire, for them to match again and start over.

Finally, we should specify that the calendar system, although shared throughout Mesoamerica, was adapted to particular languages, symbols and religions. For example, the records found on Monte Alban are very different from the Sun Stone from the Mexicas centuries later found in Mexico City. However, the overlapping cycles of 365 and 260 are consistent throughout the region. We need to consider the way in which these conceptions of time-space coincide with agricultural practices, thus completing a cosmotechnic frame. We will specify this more when we reach the Mexica culture, however, this applies to all cultures throughout Mesoamerica.⁵⁶

Back in the Valley of Mexico, around 600 BC, the Cuicuilco and Teotihuacan cultures started emerging. Teotihuacan, however, would only peak towards the end of the Preclassic period. At this point, the dominant cultures start influencing neighboring territories, thus creating elite-cities that focus more on administering the economy, producing fine arts and religious studies, leaving agriculture for the dominated regions. The city of Cuicuilco grew up to a population of 20,000, and was an important ceremonial and economic center, from which a cylindrical pyramid remains at the south side of Mexico City. However, this culture disappeared by the end of the Preclassic period (around 100 AD), leaving the region to be controlled by Teotihuacan.

The city of Teotihuacan, an icon of the Classic period, was a religious, economic and administrative center that reached a population of 120 to 200 thousand at its peak. It was the world's sixth largest city at that moment. Its economic influence was due in part to the agricultural development in nearby regions through hydraulic engineering and chinampas,⁵⁷ along with extensive commercial routes that reached up to Central America. Finally, a very important economic activity for the city was the extraction of obsidian stone in nearby mines, along with pottery and metallurgy.

⁵⁶ Tena, R. (2021, February 22). *El Calendario Mesoamericano*. Arqueología Mexicana. Retrieved May 26, 2022, from <https://arqueologiamexicana.mx/mexico-antiguo/el-calendario-mesoamericano>

⁵⁷ Technique used in classical agriculture of using rectangular areas of fertile land.

The urban planning of Teotihuacan was closely related to astronomical observation. The Sun and Moon pyramids, along with the Road of the Dead are aligned with the stars and planets that were observable from the region. This way, the city was understood as a replica of the divine order. While the names of the deities do not survive to this day, there are records of cult to a goddess of water, a god of rain, a god of fire, a goddess of the earth, a winged snake, among others.

The city of Teotihuacan entered a decadence period, and by 550-650 AD, the population reached 80,000 inhabitants, reaching 30,000 by 750 AD. During this period the city was robbed and set on fire, probably by the dominated surrounding populations, or by groups coming from the north, named Chichimecas. The fall of this very important city had repercussions throughout Mesoamerica, marking the beginning of an intermediate period called Epiclassic, from 650/800 - 900/1000 AD, featuring social mobility, a reorganization of settlements, political instability, a revision of religious doctrines and an ever growing military presence in the region. Proof of this is the popularization of human sacrifice and war themes in painting, sculpture and writing.⁵⁸

During this period, in the nearby territories of the Valley of Mexico, the Cacaxtla, Xochicalco and Teotenango cities emerged, south of Teotihuacan. Northern of the valley, the Toltec culture started dominating, with its capital in the city of Tula, in current day Hidalgo. This civilization reached a population between 18,000 and 55,000 at its peak. It was a militarily-stratified society that, similar to Teotihuacan, was composed of different ethnicities. The development of this society from the year 700 to its splendor in 1150, marks a transition towards the Postclassic period, which, specifically in the central region of Mesoamerica is divided in the Toltec, Chichimeca and Mexica periods.

The Chichimeca period is the most heterogeneous, since the concept Chichimeca was a nahuatl demeaning term used to describe “savage” societies that emigrated from what is today south of the United States and northern Mexico due to intense droughts in their original regions. These migrations happened steadily during centuries. In fact, the founding of the Toltec culture happened due to a mixture of Chichimecas and Nonoalcas in the region. However, during the decadence of the Toltec era (1150 - 1350), these migrations

⁵⁸ Luján, L. L., & Austin, A. L. (2001). *El Pasado Indígena* (2nd ed.). Fondo de Cultura Economica / Mexico, Mexico City.

became ever more present, causing greater political instability and military tensions in the central region of Mesoamerica. From these groups, the one led by king Xolotl occupied Tula after the disappearance of the Toltecs, and then continued its migration towards Cholula, Puebla. Through its way, his descendents founded various new settlements, among them Tenayuca, Coatlinchan and Texcoco.

Besides these cultures, during that same period, on the Valley of Mexico there were many other cultures, such as Culhuacán and Xochimilco in the south, and Azcapotzalco west of lake Texcoco, to name just a few of the groups that disputed military control of the basin. It is in this military tense context that the Mexicas established the city of Mexico-Tenochtitlan on the islands west of lake Texcoco in 1325. This position was privileged since it protected them from the nearby cities. Some inhabitants, unhappy with the land distribution in Mexico-Tenochtitlan, established the city Mexico-Tlatelolco, on the adjacent islands.⁵⁹

The founding of Mexico-Tenochtitlan is today culturally expressed as a symbol of Mexican national identity. The Mexicas allegedly were migrating from a northern territory named Aztlan. There is no historical consensus as to the exact location for this city, nor even evidence that the city existed. However, for the Chicano movement in the 1960's and 70's, the argument that Aztlan was somewhere southwest of the United States, probably California, is a symbol for cultural identity that claims their legitimacy as inhabitants of that region, despite the context of discrimination and racism.⁶⁰ According to the legend, Huitzilopochtli had promised the Mexicas prosperity and abundance if they were to build a city dedicated to him. This city had to be built where they found an eagle on top of a nopal cactus plant, devouring a snake, which is now a national symbol found at the center of the Mexican flag.⁶¹

Originally, the islands on which both cities were founded belonged to Azcapotzalco, so they paid them tribute and were allies up until 1430. In this year Tezozómoc, lord of

⁵⁹ Luján, L. L., & Austin, A. L. (2001). *El Pasado Indígena* (2nd ed.). Fondo de Cultura Económica / Mexico, Mexico City.

⁶⁰ Rodríguez Roberto Cintli, & Hernández Verónica Castillo. (2014). *Our sacred maíz is our mother = Nin Tonantzin non Centeotl: Indigeneity and belonging in the Americas* (1st ed.). University of Arizona Press, Tucson.

⁶¹ Secretaría de Medio Ambiente y Recursos Naturales. (2018, September 26). *Escudo nacional, Biodiversidad Enaltecida*. Retrieved May 26, 2022, from <https://www.gob.mx/semarnat/articulos/escudo-nacional-biodiversidad-enaltecida?idiom=es>

Azcapotzalco died, leading to its successor, Maxtla, into power. Maxtla had a bad relationship with the Mexicas, leading to a war in which the Mexicas would align themselves with the Texcocan Acolhuas. Azcapotzalco loses the war and the Mexicas, Texcocans and Tlacopans establish a “triple alliance”, which leads to relative stability and a quick and extensive Mexica military expansion.

By 1502, the city had a population between 150,000 and 300,000 inhabitants, and the Mexica empire had influence from the Pacific Ocean to the Gulf of Mexico, with the exception of some unconquered cities. It was in the cities of Mexico-Tenochtitlan and Mexico-Tlatelolco that we find the most extensive use of chinampas with urban functionality. The city was connected to the mainland by “calzadas” or main roads, and the tributes from conquered populations led to massive hydraulic engineering such as a dam that separated saltwater from drinkable water.

The Mexica society was divided between the *pipiltin* nobility and the commoners, *macehualtin*. Their children would attend different education institutions, *calmécac* for the *pipiltin* and *telpochcalli* for the *macehualtin*. The population was divided in *calpullis*, neighbor units, regularly from the same ethnic origins. These units administered and distributed land for agriculture between the population. The conquered territories were divided in *tlatocayotl*, understood by the Spanish as kingdoms, who had their own government delegates called *tecubtli*. The Mexica government, based on a complementary duality cosmovision, had two rulers, the *tlatoani*, representative of the heavenly powers, and the *cihuacóatl*, representative of the earth, who by turn were supported by two supreme priests, the *Quetzalcóatl Tótec tlamacazqui* and the *Quetzalcóatl Tláloc tlamacazqui*, representatives of Huitzilopochtli, deity of the Sun, and Tlaloc, deity of water.⁶²

Regarding the Mexica’s spirituality and mythology, López Austin tells us:

“The Mesoamerican forms of knowledge are macrosystemic. Consequently, each of them should be studied according to its cosmovision. This explains the cosmic processes as effects of the regulated action of supernatural beings

⁶² Luján, L. L., & Austin, A. L. (2001). *El Pasado Indígena* (2nd ed.). Fondo de Cultura Economica / Mexico, Mexico City.

possessing intellect, will and the power of communication. Therefore, for example, agricultural knowledge is understood by at least three universal principles. The first one relates to the “heart” of mundane beings. All creatures possess, beneath their perceptible matter, a divine substance, imperceptible, which is its class essence. Therefore, we can speak of “the heart of corn”, or “the heart of stones”, or “the heart of deer”, as an immortal interiority that transcends individuals, which are necessarily mortals. The second principle is the division of all beings in two big groups that are opposed and complementary. On one hand we have what is characterized by a predominantly hot, dry, masculine, luminous and vital essence; and on the other everything whose essence is inclined to being cold, wet, feminine, dark and mortal. This binary separation gives us the first taxonomic criteria for everything in existence. The third principle is the alternating power of the essences on the Earth: the dominion of the opposite forces is succeeded to create the cycles that give continuity to the world.”⁶³

These principles are applied to agriculture, but also to medicine and calendar counts. The Mexicas, beyond the solar and ritual calendars, had also a divinatory calendar of nine days marked by the observation of the cycles of the Moon and Venus. On a cosmological level, this complementary duality was part of the creation of time itself, which emerged from four coloured trees that were found at the world’s edges. On their trunks, heaven's fire and the underworld's water would merge, thus creating time. For the Mexica, the union of these elements also represented water, in the figure of *atl-tlachinolli* (“water, bonfire.”). This in turn relates to four terrestrial directions, and three cosmological ones, the heavens, the earth, and the underworld.

Regarding magic, there were various popular practices performed usually by chamans, such as divination by interpreting dreams or using divinatory calendars, witchcraft for protection or for hurting enemies, travelling to the god’s land using psychotropic substances, or nahualism. This last concept reveals once again a condition of fluidity of the vital essences, since nahual chamans had the capacity to occupy the bodies of animals or fire balls to go unseen by their enemies. This capacity came from the concept of the *tonal*, the idea that all

⁶³ Luján, L. L., & Austin, A. L. (2001). *El Pasado Indígena* (2nd ed.). Fondo de Cultura Económica / Mexico, Mexico City.

human beings have an *alter ego* from the natural world depending on their personal traits and the symbols associated with their birthday.⁶⁴

The deities were multiple and fluid, they could combine and divide depending on the specific order of the phenomena to which they were associated. We should also mention the deity Omoteotl, who represents the ultimate fusion, and its name translates to “Deity Two”, which alludes to the integration of a masculine deity with a feminine one, as a symbol of the union of the complementary and opposing essences.

On this last note, Sylvia Marcos clarifies in her article “*La espiritualidad de las mujeres indígenas mesoamericanas*” that this complementary duality that is so persistent in the mesoamerican cosmovision is not comparable with the gender binary imposed by the Modern-western worldview. This duality implies a balance, since everything that exists has a masculine and feminine component (alive-dead, cold-hot), that flows and produces the continuity of everything. This is framed by an understanding of gender that is not characterized by subordination, but, on the contrary, by an indivisible synergy.⁶⁵

3.3 Conquest, syncretism, modernity, dehydration

The Spanish conquerors took over the city of Mexico-Tenochtitlan in 1521 with the help of many armies from cultures that were rivals or dominated by the Mexicas. From then onwards, the city would be renamed as Mexico City, capital of the Kingdom of Mexico, part of the Viceroyalty of New Spain. The Viceroyalty comprised at its most expansive moment, most of what is today the United States of America, all of Mexico, many islands in the Caribbean, such as Cuba, Dominican Republic and Puerto Rico, and most of mainland Central America, up until Costa Rica. However, the Kingdom of Mexico only comprised a portion of Mesoamerica, specifically from San Luis Potosi to Oaxaca, including coastal regions East and West.⁶⁶

⁶⁴ Lupo, A. (2020, August 7). *El tonal y el nahual*. Arqueología Mexicana. Retrieved May 26, 2022, from <https://arqueologiamexicana.mx/mexico-antiguo/el-tonal-y-el-nahual>

⁶⁵ Miñoso, Y. E., Correal, D. G., & Muñoz, K. O. (2014). *Tejiendo de Otro Modo: Feminismo, Epistemología y apuestas descoloniales en Abya Yala* (1st ed.). Editorial Universidad del Cauca, Popayán.

⁶⁶ Escalante, P., Martínez García Bernardo, Jáuregui Luis, Vázquez Zoraida Josefina, Guerra, S. E., Dantán Garciadiego Javier, & Aguilar, A. L. (2008). *Nueva Historia Mínima de México* (1st ed.). El Colegio de México, Centro de Estudios Historicos, Mexico City.

On *The Darker Side of the Renaissance* Walter Mignolo speaks about how, during the late Renaissance period, the epistemological project of modernity is consolidated by the conquest of the American continent. According to Mignolo, this conquest operates in three fundamental axes: linguistic colonialism, memory colonialism, and space colonialism.⁶⁷

Each of these axes reveal different foundational dimensions of the modern project. Regarding language, alphabetical writing is imposed as superior to any other kind of writing, and it is associated with “more civilized societies”. This idea comes from Antonio de Nebrija, author of the first Spanish Grammatica, who justifies the expansion of language, first as the unification of the kingdom of Castille, and later, as a natural consequence, and even a moral obligation towards the conquered populations in America.

Colonialism of memory is also built upon this same line, as an imposition of a linear-historical time narrative. Contrasting the mesoamerican calendars, which were strongly linked to astronomical observation distributed by oral tradition and communitarian rituals, the conquest imposes a form of history as a hegemonic discourse that has its basis in literature. This means that the way to structure time is closely linked to the linear form of alphabetical writing. This would eventually lead to the notion of progress, therefore consolidating the paradigm of modernity.

Finally, the last dimension of colonialism for Mignolo refers to the conceptualization of space. From the renaissance humanism, man transforms the earth into territory, and nature into resources. It is from this moment that the continent is configured as a space for extraction, which helps produce the material foundations for the development of the modern project. As Alan Diaz comments in *From Basin to Valley*, we can see this in action studying the cartography records of the newly conquered Mexico City. In this process we can see the slow implementation of the cartesian grid on the territory, producing an alienation between “culture” and its natural environment.⁶⁸

⁶⁷ Mignolo, W. D. (1998). *The darker side of the Renaissance* Univ. of Michigan Press, Michigan.

⁶⁸ Escalante, P., Martínez García Bernardo, Jáuregui Luis, Vázquez Zoraida Josefina, Guerra, S. E., Dantán Garcíadiego Javier, & Aguilar, A. L. (2008). *Nueva Historia Mínima de México* (1st ed.). El Colegio de México, Centro de Estudios Historicos, Mexico City

In Mexico City, this process was also paired with the dewatering projects that were taken on by the conquerors towards the lacustrine city system of Mexico-Tenochtitlan. For the Spaniards the colonies were an opportunity to validate the humanist notion of man dominating the environment through intellect, which translates to an urban project based precisely in the cartesian plane, and that gets rid of any “natural obstacles” on its way. This process took hundreds of years, starting with the Real Desagüe de Huehuetoca in 1607, a massive hydraulic engineering project inspired by roman aqueducts.⁶⁹

However, where we see the territorialization process more clearly is through the introduction of new agricultural and cattling practices. The mesoamerican diet was based on the produce of the milpa, which was accompanied secondarily by small animals such as rabbits, turkeys, dogs and iguanas. Contrastingly, the diet introduced by the Spaniards was based mainly on the consumption of pig, dairy and chicken meats, and the land was adapted to grow mainly wheat and sugarcane. Another important element was the introduction of pack animals such as horses, mules and donkeys, which were not native to the Americas.⁷⁰

This caused a radical transformation of the landscape. New means of transportation were introduced, based on animal work. New roads were built, and the agricultural practices were transformed and centralized through the implementation of *haciendas*. Gradually the western crops displaced the milpa. This, along with newly introduced animal species, provoked an erosion of the land and bigger pollution and sanitation issues.

Sugarcane had a very important economic value, however, its cultivation required very specific climate conditions, huge amounts of water, and excessive human labour.

Indigenous populations would die working in the sugar plantations, which lead to the sugarcane industry to be one of the main importers of African slaves, particularly in the south of Mexico.⁷¹

⁶⁹Chávez Sánchez, A., Rico Espínola, V. M., Tudela Rivadeneyra, E., et. al. (2020). *Ciudad Resiliente: Retrospectiva y Proyección de una Ciudad (In) Vulnerable*. Dirección de Resiliencia de la Secretaría de Gestión Integral de Riesgos y Protección Civil del Gobierno de la Ciudad de México, Mexico City.

⁷⁰ Escalante, P., Martínez García Bernardo, Jáuregui Luis, Vázquez Zoraida Josefina, Guerra, S. E., Dantán Garciadiego Javier, & Aguilar, A. L. (2008). *Nueva Historia Mínima de México* (1st ed.). El Colegio de México, Centro de Estudios Historicos, Mexico City.

⁷¹ Reynoso Jaime, I. (2007). La hacienda azucarera morelense: Un balance historiográfico. *América Latina En La Historia Económica*, 14(2), 51–75. <https://doi.org/10.18232/alhe.v14i2>

Along with agriculture, mining was one of the main sources of economic value in the Viceroyalty of New Spain. New populations were born out of the work in mines, contributing to the transformation of the landscape. Through metal extraction, and its strategic geographic location, New Spain became an important international commerce spot, connecting with Spain through the Atlantic Ocean, and with the Philippines through the Pacific, an early form of globalization. Through the Manila Galleon, international trade from Asia was established through the port of Acapulco, leading to a bigger technological influence and introducing new products such as silk, ivory and spices.⁷²

Besides these colonialist axes mentioned by Mignolo, we should add a patriarchal and religious dimension. Maria Lugones in the article *Colonialidad y género* explains how gender oppression and colonial power were mutually constitutive:

“Understanding the role of gender in pre-columbian societies[...] allows for a paradigm shift in understanding the nature and reach of the changes in the social structure that were imposed by the constitutive processes of the eurocentric colonial/modern capitalism. These changes were introduced through processes that were heterogeneous, discontinuous, slow, and totally permeated by the colonality of power, which violently inferiorized colonized women. Understanding the role of gender in pre-columbian societies shifts the axis for understanding the importance and magnitude of gender in the disintegration of communal and egalitarian relationships, of ritual thought, authority and the collective process of decision-making, and of the economies. This means that on one hand we consider gender as a colonial imposition—the colonality of gender in its complex sense—it deeply affects the study of pre-columbian societies, questioning the use of the concept of “gender” as part of the social organization. On the other hand, comprehending the precolonial social organization through cosmology and precolonial practices is fundamental to grasp the depth and reach of the colonial imposition. But we cannot do one without the other. And, therefore, it is important to understand the extent to which the imposition of this gender system was constitutive to

⁷² Escalante, P., Martínez García Bernardo, Jáuregui Luis, Vázquez Zoraida Josefina, Guerra, S. E., Dantán Garcíadiego Javier, & Aguilar, A. L. (2008). *Nueva Historia Mínima de México* (1st ed.). El Colegio de México, Centro de Estudios Historicos, Mexico City.

the coloniality of power, as well as how the coloniality of power was constitutive to the gender system. The relationship between them follows a logic of mutual constitution.⁷³

It was through a patriarchal alliance that many indigenous communities were co-opted by the conquerors. Through the concept of race, indigenous communities were subordinated or “feminized”. However, the patriarchal system brought by the Spaniards would pressure indigenous men to reproduce the same subordination and feminization towards the women of their own communities. This way, through slow processes, the complementary duality vision is displaced to give way to a subordinated gender binary, which is also crossed by race and class dynamics.

On the concept of race, this emerged during the XIV Century with the idea of purity of blood, referring to the difference between Christian traditions. Purity of blood is consolidated in Spain following the liberation of the kingdom of Castile from the Al-Andalus caliphate, and the consequential expulsion of Arabs and Jews in the year 1492. After this, during the colonial period, societies were stratified through three main races: white, black and indigenous. This hierarchy places the white man at the top and the black woman at the bottom. However, there was a vast combination of these races, starting with forced marriages and rape, which lead to a social structural classification through a caste system.⁷⁴

Under this hierarchy, even if there was a white aristocracy, there was an additional element that related to nationality. This way, only white people born in Spain could occupy the role of Viceroy or other important administrative roles. Administration was centralized in Spain, which led to general discontentment of the creole population, american-born spanish people. The creoles were the main owners of *haciendas* and other economic enterprises. This administration barrier, along with the Bourbonic Reforms that hoped to reorganize the colonial economy during the XVIII century, and the invasion of Napoleon to Spain in 1808, led to insurgent conspiracies and an independence war that spanned from 1810 to 1821.

⁷³ Miñoso, Y. E., Correal, D. G., & Muñoz, K. O. (2014). *Tejiendo de Otro Modo: Feminismo, Epistemología y apuestas descoloniales en Abya Yala* (1st ed.). Editorial Universidad del Cauca, Popayán.

⁷⁴ Mignolo, W. D. (1998). *The darker side of the Renaissance* Univ. of Michigan Press, Michigan.

Regarding the religious dimension, the conquest was legally justified by Spain to the Vatican after the *Junta de Valladolid*, where it was determined that the indigenous were people and therefore possessed a soul. This way, the conquerors were on a mission to save their soul from their “savage ways”. This is why, along with the extraction of natural resources, evangelization was one of the priorities of the Viceroyalty.

Facing cultures with complex cosmological systems, the first thing that the conquerors did was to destroy a great deal of temples, and in many cases use their rubble to build churches on the exact same locations. A lot of mesoamerican codices were burnt, erasing a big portion of the cultural knowledge that was recorded, thus leaving the current task of reconstructing this information to speculation.⁷⁵

However, it was not only the churches that interacted with the preceding religions. New catholic holidays were meant to coincide with ancient rituals, and even deities were substituted by saints and virgins. This created a very syncretic variant of catholicism, that, even if it comes from the Roman canon, it still maintains a lot of ritual elements.⁷⁶

The clearest example of this is Our Virgin of Guadalupe. According to the legend, the Virgin appeared to the recently converted Juan Diego at the Tepeyac hill, where not much before was located an important temple for the goddess Tonantzin, associated with motherhood. Fray Bernardino de Sahagun reports that on this hill, massive pilgrimages were made yearly from the most distant parts of Mesoamerica. With the newly imposed Virgin of Guadalupe, these pilgrimages were maintained, but on Tepeyac hill exclusively, even if there were other churches dedicated to the same Virgin. Fray Bernardino had his suspicions about the indigenous population disguising their cult to Tonantzin as a cult to the Virgin. To this day, the Basilica of Guadalupe receives around four million pilgrims each year.⁷⁷

⁷⁵ Escalante, P., Martínez García Bernardo, Jáuregui Luis, Vázquez Zoraida Josefina, Guerra, S. E., Dantán Garciadiego Javier, & Aguilar, A. L. (2008). *Nueva Historia Mínima de México* (1st ed.). El Colegio de México, Centro de Estudios Historicos.

⁷⁶ Millán, S. (2001). El sincretismo a prueba. La matriz religiosa de los grupos indígenas en Mesoamérica. *Dimensión Antropológica*, (23), 33–49.
<https://doi.org/https://www.dimensionantropologica.inah.gob.mx/?p=655>

⁷⁷ Bernete, F. (2016). La resistencia de la Diosa, la Virgen de Guadalupe como formación de compromiso. *Trama y Fondo: Revista De Cultura*, (41), 33–43. Retrieved May 26, 2022, from <https://doi.org/https://dialnet.unirioja.es/servlet/articulo?codigo=6095847#:~:text=Tras%20la%20conquista%20de%20M%C3%A9xico,uniformizaci%C3%B3n%20de%20la%20fe%20religiosa>.

We should end this section noting the way religion really serves as the ontological foundation of a technological shift in the region. Being the spiritual mission of the conquerors, “conversion” becomes a translation of cosmotechnics that is visible in the colonisation of language, memory, space and gender. This violent cosmological overlap would determine the history of Mexico as an independent state.

3.4 From “independence” to Global Warming

The XIX Century was characterized by a complex process of consolidation of the Mexican State, which suffered many mutations in its conception. First as the Mexican Empire (1821-1823), Federal Republic (1823-1835), Centralist Republic (1835-1846), Second Federal Republic (1846-1863), Second Mexican Empire (1863-1867) and Restored Republic (1867-). These changes can be read as a dispute between two main political groups: Republican Liberals and Centralist Conservatives. These disputes happened amongst armed conflicts between conservatives and liberals, but also wars with Spain, France, the British Empire and the United States of America.

Mexico’s independence was recognized in 1821. By 1848 it had sold 55% of its territory to the USA, and by 1863 Austrian nobleman Maximilian of Hapsburg was imposed as Emperor of Mexico by the conservatives allied with the French. However, despite these conflicts, by the time of the Restored Republic, there was an effective separation between the State and the Church, in which administrative tasks such as the civil registry became a public function. This marked the beginning of a shift towards a “modern” state.⁷⁸

These disputes also reflect how, even if this was a new independent state, it was still run by a small aristocracy, even if now, they could be Mexican born. However, there was not a significant rupture with the modes of production or the social structure from the colonial era. The ruling class were now the creoles, who had now more power over their enterprises, benefitting from a caste-stratified society.

⁷⁸ Escalante, P., Martínez García Bernardo, Jáuregui Luis, Vázquez Zoraida Josefina, Guerra, S. E., Dantán Garciadiego Javier, & Aguilar, A. L. (2008). *Nueva Historia Mínima de México* (1st ed.). El Colegio de México, Centro de Estudios Historicos.

The inequality and exploitation from these modes of production led to a culminating point during the presidency of Porfirio Díaz, who ruled from 1876 to 1911. During the “Porfiriato” the ruling ideology was political positivism. This broadly refers to an ideal of order and progress, bringing about a quick modernization through a totalitarian regime. This way, technologies such as railroads, oil extraction, at-home-electricity, and telephone lines were implemented on the expenses of social inequality, land dispossession and the use of state forces to suppress any type of protest. By the end of his government, 57% of all national territory had been sold as private *haciendas*, with extreme worker exploitation.⁷⁹

The way Porfirio Díaz would re-elect himself indefinitely led to the Mexican Revolution starting in 1910. This period cannot be thought of as a unified movement, but as the emergence of different armed movements throughout the country, fighting for different social causes. The instability that resulted from this conflict led to a longer period of disputes between *caudillos*, or revolutionary leaders.

The revolutionary period is characterized by an important influence from mass media. An important example is the work of the Flores Magon brothers, considered intellectual precursors of the revolution. Through their independently published newspapers, *El hijo del ahuiçote* and *Regeneracion*, they criticized the Díaz government and spread a political vision inspired in anarchism, and which valued the struggles for autonomy by indigenous communities.⁸⁰

Another example of technological shifts during this period is the popularization of documentary photography. Brothers Agustín Víctor and Manuel Casasola were pioneers in photojournalism, and documented many historical moments such as the death of Emiliano Zapata, or the takeover of Mexico City by the revolutionary leaders.⁸¹

Finally, the revolution is also represented through cinema. Pancho Villa, leader of the Northern Division, had an image-right contract with the Mutual Film Company from the

⁷⁹ Anonymous. (2013, November 8). *Positivismismo durante el Porfiriato*. Portal Académico del CCH. Retrieved May 27, 2022, from <https://e1.portalacademico.cch.unam.mx/alumno/historiademexico1/unidad5/sistemaPoliticoPorfirista/positivismo>

⁸⁰ Lomnitz-Adler, C. (2014). *The return of comrade Ricardo Flores magón* (1st ed.). Zone Books, New York.

⁸¹ Archivo Casasola. (2021, December 17). *Acerca de, Archivo Casasola*. Casasola México. Retrieved May 27, 2022, from <https://casolamexico.com/acerca-de/>

United States, with which he filmed the fictitious movie *The Life of General Villa*. He would re-enact his own military actions for the camera, or would fight specific battles in times and places that benefited the production. The movie was released in 1914 while the revolution was still ongoing.⁸²

The *caudillo* struggles led to a series of assassinations of most of the key figures of the period. This eventually led to the stabilization of the military context and the consolidation in 1928 of the Partido Nacional Revolucionario (PNR), the revolutionary party, founded by president Plutarco Elias Calles. The PNR would change its name to Partido de la Revolución Mexicana (PRM) in 1938 and Partido Revolucionario Institucional (PRI) in 1946. This party became hegemonic and ruled uninterrupted until the year 2000, and again from 2012 to 2018.⁸³

By this point there is already a considerable ideological shift from the Viceroyalty period. If during the colony there was a religious cosmology linked to a monarchic rule, by the early XX century we see an industrialized, bureaucratic state accelerating into the splendour of modern capitalism. The promise of development became the ideological basis for the institutionalization of the revolution, and this was brought into popular discourse and mythology through modern art. The Muralist movement led by Diego Rivera, David Alfaro Siqueiros and José Clemente Orozco depicted large scale paintings of socially engaged themes in public spaces with the purpose of fostering a strong national identity based on the promise of prosperity for everyone.⁸⁴

During this period, oil mining became one of the main pillars of the national economy. President Lázaro Cárdenas expropriated the oil from foreign enterprises in 1938, creating Petróleos Mexicanos (PEMEX). Consequently, the use of automobiles is strongly popularized, which had profound consequences in the transformation of the landscape and urban planning.⁸⁵

⁸² Martínez Suárez, J. (2019, April 24). *Pancho Villa: Estrella del Cine Estadounidense*. Gatopardo. Retrieved May 27, 2022, from <https://gatopardo.com/perfil/pancho-villa-estrella-del-cine-estadounidense/>

⁸³ Camín Aguilar Hector, & Meyer, L. (2000). *A la sombra de la revolución Mexicana* (27th ed.). Cal y Arena, Mexico City.

⁸⁴ Museo del Palacio de Bellas Artes. (2019, September 27). *La SEP y el impulso Al Muralismo*. Museo del Palacio de Bellas Artes. Retrieved May 27, 2022, from <http://museopalaciodebellasartes.gob.mx/la-sep-y-el-impulso-al-muralismo/>

⁸⁵ Camín Aguilar Hector, & Meyer, L. (2000). *A la sombra de la revolución Mexicana* (27th ed.). Cal y Arena, Mexico City.

Mexico City had an exponential growth, both in population and urban space. This leads to an urbanization strongly based around the use of cars, building urban highways and viaducts. As the Oficina de Resiliencia Urbana (O-RU) mentions:

“Towards the end of the XX Century, the city started expanding rapidly, and with it, the urgency to drain the basin, with the purpose of avoiding flooding and give way to urbanization, became imminent. From 1967 to 1975, a 68 km deep sewage concrete system was built. However, the subsidence caused by the overexploitation of the subterranean water in the city reversed the slope with which the system drained water. From this, flooding became ever more frequent, and a more aggressive expansion was considered for the system. Even if the system’s capacity and operation were modified, there was still in place a logic of great grey infrastructures.”⁸⁶

The quick population density growth brought about both water supply and retention issues, so the sewage projects had to be expanded. Facing water shortages, the city started extracting water from its underground aquifers. However, these works were quickly cancelled due to a quick sinking of the swampy terrain of the city. This led on one hand, to piping the rivers Magdalena, Churbusco and La Piedad; and on the other hand, to the creation of the extraction system Lerma-Cutzamala. This system, inaugurated in 1975 and expanded in 1985 and 1993, carries 25% of the water that is consumed in the Valley of Mexico, through a total of 206 km from seven dams surrounding the basin.⁸⁷

Throughout the following decades, the PRI stayed in power until the year 2000 through a combination of armed repression, mass media control and corruption in syndical organizations. During this period there was an important industrial and economic growth. In the year 1968, just a few days before the inauguration of the Olympic games in Mexico city, the army, along with paramilitary groups, murdered hundreds of students and workers

⁸⁶ Chávez Sánchez, A., Rico Espínola, V. M., Tudela Rivadeneyra, E., et. al. (2020). *Ciudad Resiliente: Retrospectiva y Proyección de una Ciudad (In) Vulnerable*. Dirección de Resiliencia de la Secretaría de Gestión Integral de Riesgos y Protección Civil del Gobierno de la Ciudad de México, Mexico City.

⁸⁷Instituto Mexicano de Tecnología del Agua. (2021, May 16). *Vulnerabilidad del Cutzamala*. Gobierno de México. Retrieved May 27, 2022, from <https://www.gob.mx/imta/articulos/vulnerabilidad-del-cutzamala?idiom=es>

in the Plaza de las Tres Culturas in Tlatelolco. This repression was aimed to end the student and workers movements that were growing strong in recent years. These type of practices would continue during the following decades, in a period known as the “Dirty war”, in which the army and paramilitary groups would target guerrilla groups and disappear and torture important opposition figures.⁸⁸

This repression was minimized or invisibilized by Televisa, the biggest and most important public television network in Mexico. Through propaganda techniques in their news reporting, consent was manufactured regarding issues such as the student and workers movements.⁸⁹ Since the year 2000, Televisa has been investigated for government ties,⁹⁰ money laundering and collusion with drug cartels.⁹¹

Finally, through national syndicates such as the Confederación Regional Obrera Mexicana (CROM), or the Confederación de Trabajadores de México (CTM), the PRI would maintain its presence and suppress any attempt of organizing that would threaten the regime, creating a system of corporate syndicalism. In this model, collusion between powerful characters in the syndicates and government officials led to a constant exchange of political favors and population control, since access to work and rights were conditioned by the worker’s support and votes for the party. The corruption in these organizations allowed the party to maintain surveillance through society from multiple fronts.⁹²

During the government of president Carlos Salinas de Gortari (1988-1994), a great deal of national companies were privatized, such as banks, airlines, mining companies and the telephone system (Telmex). This last monopolistic company was sold to businessman Carlos Slim Helú, who was named the World’s richest man by Forbes magazine from 2010 to 2013. Telmex benefited from its condition as a private monopoly and grew exponentially

⁸⁸Mendoza García, J. (2011). La tortura en el marco de la guerra sucia en México: un ejercicio de memoria colectiva. *Polis*, 7(2). Retrieved May 27, 2022, from

https://doi.org/http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S1870-23332011000200006

⁸⁹ Trejo Delarbre, R. (1991). *Televisa: El Quinto poder* (5th ed.). Claves Latinoamericanas, Mexico City.

⁹⁰ Tuckman, J. (2012, June 8). *Archivos Informáticos sugieren que Televisa Vendió Cobertura a altos Políticos Mexicanos*. The Guardian. Retrieved May 27, 2022, from

<https://www.theguardian.com/world/2012/jun/08/mexico-televisa-cobertura-politicos>

⁹¹ Hernández Anabel. (2022). *Emma: Y las otras señoras del narco* (1st ed.). Grijalbo, Mexico City.

⁹² Camín Aguilar Héctor, & Meyer, L. (2000). *A la sombra de la revolución Mexicana* (27th ed.). Cal y Arena, Mexico City.

after introducing the internet throughout the whole country. Even if the internet service had an important competitor, this was Cablevision, Televisa's cable branch.

Throughout this period, Salinas de Gortari developed FOBAPROA, a contingency fund that had the purpose of protecting credits from an eventual lack of liquidity. During the privatization period there was an important economic development that allowed unprecedented access to bank credits. Salinas de Gortari negotiated during his government the North American Free Trade Agreement (NAFTA) between Mexico, the United States and Canada, which came into effect January 1st, 1994. This commercial agreement led to many American companies to transfer their factories to Mexico for cheaper labor costs. It also created a bigger dependence to food importation. This way, Mexico consolidated itself as an industrial superpower in sectors such as textile and automotive, but this was due to poor working conditions and big profits to foreign companies.⁹³

On January 1st, 1994, as a response to NAFTA, the Ejército Zapatista de Liberación Nacional (EZLN) rose up in arms in Chiapas demanding justice, autonomy and freedom for the indigenous communities.⁹⁴ On that same year, during the electoral period, the PRI's candidate Luis Donaldo Colosio was murdered a few days before the election. Ernesto Zedillo was elected at the last minute. The political instability of the moment, along with the big amounts of bank credits that had been given in recent years, caused a deficit of 7% in the gross national product in December, leading to a devaluation of 15% of the national currency.

This led to the most important economic crisis of the second half of the XX Century. Facing the threat of retreating investments, and without liquidity to settle debts, Zedillo implemented the FOBAPROA, converting private debts into public debt. This fund was used to settle individual debts, but mainly to rescue the banks and national companies, most of which were just privatized a few years earlier. The transformation of private debt into public debt reached 20,000 million dollars. This amount, along with the devaluation of

⁹³ Griffith-Jones, S. (1997). Causes and Lessons of the Mexican Peso Crisis . *World Institute for Development Economics Research*, (132).

⁹⁴ Comisión Nacional de los Derechos Humanos. (2018). *Insurgencia del Ejército Zapatista de Liberación Nacional (EZLN)*. Comisión Nacional de los Derechos humanos. Retrieved May 27, 2022, from <https://www.cndh.org.mx/noticia/insurgencia-del-ejercito-zapatista-de-liberacion-nacional-ezln>

the national currency, has not been mitigated. At the moment the debt reaches around 48,000 million dollars.⁹⁵

Even if Zedillo managed to stabilize the crisis, there was a big population discontent which led to the PRI to lose the elections in the year 2000, with a victory for Vicente Fox Quesada, from the Partido Acción Nacional (PAN), representative of the corporate sector. During the PRI governments, parastatal forces such as syndicates were controlled through a corporatist system. This also happened with drug cartels. However, with the arrival of the PAN to power, the drug system starts to destabilize. During the presidency of Vicente Fox, for example, Joaquín Guzmán Loera “El Chapo”, leader of the *Cártel de Sinaloa*, escapes from a prison of high security. However, it is during the next PAN presidency, with Felipe Calderón (2006-2012), that the situation scales to violence levels never seen before.

Since the beginning of his government, Felipe Calderón declares “War against drug cartels”, and uses military force to attack these groups. However, by this moment these groups had been growing strong for decades, so the government’s efforts did not come into fruition in trying to reduce the consumption or distribution of drugs, nor the presence of these groups in all deals of public life. If ever, it just created more attention to the complexity that led to these organizations. Since the year 2006, violence in Mexico has continued to escalate. At the moment, around 350,000 have died from this conflict.⁹⁶

In 2012, after the most violent government period to date, the PRI won again with Enrique Peña Nieto. Before becoming president, Peña Nieto was governor of the State of Mexico, which surrounds Mexico City, from 2006 to 2012. In 2006, he was in charge during a forceful repression of an indigenous demonstration in San Salvador Atenco.

Back in 2001, Vicente Fox announced that a new international airport for Mexico City would be built in Texcoco, one of the last surviving water bodies from the lacustrine system in the Valley of Mexico. This caused an uprising of indigenous and farming communities in the region, who manifested discontent with the project. In 2002, the project was cancelled,

⁹⁵ Griffith-Jones, S. (1997). Causes and Lessons of the Mexican Peso Crisis. *World Institute for Development Economics Research*, (132). Retrieved May 27, 2022, from <https://doi.org/https://www.wider.unu.edu/sites/default/files/WP132.pdf>

⁹⁶ Hernández, A. (2011). *Los Señores del Narco*. Grijalbo, Mexico City.

and the communities formed the *Frente de Pueblos en Defensa de la Tierra* (FPDT), which translates to front of communities in defense of the land. During the following years, tensions grew between the FPDT and local authorities. In 2006, with Peña Nieto as newly elected governor, a group of florists from these communities were evicted from selling in the town square of San Salvador Atenco. The FPDT then blocked the Lechería-Texcoco highway as a protest. Federal and state police were sent to violently repress this demonstration, resulting in two deceased, one of them minor of age, and the forceful detention of 206 people. The detained later denounced being tortured and their human rights violated. Twenty six reports of rape and sexual abuse were filed by the detained women.⁹⁷

The 2012 election saw an emergence of social media as an important political agent. On one hand, the PRI implemented a campaign of fake profiles on Twitter, popularly known as Peñabots. These accounts could be programmed bots, or handled by agencies known as “farms”. Through these profiles they managed to spread support for the Peña Nieto campaign, reaching the Trending page on Twitter immediately, and making critical content unreachable⁹⁸. This dynamic was implemented during the rest of the government period. On the other hand, there was a student movement called #YoSoy132, which was organized through social media, mainly by students, protesting unfair practices and collusion with the media by the Peña Nieto campaign.⁹⁹ Finally, during Peña Nieto’s presidency there were reports of the spyware Pegasus being implemented by the government to monitor any meaningful opposition.¹⁰⁰

The government project of Peña Nieto was based around a series of “structural reforms”. One of the main objectives of these reforms was to restructure PEMEX, one of the last few state companies, expropriated by Lázaro Cárdenas in 1936, and to open the oil sector

⁹⁷Suprema Corte de Justicia de la Nación. (2014). *San Salvador Atenco (abuso policial y violación sexual)*. Programa de Equidad de Género en la Suprema Corte de Justicia de la Nación. Retrieved May 27, 2022, from https://web.archive.org/web/20120525214224/http://www.equidad.scjn.gob.mx/spip.php?page=ficha_biblioteca&id_article=349

⁹⁸ Finley, K. (2015, August 23). *Pro-Government twitter bots try to Hush Mexican activists*. Wired. Retrieved May 27, 2022, from <https://www.wired.com/2015/08/pro-government-twitter-bots-try-hush-mexican-activists/>

⁹⁹ Latino, V. (2012, August 7). *#YOSoy132: Mexican elections, media, and immigration*. HuffPost. Retrieved May 27, 2022, from https://www.huffpost.com/entry/yosoy132-mexican-election_b_1574814

¹⁰⁰ Redacción Aristegui Noticias. (2017, August 17). *Rastros de espionaje en México apuntan a que fue el gobierno: Snowden en Videoconferencia*. Aristegui Noticias. Retrieved May 27, 2022, from <https://aristeginoticias.com/1708/mexico/rastros-de-espionaje-en-mexico-apuntan-a-que-fue-el-gobierno-snowden-en-videoconferencia/>

for foreign market competition¹⁰¹. In the year 2014 the airport project in Texcoco was resumed, with a new design by the Zaha Hadid firm.¹⁰²

In that same year, forty three students of the Escuela Normal in Ayotzinapa who were on their way to Mexico City to be part of a commemorative demonstration of the massacre of Tlatelolco in 1968, were detained by police and military elements, from both local and state levels. They were then handed over to paramilitary groups from drug cartels. The bodies of the students were never found, and this created a major social discontent and demonstrations that caught on the attention of international media. What this episode shows is that, eight years from the start of the war on drugs, the impunity, violence and collusion between government and criminal organizations had become normalized in Mexican society.¹⁰³

Adding to this, during Peña Nieto's government there was an important devaluation of national currency. The dollar's worth went from 13 pesos in 2012 to 20 in 2012. All of these factors contributed to the victory of Andrés Manuel López Obrador (AMLO) in 2018. AMLO became popular by being one of the strongest critics against the conversion of private debt into public debt by the activation of FOBAPROA during the economic crisis of 1994. Originally part of the PRI, he was one of the most important figures in the newly found left party, PRD, founded by Cuauhtémoc Cárdenas, son of Lázaro Cárdenas, who expropriated the oil. AMLO was chief of government in Mexico City during Vicente Fox's presidency. He contended for presidency against both Felipe Calderón and Enrique Peña Nieto. After his first defeat in 2006, he left PRD and created his own political party, MORENA.¹⁰⁴

AMLO's government main projects are strengthening the National Guard as an alternative to local police; the cancellation of the Texcoco airport, and construction with the help of

¹⁰¹ Presidencia de la República EPN. (2014, August 18). *¿Conoces las 11 reformas?* Gobierno de México. Retrieved May 27, 2022, from <https://www.gob.mx/epn/articulos/conoces-las-11-reformas>

¹⁰² Cruz, D. (2014, September 22). *Serrano Arquitectos + Zaha Hadid architects Presentan Su propuesta del nuevo aeropuerto internacional de la ciudad de México*. ArchDaily México. Retrieved May 27, 2022, from <https://www.archdaily.mx/mx/627520/serrano-arquitectos-zaha-hadid-architects-presentan-su-propuesta-del-nuevo-aeropuerto-internacional-de-la-ciudad-de-mexico>

¹⁰³ Hernández, A. (2016). *La Verdadera Noche de Iguala: La historia que el gobierno trató de ocultar* (1st ed.). Grijalbo, Mexico City.

¹⁰⁴ Presidencia de la República AMLO. (2018). *Andrés Manuel López Obrador*. Gobierno de México. Retrieved May 27, 2022, from <https://www.gob.mx/presidencia/estructuras/andres-manuel-lopez-obrador>

the military of a new airport in Santa Lucía; the construction of a new oil refinery in Dos Bocas, Tabasco; and the construction of a “Maya Train” in the Yucatan Peninsula.¹⁰⁵ However, the most iconic element of his government is the implementation of daily press conferences that are broadcasted on television and social media, known popularly as “Mañaneras”. Through these conferences, of varying times between one and three hours, AMLO reports on his government’s work and comments on relevant public events.¹⁰⁶

If in the 2012 elections social media had an important role, for 2018 they were determinant. On his third electoral run, AMLO already had the support of a big portion of the population, since the last two governments had resulted in a weak economy and high levels of violence. Since 2006, AMLO campaigned through each one of Mexico’s towns, thus strengthening his popularity. During the 2018 campaign, with a favorable advantage in the polls, AMLO strengthened his media presence, particularly within social media.

His campaign and government have been characterized by the way he spreads iconic and recognizable concepts (memes), to produce a massively supported populist discourse. His government was self-proclaimed as “*the country’s fourth transformation*”, the previous three transformations being the independence, the separation of state and church, and the revolution. This transformation consists of eradicating corruption by a group he calls *la mafia del poder* (the mafia in power), composed by *conservative* groups, such as his last electoral contestant, Ricardo Anaya, who he named *Riki Riquín Canallín* (something like Richie Rich). He also said during his campaign the iconic phrase *Me canso ganso*, affirming his determination to bring about social change. All of these concepts circulate through social media in the form of memes, political cartoons or simply by being part of popular discourse.¹⁰⁷

Through the “Mañaneras” press conferences, AMLO uses these concepts, such as the *conservatives*, to *discredit* any type of opposition or criticism towards his government. While it’s true that there is a wealthy conservative part of society that is against his government,

¹⁰⁵ Presidencia de la República AMLO. (2019, May 1). *Plan Nacional de Desarrollo 2019-2024*. AMLO. Retrieved May 30, 2022, from <https://lopezobrador.org.mx/temas/plan-nacional-de-desarrollo-2019-2024/>

¹⁰⁶ Presidencia de la República AMLO. (2022, May 30). *Conferencias de prensa*. AMLO. Retrieved May 30, 2022, from <https://lopezobrador.org.mx/?s=conferencia%2Bde%2Bprensa>

¹⁰⁷ MILENIO. (2018). *AMLO llama "Ricky Riquín Canallín" a Anaya*. YouTube. Retrieved May 30, 2022, from https://www.youtube.com/watch?v=K4fKHxX6QYs&ab_channel=MILENIO.

AMLO has used the concept of conservatives to discredit social movements such as the feminist movements that have protested against the rising women murdering rates and violence against women in the country,¹⁰⁸ or environmentalists and indigenous communities who protest against the destruction of ecosystems in favor of the construction of projects such as the Maya Train.¹⁰⁹

Even if AMLO's discourse states that his government represents the end of the neoliberal period, referring to the privatization period led by Salinas de Gortari, the logic of land dispossession and exploitation remains.¹¹⁰ Not only this, but an important portion of the Maya Train is being built by Carlos Slim, the same to whom Salinas de Gortari sold Telmex during the privatization period.¹¹¹ Finally, despite the massive public support of the current president, violence rates have not ceased to increase.¹¹²

During the last few years, water has become an increasingly worrying issue in Mexico. At the moment, more than half of the country's territory is facing water shortages, while there is an ongoing drought. Mexico City is no exception, as it almost solely depends on the Lerma-Cutzamala system of extraction. Ironically, the city also suffers from seasonal floods due to extended rainy seasons, and a poor sewage infrastructure.¹¹³

3.5 Current context

¹⁰⁸ Redacción Animal Político. (2021, September 29). *Movimiento Feminista Busca perjudicarme, es conservador, dice amlo*. Animal Político. Retrieved May 30, 2022, from <https://www.animalpolitico.com/2021/09/amlo-movimiento-feministas-es-conservador-busca-perjudicar-go-bierno/>

¹⁰⁹ Redacción Aristegui Noticias. (2019, November 10). *Conservadores se disfrazan de ambientalistas contra tren maya: AMLO*. Aristegui Noticias. Retrieved May 30, 2022, from <https://aristeginoticias.com/1011/mexico/conservadores-se-disfrazan-de-ambientalistas-contra-tren-maya-amlo/>

¹¹⁰ Galván, M. (2021, December 9). *Guerrero y Chiapas, Los estados con más desplazamientos forzados en 4 años*. ADNPolítico. Retrieved May 30, 2022, from <https://politica.expansion.mx/mexico/2021/12/09/guerrero-y-chiapas-con-mas-desplazamientos-forzados>

¹¹¹ Redacción Animal Político. (2021, April 17). *Amlo y Carlos Slim Evalúan Avances de la Construcción del Tren Maya*. Animal Político. Retrieved May 30, 2022, from <https://www.animalpolitico.com/2021/04/amlo-carlos-slim-tren-maya/>

¹¹² Defunciones por homicidio de enero a junio de 2021. (2022, January 25). INEGI. Retrieved May 30, 2022, from <https://www.inegi.org.mx/contenidos/saladeprensa/boletines/2022/do/do2021.pdf>

¹¹³ López, R. (2017). *México experimenta escasez de agua y falta de equidad en su distribución*. Gaceta UNAM. Retrieved May 30, 2022, from <https://www.gaceta.unam.mx/mexico-experimenta-escasez-de-agua-y-falta-de-equidad-en-su-distribucion/>

Through this chapter we have synthetically reviewed Mexico's history through the lense of the technologies that characterize each period. This path shows us the way *technics* are linked to cultural and political contexts, in brief, to the cosmovision of the culture that uses such technologies. We can see how the Valley of Mexico in particular has been a strategic location that has administered vast territories throughout different regimes. We can also see some important cosmological shifts from mesoamerican technology, based on the attention to natural cycles and adaptation of the city to the lake through the chinampa-milpa-oral tradition complex; versus the modern technological universal, which conceives land as territory for exploitation. With this distinction we do not mean to idealize an unreachable past, nor to create a binary opposition between models, but to attest that other cosmotechnic models are feasible.

Although much of the technological development since the conquest coincides in big part with the narrative of modern mono technology, it is important to note that a good deal of indigenous cosmovision resists, although distorted by the violent imposition of the modern paradigm. On one hand, there are hundreds of indigenous communities that preserve their languages and traditions, despite receiving discrimination, repression and land dispossession by the state and society. On the other hand, elements such as religious syncretism, and even the milpa practices are elements that are present in some parts of the population.

What this account reveals is that the implementation of the modern paradigm is closely linked with the use of technology to extract and exploit the land, and to submit lower classes and indigenous communities. From this perspective, the development of the modern paradigm in technological terms seems to only exacerbate inequality and precarity, despite its ideological discourse promises an opposite social effect. On the other hand, the cultural role of technology is much more complex than this. Although forms of government such as the Viceroyalty, or the modern Nation-State have the capability to direct an extractivist tendency at a macro scale, it is also possible to reclaim our relationship with technology as a form of resistance, dissidence or posthuman innovation.¹¹⁴

¹¹⁴ Braidotti, R. (2022). *Posthuman feminism* (1st ed.). Polity, Cambridge.

It is also interesting to note the way cosmology mutates through the centuries. We see shifts in religious traditions throughout the mesoamerican period, then a transition towards a catholic monarchy, and then a departure from the church towards modern capitalism. We have seen the way these changes occur parallely to the deployment of new technologies. Note how, although at the present moment the Catholic church is still very popular in Mexico, it does not really explain the pairing of technology and political administration the way it did back in the Viceroyalty era. Instead, the ideas of progress, development, and dignity through working in a market-based economy, are much more helpful to understand the current context.

In the next chapter we will speculate with a technological breakthrough that departs from the modern paradigm, imagining which type of tools are needed to revert extractivism and mitigate the survival crisis in the region.

4. Chapter IV

The Fungi Approach: *How can technological diversity bring forward a reversal of extractivist economies and foster autonomous governance for communities?*¹¹⁵

So far we have reviewed the historical conditions that explain the current situation in Mexico City. We find that currently, the modern, mono-technological paradigm is still established¹¹⁶, however, remains of mesoamerican cosmotechnics, such as the survival or resistance of the chinampa practice in Xochimilco¹¹⁷, are a living testament that other models are possible. This crisis is also framed within the sixth massive planetary extinction, sometimes named the Anthropocene crisis, referring to the destruction of biodiversity and ecosystems due to human activity, as seen by the rise of global temperatures¹¹⁸. With extended droughts, deforestation, seasonal fires, ocean contamination, among many other phenomena, this crisis seems to challenge the modern, humanist and mono-technological paradigm, in which the Earth-Territory and Nature-Resources can be infinitely extracted for gross domestic product increase indefinitely.

4.1 Gaia theory

It is at this point in which symbiosis and the Gaia theory developed by Lovelock and Margulis become relevant to inspire the imagination of other worlds. Gaia theory states that the Earth's atmosphere is regulated at a large scale by the biota, specifically by bacterial activity. This way, the notion of an *a priori* nature or Earth is challenged by a vision that understand the necessary conditions for life as the result of the living being's own processes throughout millions of years¹¹⁹. This theory is very relevant regarding scalability. Through the temporal dimension, the development of atmospheric conditions is the result of an evolutionary process that places symbiosis as the protagonist, in contrast with the

¹¹⁵ An early version of this text was presented at Materia Abierta's online symposium "Simbiosio"

¹¹⁶ Delgadillo, V. (2022, February 23). *La Urbanización Especulativa Es Tendencia en ciudad de México*. El País. Retrieved July 24, 2022, from <https://elpais.com/planeta-futuro/seres-urbanos/2022-02-23/la-urbanizacion-especulativa-es-tendencia-en-ciudad-de-mexico.html>

¹¹⁷ Secretaría de Agricultura y Desarrollo Rural. (2018, July 23). *Las chinampas, un antiguo y eficiente sistema de producción de alimentos*. Gobierno de México. Retrieved July 24, 2022, from <https://www.gob.mx/agricultura/es/articulos/la-agricultura-en-chinampas>

¹¹⁸ Moore, J. W. (2015). *Capitalism in the Web of Life: Ecology and the Accumulation of Capital* (1st ed.). Verso, New York.

¹¹⁹ Margulis, L., & Sagan, D. (1997). *Slanted Truths: Essays on Gaia, Symbiosis and Evolution* (1st ed.). Copernicus, New York City.

Darwinian and Neodarwinian theories¹²⁰, which would prioritize competition, selfishness and individual benefit of species.

Symbiosis, and particularly the studies of Lyn Margulis, challenge the very notion of individual, since, again, referring to scalability, we find that Eukaryotic cells are actually a product of symbiotic bacterial interactions. What we understand as individuals are in fact complex networks of bacterial communities, composing the different units, such as organs and their functionalities, that would in turn form an “individual”.¹²¹ A case study that reveals this complexity are mycelial networks and their relationship with plants. Some mycologists have even reached the point of discarding the notion of fungal species due to the complex mycelial entanglement in which these beings develop. In many cases, looking at a mycelial network in a forest, it would be hard to identify where one “individual” would end and the next would start. There is also the example of lichens, hybrid beings composed partly by an algae and partly by a fungus. Finally, mycorrhiza, the symbiotic association between fungi and plant roots, which is fundamental for both species survival and feeding processes, challenge the notion of “selfish genes” as an evolutionary force¹²².

We should also point out that Margulis and Sagan warned about not idealizing symbiotic relationships as purely mutualist. Instead they propose to look at them as a spectrum that ranges from parasitism to pure mutualism. However, through this perspective, we have a scientific argument that invites us to challenge the political values lying at the core of the humanist ideology and the modernity project. We should consider that the traditional evolutionary theory was used to scientifically justify an idea of “human nature” as the basis of an economic model that revolves around individualism, extraction and consumption. The clearest example of this trend was “Social Darwinism”, a popular concept between 1860-1945, used to justify imperial expansion and the rise of racist authoritarian regimes.¹²³

¹²⁰ Dawkins, R. (2019). *The Selfish Gene*. Folio Society, London.

¹²¹ Margulis, L., & Sagan, D. (1997). *Slanted Truths: Essays on Gaia, Symbiosis and Evolution* (1st ed.). Copernicus, New York City.

¹²² Sheldrake, M. (2020). *Entangled Life: How Fungi Make Our Worlds, Change Our Minds & Shape Our Futures* (1st ed.). Vintage, Dublin.

¹²³ Hawkins, M. (1998). *Social Darwinism in European and American Thought, 1860-1945* (2nd ed.). Cambridge Univ. Press, Cambridge.

It is true that the association of the Gaia theory with New Age spirituality has been in detriment of its support and defence in the scientific community¹²⁴. However, this does not mean that the theory does not imply a deep questioning of the philosophical foundations of science, and therefore opens up possibilities beyond the current dominating logics. From resonances with indigenous cosmovisions and epistemologies that do not distinguish humanity-culture and nature¹²⁵, up until alien theories of life on Earth. While this may open the door to non rigorous postmodern spiritual fanaticism, it is a double edged-sword considering the potential it has to think about cybernetic, multi-scalable systems that could be helpful to take on the challenges of the present¹²⁶.

4.2 Symbiotic speculation

It is at this point in which this project takes a literary license and aims to imagine scenarios in which modernity, and therefore technology, become fragmented towards a plurality of worlds¹²⁷. Taking into account the way symbiosis operates at multiple, simultaneous scales, we have to consider that these scenarios do not take place in a linear temporality. A lot of this plurality of worlds already exists (resists) in our present time, as we can witness through the diverse territory defense movementa by indigenous and rural movements in Mexico¹²⁸.

The next important issue to clarify is that, in a fragmented modernity, “development” does not equate to the conquest of novelty as we currently understand it. In many cases, the technological work of survival can actually mean un-doing, decomposing, redistributing, or rescuing practices that are no longer in use. In this fragmentation, the technological discussion is closely related to philosophical and political issues. For instance, the Latin-american concept of “Buen vivir”, or “Good life”¹²⁹, an idea of life in harmony

¹²⁴ Anonymous. *What is Gaianism?* Gaianism. (2016, August). Retrieved July 24, 2022, from <http://gaianism.org/what-is-gaianism/>

¹²⁵ Danowski Deborah, Eduardo, V. de C., & Álvarez Rodrigo. (2019). *¿Hay mundo por venir?: Ensayo sobre Los Miedos y los fines* (1st ed.). Caja Negra, Buenos Aires.

¹²⁶ Margulis, L., & Sagan, D. (1997). *Slanted Truths: Essays on Gaia, Symbiosis and Evolution* (1st ed.). Copernicus, New York City.

¹²⁷ Hui, Y. (2020). *Fragmentar El Futuro: Ensayos Sobre Tecnodiversidad*. (T. Lima, Trans.) (1st ed.). Caja Negra, Buenos Aires.

¹²⁸ Aguilar Gil Yásnaya Elena, Aguilar-Guevara, A., Varela, J. B., Badillo, G. O., & Rodríguez Valentina Quaresma. (2020). *Aïï manifiestos sobre la Diversidad Lingüística* (1st ed.). Almadia, Mexico City.

¹²⁹ Balch, O. (2013, February 4). *Buen vivir: The Social Philosophy Inspiring Movements in South America*. The Guardian. Retrieved July 24, 2022, from <https://www.theguardian.com/sustainable-business/blog/buen-vivir-philosophy-south-america-eduardo-gudynas>

between environment, community and individuals, inspired in Ecuador the first official constitution that recognizes rights for nature. Here, the political artifact establishes a legal ground for changing practices that could lead to other modes of living.

Technological speculation takes into account the non-linearity of this paradigm shift. For instance, Donna Haraway proposes the speculative era of the Cthulucene, an era of cyborg symbiosis in which the survivors of the mass extinction create strategic material alliances to preserve life. In her argument she uses the example of the monarch butterfly, a species that migrates every year from Canada to Mexico. She uses this movement to emphasize the many local efforts of community resistance, land protection, movements for water autonomy, among others throughout the continent¹³⁰.

The non-linear nature of this fragmentation is also due to the main obstacle for this future survival landscape: military imperialism from the global powers. Precisely through the modern paradigm, the “political subject” (based on the male european burgeoise) participates in the political landscape through representative democracy, and therefore is supposed to have certain level of influence in government decisions. However, what we see currently is an exacerbated global inequality, an acceleration of industrial production and the defense of an extractivist economy through strategic military interventions for fossil fuel production. All of this despite the disillusion and preoccupations of vast populations whose votes cannot really stop the “destruction machine”¹³¹.

Systemic violence, which we sadly witness in Mexico through the excessive murders of environmental activists¹³², among many others, reveals how this paradigm will be defended by any means possible, no matter the consequences. This way, we can project a future in which the inequality and violence tendency is maintained, and consequences of climate change, such as water shortage, droughts, heat waves, biodiversity loss, hurricanes, floodings, and many more become exacerbated.

¹³⁰ Haraway, D. J. (2016). *Staying with the trouble: Making kin in the cthulucene*. Duke University Press, Durham and London.

¹³¹ Turley, J. (2014, January 11). *Big money behind war: The military-industrial complex*. Opinions | Al Jazeera. Retrieved July 24, 2022, from

<https://www.aljazeera.com/opinions/2014/1/11/big-money-behind-war-the-military-industrial-complex/>

¹³² Ruiz-Healy, E. (2021, September 14). *Registran 227 Activistas Ambientales Asesinados en 2020; 30 en México*. El Economista. Retrieved October 30, 2022, from <https://www.economista.com.mx/opinion/Registran-227-activistas-ambientales-asesinados-en-2020-30-en-Mexico-20210914-0004.html>

Even if the current situation seems to be aiming towards this future, the idea of this exercise is to consider this possibility among other, more favorable scenarios, to counteract a nihilist and defeatist ideology that seems to characterize our social moment¹³³. Once again, to reference symbiosis, we can consider these futures more as a spectrum, from the most parasitist to the most mutualist. On one extreme, humanity annihilates itself and a good portion of life as we know it, and on the other it reaches a balance, reduces its impact and restores affected or destroyed ecosystems. Of course the aim here is not to produce a binary opposition, but to present a range of possibilities. It is also not to replace a totalitarian paradigm with a similar alternative.

The specific examples of this exercise require some literary licences, considering its a work of fiction. However, the idea is for them to be inspired by technological possibilities with present references. A very provocative scenario for Mexico City is the return to the lacustrine city¹³⁴ with an updated chinampa and urban agriculture system adapted to the XXI or XXII centuries. Through various capture and filtration technologies, and urban planning and design, the city slowly rehabilitates the surviving water bodies and rivers that are trapped in concrete. This allows for the city to reduce its hydric dependence with nearby aquifers.

Local agricultural production reduces economic dependence on international trade. Open-source patents allow people to build electronic devices using recycled materials. Free energy is distributed through electric towers such as the ones proposed by Nikola Tesla¹³⁵. The bacteria *Ideonella Sakaiensis*¹³⁶, capable of metabolizing plastics, is integrated to human intestinal flora through medical intervention, allowing microplastic digestion.

¹³³ Segal, G. (2021, February 13). *The Doomer: The most important meme of a generation?* Mouting Off Magazine. Retrieved July 24, 2022, from

<https://moutingoffmagazine.com/the-doomer-the-most-important-meme-of-a-generation/>

¹³⁴ Pacheco, J. E. (2011, March 27). *Vuelta a la Ciudad Lacustre*. Agua.org.mx. Retrieved July 24, 2022, from

<https://agua.org.mx/vuelta-a-la-ciudad-lacustre/>

¹³⁵ Tesla Science Center. (2020, November 25). *The Tower*. Tesla Science Center at Wardenclyffe. Retrieved July 24, 2022, from <https://teslasciencecenter.org/history/tower/>

¹³⁶ Tanasupawat, S., Takehana, T., Yoshida, S., Hiraga, K., & Oda, K. (2016). *Ideonella sakaiensis* sp. nov., isolated from a microbial consortium that degrades poly(ethylene terephthalate). *International Journal of Systematic and Evolutionary Microbiology*, 66(8), 2813–2818. <https://doi.org/10.1099/ijsem.0.001058>

Of course none of these situations would be enough without structural changes in government, production and consumption. Autonomous governance models are tested on local community levels, while the nation-state model is dismantled. The individualist paradigm in the law is replaced by a tendency to prioritize the relationship between community, territory and individuals. Cooperative administration and communal property replaces the free market model¹³⁷. The dominant ideology in mass media shifts from individualist consumerism towards ritualistic, cyclic community production. These scenarios occur on the speculative plane through collective organization exercises, facing violent repression from a paradigm that refuses to be displaced.

While these ideas may sound utopic or frankly impossible, the objective of this exercise is to influence collective imagination through these possibilities, at least on a discourse level. Referring back to Solarpunk gaming as a counterapparatus, the idea is to participate in a creative process that includes participation or interactivity as a core element in the consumption of content, which could lead to a more critical relationship with the ideas expressed.

¹³⁷ Aguilar Gil, Y. E. (2020, December 9). *Una propuesta modesta para Salvar al Mundo*. Rest of World. Retrieved July 24, 2022, from <https://restofworld.org/2020/tecnologia-tequio-cambio-climatico/>

5. Chapter V

The Game's Path: *The process of the practical project in the context of the Multimedia Art Master program at FBAUL.*

The practical project for this thesis is a videogame titled *La ciudad lago (The Lake City)*. It is the result of an artistic and research process that was developed during the four semesters of the Master program at Faculdade de Belas-artes da Universidade de Lisboa, starting in September 2020, and ending in October 2022.

A good starting point to understand this process would be the COVID-19 pandemic. During the Project I and Transmedia Lab courses at the beginning of the program, while taking online classes in lockdown, I was very interested in exploring ghosts and their relationship with media. I made a project titled *Ghost Communication*. This made sense considering the isolation regime required most communication to happen virtually. Some of the ideas that came from this first process can be found in the first chapter of this document.

However, this was also accompanied by an installation that included textile prints, a microphone and a video series that combined the research with a form of video diary, a mash-up of previous works, and some music that was produced during that period. In technical terms, this process included exploration of softwares and techniques that were novel for me (Touchdesigner and VCV Rack), and eventually led to a modular set of elements that would be later recombined for different other outputs. The *Ghost Communication* project was presented at the Spring Seminar at UCP Porto. The music created through this period was also used in the final videogame.

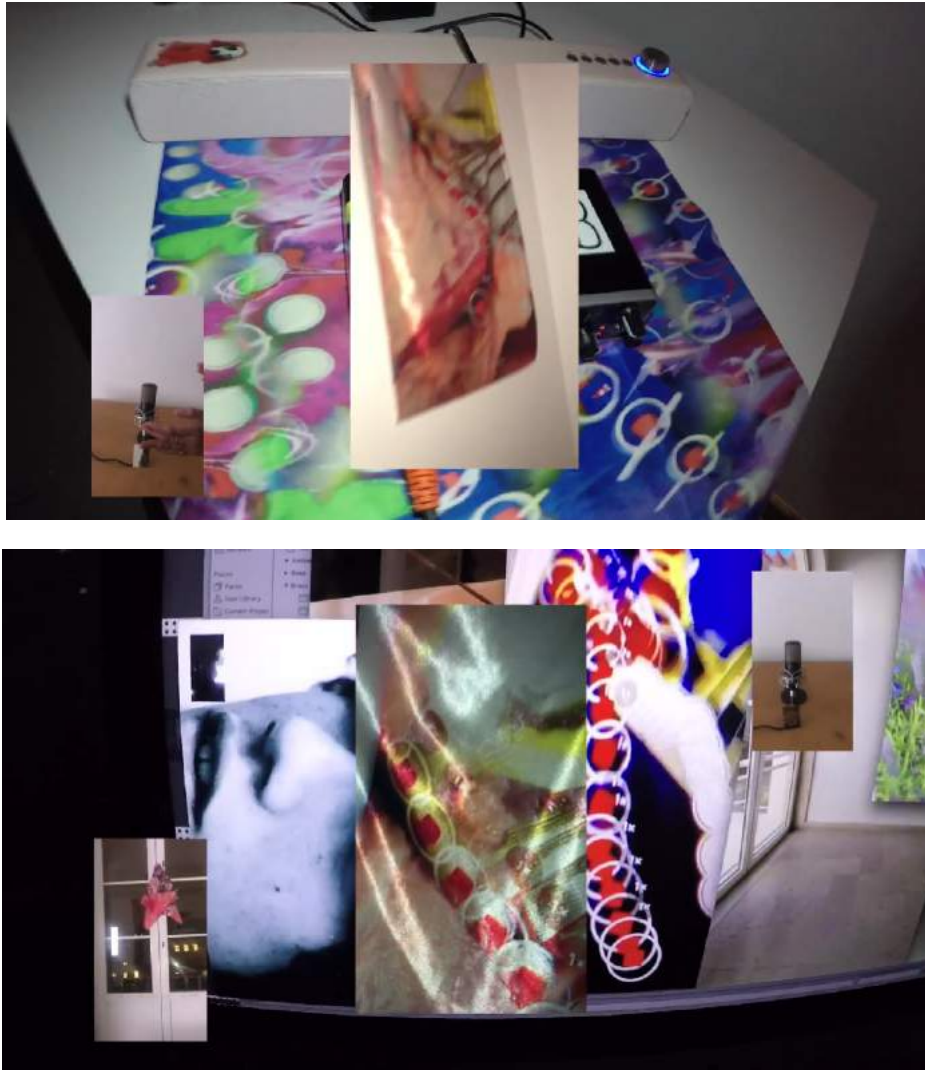


Figure 1 and 2 – Images from the Ghost Communication installation

During the second semester, some elements of the *Ghost Communication* project were transferred into a collaborative project made for the Transmedia Questions course, titled *Baralha.me* with colleagues Mariana Carvalho, Renata Torralba and Sandra Araújo. Here we produced a deck of oracle cards, where each artist would design 11 cards. We then made an altar that included some of the elements presented in the cards, we recorded a video performance and made a website that had all the information for the project. For the cards I designed, I used some of the textures from the *Ghost Communication* video series, and I also included some drawings from elements that would later acquire importance on my final project, such as the corn and the deity Chalchiuhtlicue. This project was later presented again at Prisma gallery and FBAUL's Cisterna.

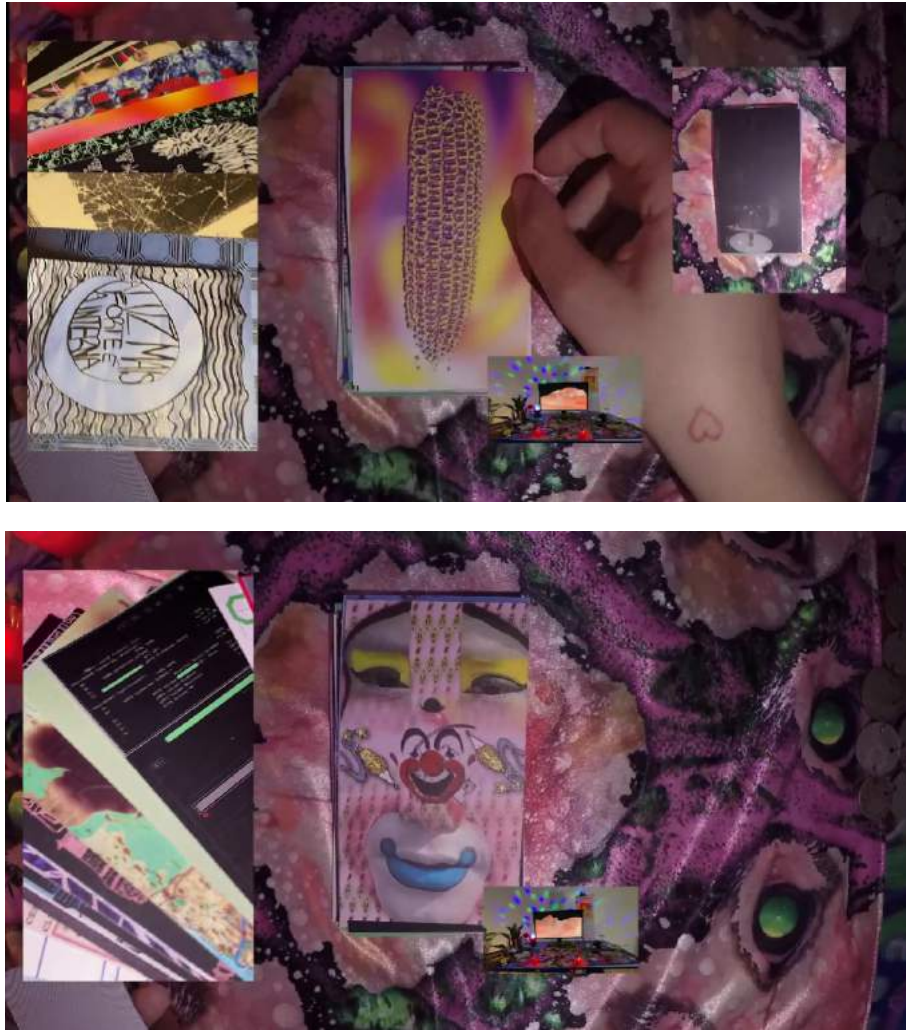


Figure 3 and 4 – Images from the *baralba.me* video performance

It was during this semester that I realized I wanted my final project to be directed towards gaming. I already had some ideas of the themes that I wanted to work on, such as the environmental crisis, and spectral, non-linear time, which came from the *Ghost Communication* project, but now aimed towards understanding the historical context of Mexico City. Also, during this semester I took the Game Design course, in which I collaborated with a team of programmers from Instituto Superior Técnico in the development of a videogame titled *Noah's Nightmare*. Here I designed some pixel art characters for the game, one of which (a ghost) ended up appearing on my final project. This helped me understand more about video game production, and encouraged me to pursue this project.

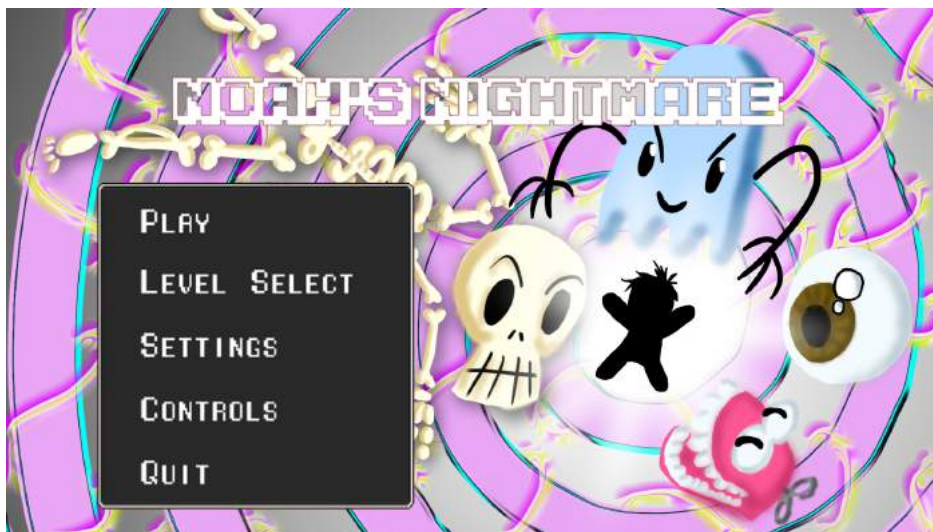


Figure 5 and 6 – Images from the *Noah's Nightmare* videogame

During the third semester I started collaborating with a videogame collective back in Mexico City called Medio Inestable, and they introduced me to the open-source videogame engine Godot, which I ended up using for the development of my project. During this time, and up until now, we have been developing a racing videogame in our free time. However, this was extremely useful in getting used to the technical aspect of the project. During this semester I had also the goal of learning 3D modelling (Blender) to be able to include some 3D levels in my project. While doing this, I designed some characters for the Medio Inestable game, from which I ended up using the Grasshopper for my own game.



Figure 7 – Image from the production of *El camino del deseo* videogame by Medio Inestable

This ability to transfer elements of previous works from one project to another has been a constant element since the *Ghost Communication* project, and it has to do with the very concept of Transmedia, as we have discussed earlier, in which media is a spectral dimension of reality, and therefore content is constantly recombined to create new meanings in different contexts.

During this semester I developed both the concept of the game, and created a big bulk of assets that would compose the content of the levels. Since the beginning, it was my goal to create a game made out of minigames, that, inspired by the spectral, nonlinear time of ghosts, would provide the player with different perspectives about technology, Mexico City, the lakes it was built on, and the past, present, and future. The game developed for this project would only be a demo version, as I would then use it to find funding opportunities to be able to turn it into a collaborative project and have guest artists, researchers and activists create their own minigames, thus expanding the project's discourse beyond my subjective perspective.

By the end of the third semester, I presented an early demo version at the Project III course. My colleague Simão Rodrigues showed the project to his friend Filipe José, who is a

programmer, and got us in contact to collaborate. Filipe José was kind enough to offer help with the coding aspect of the project, which until then had been very complicated for me since I had no formal training in coding. Since then, and during the last semester, we continued the project in a collaborative manner, I would create content and the general structure of new levels, and he would make the elements work. He also debugged my original version.

Finally, during the fourth and last semester, I focused more on developing the research aspect of the project. This gave me clarity about the topics I was interested in exploring, and helped me translate these ideas into characters, dialogues and game dynamics. I went to Mexico City for a month and made 3D scans of some elements that were included in the last level.

I do feel there is still much more to be explored and translated into the game, but for now I believe the idea comes across. As of the demo I am submitting as my final project, it is composed of 6 levels and 4 interactive cutscenes. I will describe the structure briefly:



Figure 8 – Game Main Menu

Main menu presented in figure 8: introduces the controls, has an “About” page, and the option to exit the program.



Figure 9 – Lake level one



Figure 10 – Ghost labyrinth level one

In the game level named *Lake 1*, showed at figure 9, the player can see the lake has not been inhabited by humans. In this level players (you) meet an Axolotl and a Grasshopper. In the *Ghost labyrinth* level, presented at figure 10, players (you) became a ghost finding your way through a labyrinth to haunt the mobile network.

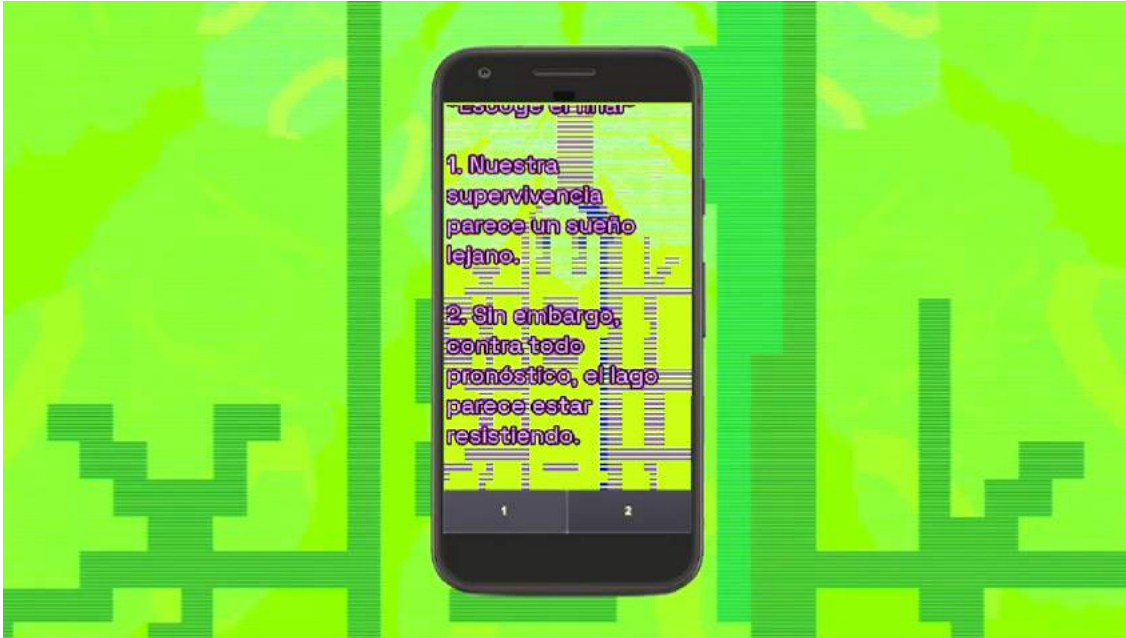


Figure 11 – Ghost cutscene one

Figure 11 shows the Ghost cutscene number one. Here, the ghost haunts a telephone and brings a message from the future about how people are trying to restore the city's rivers trapped in concrete.



Figure 12 – Lake level two



Figure 13 – Milpa minigame

Figure 12 shows lake level two. The lake is now an abstract version of Mexico-Tenochtitlan. Players (You) hop on various chinampas to reach a Rabbit that tells you the story of how

the city was later conquered. In the Milpa minigame presented in figure 13, players (You) must collect 100 foods from the milpa while avoiding junk food.



Figure 14 – Plastic digestion cutscene

In figure 14 the plastic digestion cutscene is presented. It tells the story of how a new drug allows to use the bacteria *Ideonella Sakaiensis* to digest plastics, as the Earth will be too eroded to have agriculture anymore.





Figures 15 and 16 – Lake level 3

In the lake level three, shown in figures 15 and 16, the lake is now a big crowded city filled with buildings and cars. The player (You) find the Axolotl again, who talks about how the city became the icon of an extractivist model.



Figure 17 – Calendar cutscene

In the calendar cutscene shown in figure 17, the 20 symbols of the days of the Mesoamerican calendar tell the story of how this time system reveals a cosmotechnic that can be useful to imagine alternatives to our current technological regime.

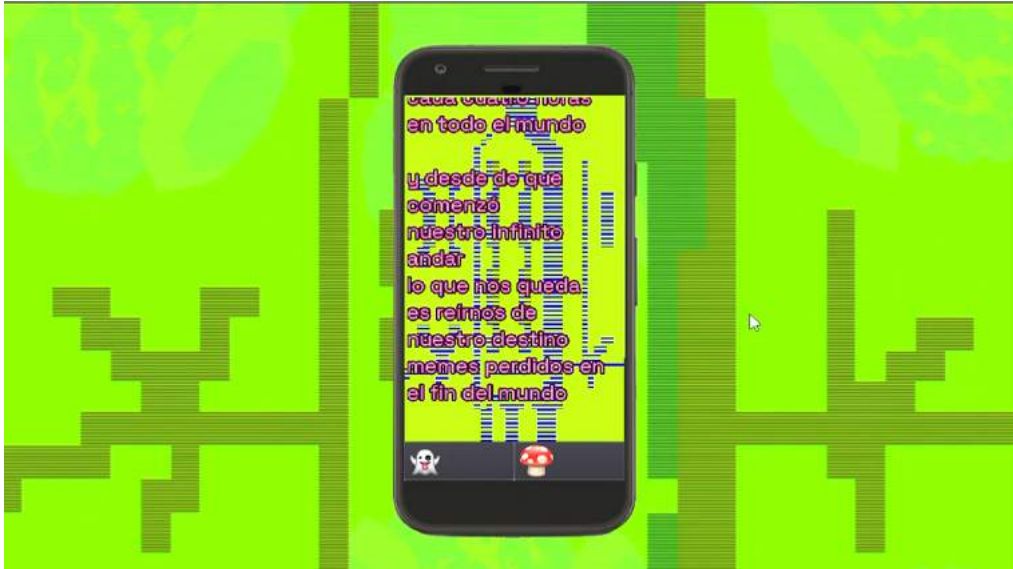


Figure 18 – Ghost cutscene two

In the second ghost cutscene, shown in figure 18, the ghost haunts a telephone and brings a message from the future about how people have been migrating indefinitely, leaving messages for future generations.





Figures 19, 20, 21 – Lake level four

Lake level four, shown in figures 19, 20 and 21, has a more detailed scale model of the Valley of Mexico. Here the player (You) has to collect coins based on the calendar symbols, escape a jaguar and speak with the milpa crops to grow 5 milpas. Each time a milpa is grown, some elements of a collage made from 3D scans appear on top of the lake. When the player (You) collects all coins, the credits roll and the game ends.

The game is available to download on the following link:

[https://drive.google.com/drive/folders/1glL9NmHDKYPaN5MykQhA4Q2hESn5m59j?usp=share link](https://drive.google.com/drive/folders/1glL9NmHDKYPaN5MykQhA4Q2hESn5m59j?usp=share_link)

A full gameplay can be seen here:

<https://youtu.be/IqJlCg--mCM>

6. Final Conclusions

Throughout this research and practical process, I have tried to establish a creative feedback loop that goes back and forth from theory to practice. It has been challenging to merge a best attempt into rigorous academic writing, and the production of a project in a medium that was novel to me. However, the process has been extremely nurturing and hopefully can be inspiring both critically and artistically for whoever comes across this work.

In terms of the themes that have been discussed, I will do my best to make a brief synthesis of this research, and end with some questions that have come up during the process that would be useful for future works. However, if I can try and sum it up into a single line, it would be a collection of references that try to weave possibilities for future speculation.

So first off, I wanted to establish the spectral dimension of media, and the possibility of an outside realm beyond what we understand as our reality. This comes from the intention to gaze towards a possibility beyond, outside or contingent to modernity. In this sense, ghosts can be seen as allies in terms of making possible the understanding of alternative timelines, alternative ways of being in the world. This also establishes a double-edged dimension to technology, as both a possible apparatus and counterapparatus. However, what this relationship truly shows us is a complex system of technological control that, far from really dismantling modernity, reinforces its grip on nature and humans alike.

But, if there is any potential of functioning as counterapparatus, I believe videogames are, within mainstream media, very promising as they introduce an interactive dimension and produce immersive experiences that blur the line between fiction and reality. We saw this with Solarpunk and the way it is trying to invoke a sustainable future. However, as we see from the concept of cosmotechnics, sometimes Solarpunk examples come off as naive or greenwashing, since they do not really propose a break from the modern-capitalist ideology, and only changes some of its forms into the use of renewable energies. We have to be generous considering the promising intentions behind this genre.

Then, when we look at the specific history of the Valley of Mexico, we find a complex story of how modernity was imposed and has been sustained through the use of violence

and technology. Looking at this history, it would be hard to imagine a future beyond the extractivist project, and frankly, it was challenging trying to include these possibilities in the practical project. I feel like, such as the title of Yuk Hui's book, this future comes off as "fragmented", in the way that we can only glimpse briefly into them, but not fully.

However, it has been inspiring to draw and identify elements of Mesoamerican cosmotechnics that survive to this day, and knowing that they have the potential to be combined with contemporary critical approaches to technology.

Finally, if we take this intention into account, and combine it further with the symbiotic perspective, then a big space of speculation truly appears. Symbiosis and Gaia theory are valuable in the way they create a scientific background (somewhat of a counterapparatus in itself) to challenge the notion of human exceptionality that is so central to Modernity. It is very provocative to imagine how science could change if the nonhuman took ever more important roles in the way we create knowledge, and how this could be eventually reflected in technology.

The first question that came up during this process is resisting the urge to apply moral values to the subjects of study. This could make sense in the context of creating a videogame, but I will admit to having a tendency to create antagonizing connections throughout the research, especially when it comes to describing modernity and technology. Although I can recognize this, I did my best to not be reductionist, and would want to clarify that we should not look at these concepts through moral binaries such as good/bad. Instead we should understand their ever more complex contexts and forms of relationship. We cannot really fit technology, ideology or culture into these categories. However, we can study their interaction within these complex contexts, and problematize their relationships.

This point then brings up the question of agency in these processes. As we have discussed, our present subjectivity is deeply rooted in an individualist perspective that often tries to reduce the complexity of issues such as water shortage to a matter of personal choice. Many contemporary trends such as reusable straws or tote bags come from the anxiety and desire of wanting to be morally free of the responsibility of environmental damage. However, looking at these processes through a broader, ideological perspective, we find that the focus on individuality is in itself a resource for the continuity of this project. We

then wonder: how can we truly take responsibility? In such an antagonizing time, is it possible to take action collectively and bring about a different world, or at least a different model?

A posture that I have sustained through this work is that we can at least try and imagine these possibilities, talk about them, share them and maybe bring them into existence. However, on the other hand we see how, through the development of Modernity and technology growth, discourse serves as the ideological device that pairs technology and a cosmovision into a closed control system. Novelty and trends become then a channel for the continuity of hegemony. I do wonder if theoretical efforts could eventually breach these cycles, or if they are just producing more noise and information that simply feeds this process.

It is disheartening to think about extractivist models, and especially to live with the violence associated with them, since it normalizes a feeling of impunity and disillusion. But in the end, and on a strictly personal level, being able to put these ideas down together and clarify this landscape feels like a good start to work towards answers to these questions, and of course, to the creation of new questions.

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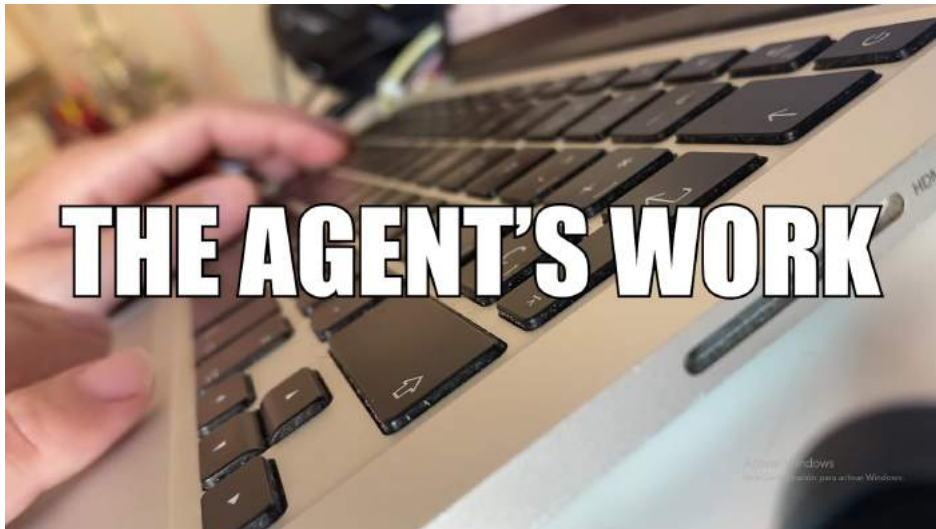
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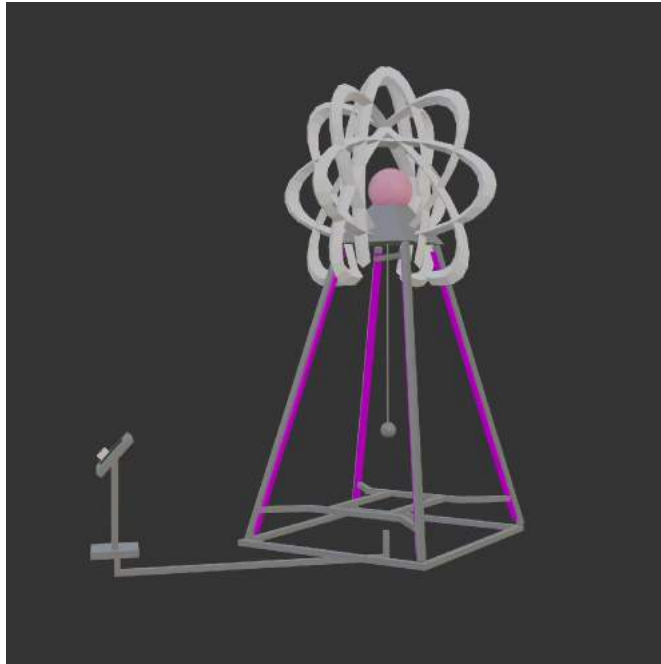
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9. Appendices

The following images are documentation of projects that were produced during the course of the Master's degree. Some of them were isolated from this project, but all of them influenced my process creatively.



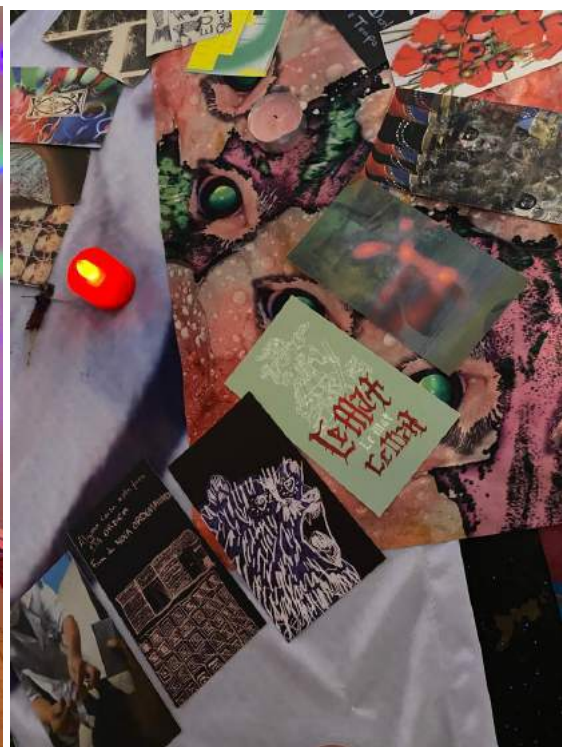
Figures 22 and 23 - Screenshots from the video performance *The Agent's Work*, inspired by my job as a Customer Care Agent, and presented on the Transmedia Lab course.



Figures 24, 25 and 26 - Design projects for Instituto Superior Técnico



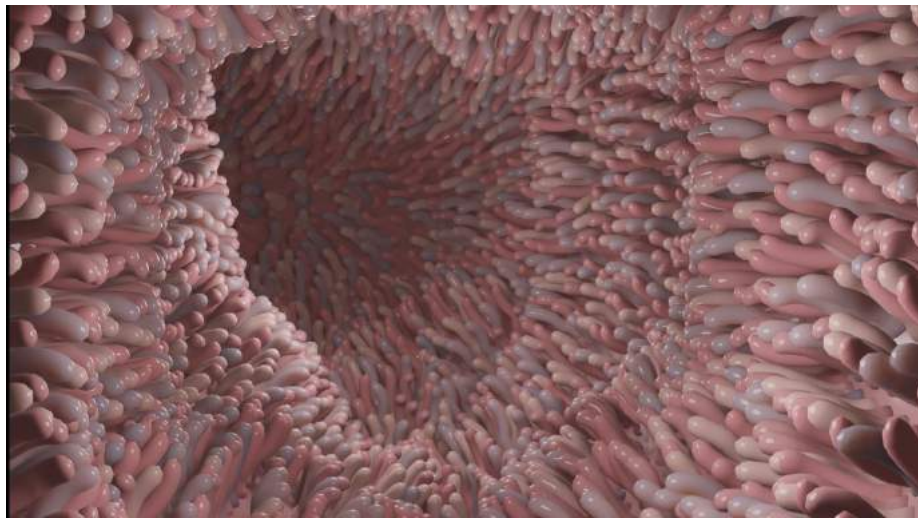
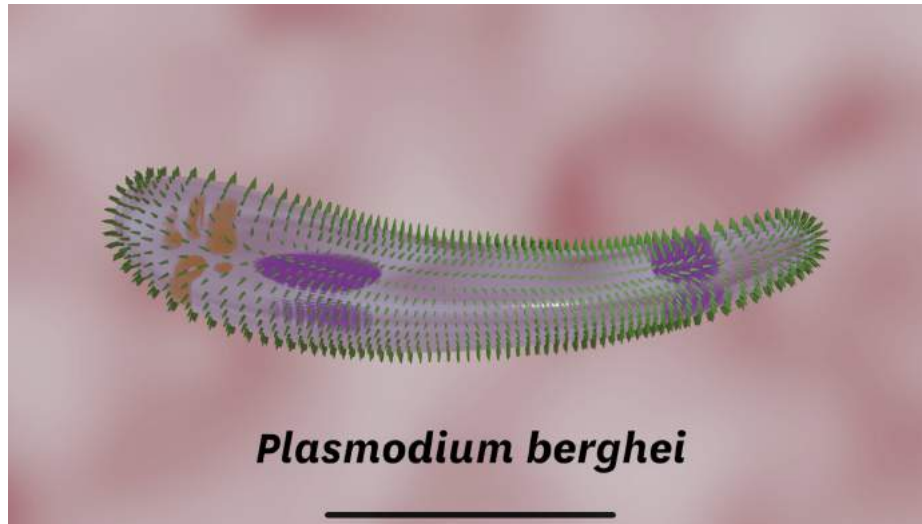
Figures 27, 28 and 29 - Scenes from the documentary *As Vozes da Rede*, produced for the Observatorio Nacional de Violência de Género at IGOT



Figures 30, 31, 32 and 33 - *baralha.me* presented at Prisma gallery in Lisbon



Figures 34, 35, and 36 - *baralha.me* presented at FBAUL's Cisterna



Figures 37 and 38 - 3D animations for Instituto de Medicina Molecular, the last one was used as a background video for the Plastic digestion cutscene in the videogame