

Toxic City: An Inquiry Into Environmental Health Through
Graphic Novel Making

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Abstract

Toxic City : An Inquiry Into Environmental Health Through Graphic Novel Making

Toxic City is a research-creation project composed of a short graphic novel and a written component that investigates the process of making a personal graphic novel about environmental health and toxicity. Drawn by hand, the self-reflective silent graphic novel uses metaphors and the feature of the gutter to illustrate a story around the connections between health, environment and toxicity. The written component is organized around the contribution of this research to the four modes of research-creation as described by Owen Chapman and Kim Sawchuk. The topic of toxicity is analyzed with a deconstruction of health impacts and legal implications, environmental health justice with a reading of Foucault, fiction and graphic media making, and a short autobiography.

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Table of contents

Introduction	1
1. Research-for-creation	2
1.1 Toxicity and Human Health	2
1.2 Environmental Health Justice	6
1.3 The Problem With Science.....	8
Conclusion	8
2. Research-from-creation	9
2.1 Production of Knowledge.....	10
2.2 Biopower	13
2.3 Resisting Biopower	15
Conclusion	18
3. Creation-as-research.....	18
3.1 The Fine Line Between Fiction and Reality	18
3.2 Semiotics : The Gutter	22
Conclusion	23
4. Creative Presentation of Research.....	23
5. Complications.....	26
Conclusion	28
Works Cited.....	30

Introduction

The microscopic is an invisible place of struggle. With the ongoing Covid-19 pandemic, an awareness about the ways that the scale of the infinitely big connects to the world of the infinitely small is emerging. While the pandemic and climate change are hot topics, another invisible struggle is happening at all times within our bodies. Many substances can seep from the environment through the protective layers of our skin. A common thinking is that individuals have a choice - in regards to what we eat, drink, what we apply on our skin, or what we use to clean or decorate our homes. However, when food is already expensive and organic options are even more unaffordable, and when the culture incites at using certain products for social acceptability, the question of choice becomes muddy. Furthermore, some factors are impossible to control through consumer choices, such as the substances we come across at work, and in our neighborhood. In a world where air, soil and water are contaminated, which health risks are citizens facing from the exposition to toxic substances? Is everybody equal in terms of environmental health?

I used the form of graphic novel to explore these questions, in order to produce a personal and accessible creative-research. I am indebted to previous graduate students who have explored different topics through the medium of graphic novels. Three Concordian alumnis in particular have paved the way for my thesis : Grant Collins produced hybrids between painting and comics (*Comics, Art, and the Everyday*), Emmanuelle Dufour pictured stories in order to ask questions about what it means to be a white colonizer (*Des Histoires à Raconter*), and Isabel MacDonald has illustrated interviews from local haitians criticizing humanitarian organizations after the 2010 Haiti earthquake (*Picturing Aid in Haiti*). Another artist that I am drawing from is Nick Sousanis, who produced a philosophical investigation into the art of graphic noveling as doctorate thesis. *Unflattening* had a significant influence on the style of *Toxic City*.

In this thesis, I am using an epistemological approach to investigate the connections between environmental health and the medium of graphic novel in four research-creation modes. My objective is to use the full range of research-creation to picture a self-reflective illustration of the environmental health injustice of toxicity, and to contribute to the fields of critical disability studies as well as comics and graphic novel studies. Mixed methodologies are employed, starting with investigative journalism, then moving to social justice lenses, followed by using graphic novel

making as a method, and ending with a short autobiography. The chapters will be divided using the four modes of research-creation according to Owen Chapman and Kim Sawchuk, and I will discuss in which ways each mode was incorporated into my project. I will firstly investigate the topic as a research-for-creation through scientific literature, secondly as a research-from-creation in a reading of Audre Lorde, Lochlann Jain and Michel Foucault, thirdly as a creation-as-research in the domain of graphic novel making, and fourthly as a creative presentation of research in the form of a personal essay. The last part will consider issues that have not been addressed, and challenges that arise from the research.

1. Research-for-creation

Chapman and Sawchuk describe research-for-creation as “an initial gathering together of material, ideas, concepts, collaborators, technologies, et cetera, in order to begin” (15). It includes finding relevant concepts and experimenting with prototypes. I will discuss the preliminary findings I used when planning the conception of the graphic novel and this paper, relating to concepts of toxicity and social determinants of health. I will argue that commercial interests are the priority of the government, in opposition to public health. Governmental websites, information from advocacy groups, scientific literature and news articles will be used as evidence.

1.1 Toxicity and Human Health

Living organisms are composed of cells. Cells are the smallest units of life. Their activities are both individual and collective. Various chemicals compose the cells. Chemicals, in turn, are part of everything in the world, including the water in your glass, cats, trees, compost, or even your shower curtain.

Toxicity is not limited to human-made chemicals. The Canadian Centre for Occupational Health and Safety defines toxicity as “a measure of the poisoning strength of a chemical. Chemicals with low toxicity require large doses or amounts to cause poisoning. Chemicals with high toxicity only need small doses to cause poisoning” (*What Makes Chemicals Poisonous*). In other words, anything that enters the body can become poisonous, and quantity is a key factor in the level of toxicity of a chemical. Humans can develop acute toxicity when the body is suddenly overwhelmed by toxic chemicals, and chronic toxicity when the exposure happens on smaller

doses over a long period of time (*What Makes Chemicals Poisonous*). Therefore, because it is relative to a dose, toxicity is not a black or white phenomenon.

Since the Industrial Revolution, the presence of toxic chemicals in the environment has dramatically increased. In 1962, Rachel Carson described the current situation of chemicals in her book *Silent Spring*: “Their presence casts a shadow that is no less ominous because it is formless and obscure, no less frightening because it is simply impossible to predict the effects of lifetime exposure to chemical and physical agents that are not part of the biological experience of man” (Chapter 12). The effects of newer man-made chemicals are not well understood. Carson gives an example of the complex interactions of ecology by mentioning a pesticide that was sprayed on elms and ended up causing the death of all the robins because they ate the worms that were contaminated. She also points out that humans tend to deny what does not seem an immediate threat, such as health issues that only develop after decades of exposure (Chapter 12). As we will see, the way toxicity and health are currently being handled at the Canadian federal level attests to this.

We want to believe that what is available on the shelves of our stores is safe, since there are laws protecting consumers regarding the ingredients in consumer products. However, this has not always been the case. In 1933, a traveling exhibit named the “American Chamber of Horrors” was informing the American public of dangerous products available on the market (Stevenson). It included beauty cream made of mercury and a mascara that literally burned the eyes to the point of turning people blind (Eschner). The exhibition eventually led to the creation of the Federal Food, Drug and Cosmetic Act (FDCA) in 1938 (Stevenson). The FDCA, along with the Fair Packaging and Labeling Act (FPLA), are laws applied by the Food and Drug Administration (FDA). The FDA regulates cosmetics, but it does not screen products before they are sold on the market (*FDA Authority Over Cosmetics*). In other words, regulations exist in the US, but they do not protect consumers from products that contain known dangerous chemicals and have not yet received attention. The same scenario exists in Canada, along with the European Union (EU): they have a post-market program – meaning that the products are not going through an approval procedure, and the regulations happen after entering the market (*Chemicals in Consumer Products and Cosmetics*).

The Canadian equivalent of the FDCA and FPLA is the Food and Drugs Act, and the Cosmetic Regulations, both applied by Health Canada (*Regulatory Information for Cosmetics*). According to Prevent Cancer Now, an organization that works in cancer prevention advocacy on a national level: “Canada evaluates chemicals, some of which end up on the hotlist, using a risk-based assessment approach. This means chemicals are evaluated by the level of risk posed to Canadians through possible exposure” (Melanson). Even if a risk is known, the chemical can be used in cosmetics if the risk is considered low (a precision will come later). On a report of the Auditor General of Canada, Health Canada “aims to examine approximately 4,300 chemical substances used commercially” by 2020 (*Chemicals in Consumer Products and Cosmetics*). As stated by Prevent Cancer Now: “The European Union follows a hazard based assessment model, which means that if there is a known hazard associated with a chemical it is more likely to be banned or restricted” (Melanson). More than 1,300 chemicals were prohibited by the EU, in comparison to 11 in the US (Milman). In Canada, over 500 chemicals have been banned (Melanson). Still, there is a lot to learn from the EU in terms of cosmetics regulations.

The Canadian Environmental Protection Act (CEPA) is the broader legislation used in Canada to protect citizens from toxic man-made chemicals, and it is in need of a profound and urgent reform. According to Breast Cancer Action Quebec (BCAQ), CEPA “defines what constitutes a toxic substance and establishes, among other things, controls on emissions of air and water pollution and hazardous waste”, and is used across a wide range of municipal, provincial, and federal laws (*Why We Need to Reform the Canadian Environmental Protection Act*). Still according to BCAQ, the main problems with the legislation unfold in three ways: it leaves out crucial chemicals that should be regulated for our safety (including hormone-disrupting and carcinogenic substances), it is limiting the implementation of pollution prevention programs, and it does not provide standards for air quality and drinking water. CEPA was written in 1999, it is outdated, and citizens are not adequately protected against toxic chemicals.

Carcinogens are substances that cause cancer. The World Health Organization divides suspected agents into a range of categories depending on their probability of causing cancer (*IARC Monographs Questions and Answers*). According to the American Cancer Society: “When a substance or exposure has been labeled a carcinogen, it means it has been studied extensively by researchers, and one or more agencies have evaluated the evidence and determined it to be a cause

of cancer” (*Determining if Something is a Carcinogen*). It is a process where the notions of risk and hazard are differentiated: hazard is the capability of the agent to cause cancer, and it is steadier than the amount of risk, which “measures the probability that cancer will occur, taking into account the level of exposure to the agent” (*IARC Monographs Questions and Answers*). When a different use is found for a chemical, the risk associated with it will change. A known carcinogenic agent that has been approved for a specific use where the exposure was relatively low could potentially be used in a different way. In this scenario, humans can be exposed to a much higher dose of the agent, and the risk factor would increase. This is the reason why carcinogens are approved for use depending on the industry, and why we must remain vigilant on new substances appearing in the ingredient lists of the products we consume. It also sheds light on the reasoning behind the preventative EU cosmetics regulations that systematically prohibits the use of any chemicals labeled hazard. In comparison, the Canadian cosmetics regulations allow some of them.

A blatant example of the backward legislation in the USA (and to some extent in Canada) is talc powder. Talc, a product used by generations of women, is suspected to be carcinogenic, but the evidence is not clear. It used to contain asbestos, and although the company affirms that this carcinogen has been removed from the modern version of its powder, there have been incidents where contamination with asbestos has been confirmed (Labos). In May 2020, Johnson & Johnson announced that they will stop selling their talc powder in North America, citing the thousands of lawsuits in relation to cases of ovarian cancer that have been launched against them, while reaffirming the safety of the product (*J&J to Stop Selling Talc-Based Baby Powder*). The fact that such a widely used product might have been responsible for ruining thousands of lives demonstrates the urgency of a preventive approach regarding toxic substances in consumer products.

Some types of chemicals can have more potent effects than others. Endocrine disrupting chemicals (EDCs) are an example of such chemicals. According to the National Institute of Environmental Health Sciences (NIEHS), EDCs have a different impact on the body since a lower dose can lead to health issues: “The body’s normal endocrine functioning involves very small changes in hormone levels, yet we know even these small changes can cause significant developmental and biological effects” (*Endocrine Disruptors*). These substances can cause abnormal physiological consequences such as sexual dysfunction, uterine diseases, cancer, and

many other conditions (Rimbert). They can be found in sanitary and cleaning products, as well as food (Rimbert). Endocrine disruptors are not an easy phenomenon to research, since they are common in the environment. In the words of the NIEHS: “Because people are typically exposed to multiple endocrine disruptors at the same time, assessing public health effects is difficult” (*Endocrine Disruptors*).

Phthalates are an example of EDCs that are banned in EU but allowed in Canada, despite rising concerns about its safety. According to the Government of Canada’s page about Safety of Cosmetic Ingredients: phthalates are considered “safe at the levels at which they are currently used in cosmetics” (*Safety of Cosmetic Ingredients*). But what exactly is a safe level of EDC, when the NIEHS affirms that only a little can have serious health consequences?

Changing current regulations for a pre-market screening with a hazard based program would mean ensuring safer cosmetics in Canada. Furthermore, cosmetics is only one of several industries that should be investigated in relation to carcinogens and EDCs, since they are also present in an excessive number of common places. Public health would benefit from a more thorough approach on the situation. Finally, impact on wildlife would be another aspect to peruse, as all these chemicals are often washed away in the sewer system, and then into the ocean (Soto and Sonnenschein).

1.2 Environmental Health Justice

When toxic chemicals are involved, not everyone has the same odds of developing health issues. Social inequities are a major factor affecting these odds. According to the National Institute of Environmental Health Sciences, “These social inequities, often referred to as social determinants of health, include differences in individual behaviors, cultural influences, access to health services, economic status, and literacy levels” (*Environmental Health Disparities and Environmental Justice*).

Plenty of chemicals are released into the air and cause a serious threat to public health. The Health Effects Institute regularly posts the latest research on the correlations between loss of life expectancy and air pollution, including an annual global report. In the *State of Global Air 2019*, we learn that life expectancy worldwide has diminished by a year and 8 months because of illnesses

related to air pollution, compared to someone born in an environment without air pollution (16). The report explains it by : “increased hospitalizations, disability, and early death from respiratory diseases, heart disease, stroke, lung cancer, and diabetes, as well as communicable diseases like pneumonia” (11). According to a governmental study, in the eastern part of Montreal, life expectancy can be affected by as much as 9 years (Brassard). This has been explained by its close proximity to highways, which has impoverished the air quality of the neighborhoods (Bérubé). Therefore, location can be a key factor in the amount of pollution one is exposed to.

Socioeconomic status and race have been the object of studies in regards to air quality. According to a research from 2015, North American communities with a “low socioeconomic status” live in areas with higher concentration of air pollution (Hajat et al.). A study from 2018 in the US demonstrates that air quality and pollution disproportionately impact people of colour, and Black people more particularly, because they have higher probabilities of living in areas closer to facilities that produce high emissions (Mikatis et al.). A paper from 2017 illustrates that oil and gas facilities “specifically threaten the health of African American communities” (Fleischman and Franklin 3). The substances emitted from those facilities “are linked to increased risk of cancer and respiratory disorders” (Fleischman and Franklin 3). The authors observed that “African Americans are exposed to 38 percent more polluted air than Caucasian Americans” (6), a number that correlates with higher rates of asthma and cancer in Black communities. I have not found similar studies done in Montreal, but we can ask whether this pattern might be happening here as well.

There are other examples that illustrate how race is likely to influence proximity to substances that are harmful, especially in conjunction with gender. This can be seen through cosmetics usage. Black women have been specifically targeted in advertisements for talc powder (Kirkham and Girion). According to *The Environmental Injustice of Beauty*: “Compared with white women, women of color have higher levels of beauty product–related environmental chemicals in their bodies, independent of socioeconomic status” (Zota and Shamasunder). It is mentioned that hair straighteners and skin lighteners are known to contain alarming rates of endocrine disruptors, and that the companies making these products target women of colour. Race and gender are therefore determinant factors when it comes to proximity with toxic chemicals, and may increase risk of environmental diseases.

1.3 The Problem With Science

How do we produce the kind of “hard” science research that is necessary to understand carcinogens and endocrine disruptors? The difference between basic and applied research is crucial for answering this question. Basic research is meant to gather new knowledge without a precise objective, while applied research has a specific objective or problem to solve. Applied research is often tied with commercial interests (*Basic VS. Applied Research*). Could it be that the kind of research needed to explore the connections between environment and health mostly fall within the category of basic research, since it does not aim to reach a targetable goal, produce a medication, or find a solution to a problem? While statistics about basic research are not recorded by the Canadian government, an investigation conducted on the Natural Sciences and Engineering Research Council (NSERC) suggests that funding for basic research only in this major federal institution of over \$1 billion has diminished by 12% in 25 years (Veletanlic). The fact that basic research funding is in decline demonstrates that the issue of prevention of environmental diseases is tied to a larger problem of the allocation of resources in science. We cannot ignore that our institutions are being driven by commercial interests. Furthermore, science research funding from the federal government has dwindled in recent years (Khan). While there has been research on some characteristics of carcinogens and ECDs, air pollution and longevity, the issue is that the trail is followed once trauma and death has been experienced in the community, rather than in a preventive mode. As Audre Lorde says very succinctly: “We live in a profit economy and there is no profit in the prevention of cancer; there is only profit in the treatment of cancer” (*The Cancer Journals* 71).

Conclusion

While gathering information for the topic of this research-creation, I learned how the impact of toxic chemical substances present in everyday life affects the health of certain populations in a severe way, across a wide range of illnesses that can strike several organs of the human body. Air quality and the ingredients contained in cosmetics are two examples that illustrate the unequal distribution of toxicity across the population, but they are two among many others. A critical view of the situation allows for acknowledgement that race and gender are some of the specific factors that increase the risk of suffering from environmental diseases. The rising health inequities require further investigations, but also concrete action on the part of authorities, since

better regulations are needed to stop the amount of toxic chemicals that circulate in the environment, not limited to the examples of cosmetics and air, but also everywhere else - including water, food and soil. How long are we going to maintain this cycle of trauma before doing active research on the prevention of environmental diseases? Are we using vulnerable people as living petri dishes for testing toxic substances? We need to hold Canadian federal institutions accountable for the way they are currently handling (or mishandling) the presence of toxic substances in our environment.

2. Research-from-creation

While doing research-creation, we can generate research data. Research-from-creation involves more than making a standalone creation. It “can also involve analyzing different dynamics that flow from a game or creative project and may lead to the writing of more formal academic papers that are based on an experimental art practice” (Chapman and Sawchuk 17). When I was working on the script of *Toxic City*, I felt that I had to find a mechanism to connect different articulations of the theory together.

Revisiting some of Michel Foucault’s fundamental concepts allows us to see parallels emerge between capitalism, governmental regulations, institutions, medicine, graphic novels, and social determinants of health. Philosopher Michel de Certeau has discussed strategy and tactics in *The Practice of Everyday Life*, and this distinction can emphasize the ways in which cancer patients can subvert dominant ideas about living with a chronic illness. In *Caliban and the Witch*, Italian scholar and activist Silvia Federici has engaged with the history of medicine from a Marxist-feminist perspective, and her work sheds light on gender and the production of knowledge in institutions. Audre Lorde was a Black feminist author, professor and poet who has detailed her personal experience of living with cancer as a lesbian and person of colour. Author Lochlann Jain has also written on their personal experience of living as a cancer patient. The nonbinary professor of medical and legal anthropology has critically analyzed the illness in relation to capitalist interests, and in relation to gender.

2.1 Production of Knowledge

Is the state deliberately letting industries poison us? To answer, I will explore Foucault's analysis of the production of knowledge, and Michel de Certeau's notions of strategy and tactic. For Foucault, we have to look at censorship as playing a side role to power, because censorship is more of a tactic than a strategy. In other words, it is a tool rather than a strategic orientation. In this way, censorship is one way to exert and maintain power, but it is not the only one, because it is one tactic among others (Foucault, *La Volonté de Savoir* 21). De Certeau differentiates between the two in this way: "I call a *strategy* the calculation (or manipulation) of power relationships that becomes possible as soon as a subject with will and power (a business, an army, a city, a scientific institution) can be isolated" (35-36). Later, he adds: "A Cartesian attitude, if you wish: it is an effort to delimit one's own place in a world bewitched by the invisible powers of the Other. It is also the typical attitude of modern science, politics, and military strategy" (36). In contrast, a tactic can also be employed by a force counter to the dominant power (de Certeau 37). This difference between tactic and strategy has prompted a question in relation to environmental health justice: is there a strategy at play behind this phenomenon?

Testimonies hold an important role in environmental health justice, and the hierarchization of "hard" sciences as better or truer is meant to disqualify other valid ways of producing knowledge. When the research does not yet exist about a phenomenon, and testimonies are all that we can rely on as preliminary information, Foucault's idea of the authoritative invisible science and the perception of something as being scientific or not as a way to legitimize or delegitimize knowledge becomes clearer. *Il Faut Défendre La Société* is a transcription of Foucault's course at College de France. In his class on January 7 of 1976, he gave a lecture on what is a course, and put into question the production of knowledge, and what he calls "la hiérarchie des connaissances et des sciences" (*Il Faut Défendre La Société* 9). He is distinguishing between two types of knowledge: knowledge that is considered scientific, and the one that is not perceived as such. The first type is accepted, and therefore invisible, because it is not put into question as much as the second type. Rather than a divide between legitimate or illegitimate, he contrasts the two as either submissive or fight knowledge (17). The disqualified/fight knowledge allows for criticism of institutions and of relationships of domination. The role of the expert has to be questioned, as it imposes a hierarchy of knowledge: "Il s'agit, en fait, de faire jouer des savoirs locaux,

discontinuuous, disqualifiés, non légitimés, contre l'instance théorique unitaire qui prétendrait les filtrer, les hiérarchiser, les ordonner au nom d'une connaissance vraie, au nom des droits d'une science qui serait détenue par quelques-uns" (10). As toxicity is a multidisciplinary topic with many gray areas, and as many researches do not yet exist in part because of the priority accorded to applied research as opposed to fundamental research, it is safe to assume that we cannot rely solely on proven "hard science" facts from experts of legitimized sciences. Humanities, a field that is sometimes devalued in comparison with "hard" sciences, has accorded a place of choice to testimonies, and values questioning the production of knowledge. Together, researchers from the humanities and from "hard" sciences can complement each other, instead of competing.

We tend to take for granted that experts are impartial appliers of science, while this is not the case. Experts could be more akin to inspectors, who apply norms and knowledge that has been absorbed and homogenized by institutions. Analyzing the production of knowledge through the status of expert, and observing the hierarchy of knowledge, sheds light on problematic discourses and practices, and makes visible what is hidden under a cover of legitimacy. Through a critical analysis of history, Foucault posits that technical knowledge was appropriated by institutions during the 18th century (*Il Faut Défendre La Société* 160). Big knowledge then absorbed small ones: "des plus petits savoirs, les plus particuliers, les plus locaux, les plus artisanaux, par les plus grands" (160). Knowledge also means power and independence, and institutions created through the state incorporated ancestral knowledge (among other types of knowledge) and made them inaccessible to individuals. In *Caligari and the Witch: Women, The Body and Primitive Accumulation*, Silvia Federici underlines the specificities of the oppression of women throughout history, that is absent from Foucault's work, and emphasizes the historical significance of the witch-hunt. She posits that some of the women who were accused of witchcraft were actually using contraceptive methods, a practice that was perceived as dangerous in the 17th century, at least in part because of the decline of population (181). According to Federici, it was an "attempt to criminalize birth control" in the goal of accumulating power over the uterus and labor in general during the 16 and 17 century, at the same time that notions of demography were emerging (181). In the same way, the profession of midwifery eventually became appropriated by men and controlled by the state (Federici 183). According to Foucault, inspectors of the state appeared in the later part of the 18th century (*Il Faut Défendre La Société* 161). Medical knowledge meant the creation of norms and classification, and the 18th century saw the birth of science as a global

discipline (162). Universities were born, and Foucault describes them as uniformizing apparatus: “quelque chose qui est comme une sorte de grand appareil uniforme des savoirs, avec ses différents étages et ses différents prolongements, son étagement et ses pseudopodes” (163). Those institutions apply a process of selection and homogenization of knowledge. In this way, a status of expert does not imply impartiality, but rather implies a conformity to norms applied by the state through institutions.

One could argue that when we are unaware of the widespread presence of toxic chemicals in our daily life, then we cannot rebel against those who are responsible for the situation. Following this logic, holding massive information campaigns about toxicity and the connections between health and environment, along with discussing these issues with governmental representatives, would then lead to change the current situation. These are important ongoing actions and an honorable goal, but alone they are insufficient to change the status quo. There have been information campaigns and advocacy for changing policies by groups such as Breast Cancer Action Quebec for decades. I believe that there is a strategy at work on the part of our government, and that it is for toxicity to be presented as an information war instead of the public health crisis that it is. The fact that a product has to be proven to be dangerous in order to be removed from the market, rather than proven nontoxic before being marketed, attests that priority is given to industries rather than to public health.

Furthermore, the ongoing attempt to modify the Canadian Environmental Protection Act is moving at the notably slow speed of our legal system. While the government committed to reform the law in 2018 (*Consulting on the Future of Chemicals Management in Canada*) – without specifying what those changes will consist in, and that those changes were projected to be applied by 2020 (Jamal), no concrete change has been done. Meanwhile, federal and provincial governments were fast to suspend many environmental protection measures for the benefit of industries, while citing coronavirus as the reason (McIntosh). One of those protection measures in Quebec included a “pause on pursuing penalties for companies who breach their environmental obligations, as long as the breach does not cause “significant risks” to the environment or to human health and safety” (McIntosh) – what “significant risks” actually means remains to be defined. The fact that toxicity - or what should be: the lack of it, is not considered the responsibility of industries before the marketing and selling of products, and the slowness of the system through which legal

changes benefitting public health have to be made in comparison with the speed of the one used to favor industries are part of a strategy used by the state to maintain business as usual. The favoring of commercial interests is not random, but rather a strategic agreement with industries, which are much more powerful actors than citizens, and a dismissal of public health concerns. This explains a general climate of silence and passivity over the fact that toxic chemicals present in our environment are currently causing very serious diseases that are chronic, and at times, fatal. The state has purposefully chosen that what is worthy of attention are industries, not the health of citizens, and it has developed a strategy of remaining passive rather than proactive when it comes to evaluating toxicity.

In the spirit of Foucault's ideas, armed with fight knowledge, I aimed to dismantle a common idea that so-called hard sciences are neutral, in order to shed a new light on issues related to health and environment, and demonstrate the dangers around the path that our institutions are currently walking. When I started working on this thesis, I was worried that my questions were not going to be scientific enough, since navigating the topic of endocrine disruptors and toxic chemicals means sailing in murky waters, and since my background is in so-called "soft" sciences. From Foucault, I gathered the importance of questioning the "dispositifs de savoir" (*Il Faut Défendre La Société* 30), and this graduate thesis is one of many other researches that are attempting at doing this. Graphic novel is a great medium for what Foucault calls fight knowledge, which was defined previously as what is considered illegitimate knowledge, in contrast to what is perceived as scientific and established.

2.2 Biopower

The notion of biopower sheds light on environmental injustice as a phenomenon as opposed to a list of anecdotes, because we can recognize the systematicity of different actions or inactions of the government, without falling into a problematic overgeneralization, and without using simplistic metaphors that erase the specificities of everyone's struggles. Foucault observes how technologies of discipline and technologies of regularization have evolved. He perceives power as having evolved from a technology of discipline belonging to a sovereign, who had control over giving death and letting live, to a modern version of a technology of regularization that is also perpetuated through the control of life (*Il Faut Défendre La Société* 180). The right to make live

and let die was then born (214). The difference here lies between seeing the human as a body, as the sovereign did, as opposed to a species, for biopower (216). A concrete example of this is how death used to be the celebration of a transfer of power, from the sovereign to the afterlife, but with modernity, there is no transfer of power, and death is seen as a shameful event rather than a ritualized celebration (220). Among the technologies of power, there will be the emergence of statistics and notions such as birth and death rates (216). Biopower holds the means to change mortality rates but will not have control over death itself (221). In this way, to have power over life means to qualify and manage it, and to regularize the population through modern sciences, which in turn apply a process of normalization. For Foucault, the State systematically uses racism in its normalization process. The racism that he defines does not mean discrimination in regard to race specifically – the term is used here in a broader sense: it is a “coupure entre ce qui doit vivre et ce qui doit mourir” (227). In times of crisis such as today with the Covid-19 pandemic, this literal cut between who must live and who must die can be illustrated by a criteria in the triage of patients that makes having a cognitive impairment a basis for not receiving treatment, in a scenario where the province’s emergencies become overflowed in the wake of a second infection wave (Karwatsky). This example of Foucauldian racism goes along the rationalization that some lives must be sacrificed for the common good. This is not far from the belief that if more abnormal people die, then the whole species becomes stronger, an underlying thought behind the technologies of power (Foucault, *Il Faut Défendre La Société* 228). The most racist states (racist in the sense intended by Foucault) are also the deadliest, and Nazism would be such an example (230). The normalization process and its technologies represent a different frame of thinking than if hate alone was used as an explanation for the systemic oppression of some individuals over others (230). Framing environmental injustice on accounts of hate would mean to disregard a strategy that is based on rational thinking, and this has systematic consequences on individuals that face discrimination of different nature, whether it is capacities/disability, race, gender, age, sexuality, class, and the intersections in between. It would be hard to define what those characteristics have in common if they were not all involved in dynamics of othering.

2.3 Resisting Biopower

In the previous chapter, we have seen that toxic chemicals circulate widely in the environment, and that race and gender are factors which increase the risks of developing environmental illnesses. However, the picture is incomplete without looking at the underlying structure that allows these injustices to happen. With several examples of the way pharmacology, insurance companies, charity organizations and corporations profit from cancer patients, Lochlann Jain's investigation into the lucrative business of cancer in *Malignant* illustrates deep concerns about the place of cancer in society today. Jain and Audre Lorde have described their experiences of living with breast cancer and maneuvering the medical system while being queer (for both), in addition to being a Black woman (for Lorde), in a way that illustrates a double injustice: falling ill from an environmental illness brought by a capitalist system, and having to struggle for healing in a normalizing system that is designed with capitalist structures. Discussing their works also bring forwards some of the tactics used to work around the system.

Lorde denounces a capitalist culture of pretending to be happy and saving appearances, as working against the well-being of cancer patients, who need to relate and talk about illness and pain in order to process insecurities. After a representative from a support group for breast cancer patients came to visit, and while facing a displaced remark from a nurse, Lorde felt the need to connect with other women like her – Black women, cancer patients, and Lesbians: “Where were the dykes who had had mastectomies?” (*The Cancer Journals* 49). Rather than talking about a victorious narrative of conquering the illness, she delves into her own insecurities, and reveals her intimate struggles, to connect with herself and others. *The Cancer Journals* represents a counter-knowledge to the normative narrative of cancer as something to be overcome as she describes her journey of living with cancer through journal entries, as an intimate experience, told with vulnerability. Vulnerability can then be a tactic against superficiality.

Lorde mentions that making breast cancer patients invisible by encouraging the use of prosthetics means not having the possibility of grouping together. Refusing to wear prosthetics could be a visual tactic to demand meaningful changes: “For instance, what would happen if an army of one-breasted women descended upon Congress and demanded that the use of carcinogenic, fat stored hormones in beef-feed be outlawed?” (16). Jain also has a critical reflection

regarding prosthetics. They mention how being gay had the advantage of having gone through a reflection about the act of “passing” (205), as in passing for heterosexual/normal. Passing could then mean passing as healthy while one is sick, but they are asking: “Did I want to? And if so, why? For me? To protect others?” (205). They had to maneuver life as a queer person, and perhaps this helped with the new reality, in the margins of normality. They mention how the prosthesis let them peek into how women use “make-up and other devices”, practices that have never appealed to Jain, but are heavily encouraged and marketed by corporate-funded programs as a way for breast cancer patients to feel better (205). In a similar way to Jain, Lorde mentions that cancer patients are made to feel as though they should hide their cancer by wearing prosthetics, in order to make yourself feel “normal” – in other words, to hide and deny the uncomfortable sickness. About these “patterns and network” experienced right after mastectomy, she says: “it encourage us to deny the realities of our bodies which have just been driven home to us geographically, and these old and stereotyped patterns of response pressure us to reject the adventure and exploration of our own experiences, difficult and painful as those experiences may be” (41). While in the hospital, she was given a lambswool form to give a fuller breast shape on the side of the surgery, and it was “the wrong color, and looked grotesquely pale” (44). The fact that the pressure to appear normal is pushed on women right after surgery to hide the damage of cancer, on top of the expectations of pink skin, attests to the normalization process discussed in Foucault, and the standards one must conform to in order to be saved: to be healthy-looking, and white. However, as Jain mentions, living as a queer means being used to live outside of the norms. In this way, refusing prosthesis can be part of a tactic of refusing to try to pass as healthy, or as having an acceptable body according to the norm.

Jain is looking for a way to resist cancer outside of the feminine/masculine normative discourse, and they ask who are cancer warriors really fighting against (82). They discuss how having breast cancer forces one to enter into the biology of gender. The use of pink and highly feminine imagery in the pink ribbon campaign is one example. This can be hard on people who are at a different place on the gender spectrum, and do not conform to the binary model of feminine/masculine: “You can spend your whole life creating an identity different from the one people smear onto you (girl, husband-seeker, spinster, mother, whatever), and then one charming little diagnosis threatens to suck you under, into the archetypal death doled out by the feminine body” (Jain 69). The medical establishment genders in a brutal way, because of the focus on the

biological realities of the body, and the assumption that it matches with the gender assigned at birth. This represents a barrier to trans and nonbinary individuals in particular. Since individuals who are not heterosexual or cisgender lack trust in medical institutions still today, LGBTQIA2+ communities share lists of safe doctors and clinics in their area, and basic medical knowledge in enduring publications such as the zine *Hotpants: Do-It-Yourself Gynecology*, or the collective book *Our Bodies, Ourselves*. Sharing knowledge freely is a tactic against a monopoly of knowledge, but also a necessity when medical institutions are not safe for people who live outside of heteronormativity.

As discussed earlier in the chapter, graphic novels can be examples of fight knowledge, in opposition to knowledge taken for granted. According to Jain, cancer brochures infantilize patients by minimizing the actual gruesomeness of the procedures that they go through during treatments (183). They contrast clean and happy cancer brochures with a comic named *Cancer Made Me A Shallower Person* by Miriam Engelberg, where the same pamphlets are parodied: the smiling cancer patients sitting at a table and drinking coffee are shown with bubbles saying how they love their surgeries and prescriptions (Jain 184). It reminded me of the humor in *In-Between Days*, a graphic memoir by Teva Harrison, and specifically the part where she mentions the awkward small-talk that she has had when people have asked her what she is doing in life, and her honest reply was : “I have cancer. Mostly, I do that.” It also reminded me of the blog Tchao Gunther by Lili Sohn (whose comics were later published under the name *La Guerre des Tétons*), who also uses blunt and direct commentaries as humor – for instance in the comic strip where she imagined the moment when the doctor told her that she had cancer was actually a prank. Sarcasm, self-mockery, and punchline humor are among the most widely used tools of graphic storytelling, because they are a good emotional outlet, along with the potential to be entertaining, personal, and instructive. For talking about the serious and sad subject of cancer, humor represents a tactic against the impersonal images supposed to represent cancer that can be seen in stock pictures and pamphlets: bald heads, hospital gowns, landscapes, or smiling doctors and patients. Graphic novels make it easier to discuss difficult topics such as illness, without falling into the traps of stereotyping or sugar-coating, and they use humor as a tactic.

Conclusion

To conclude this chapter, I included Foucault in my research because I wanted to ensure that my text would point a finger at the roots of environmental health injustice, rather than simply educating about toxicity from a so-called “neutral” point of view. The distinction between strategy and tactic, a critique of the production of knowledge, and the notion of biopower have been useful in untangling what is a causality versus a consequence in the mechanics of environmental health injustice. Jain and Lorde have provided us with examples of tactics to defeat the workings of capitalism and biopower, including the act of sharing personal stories with vulnerability, and humor – processes highly familiar to graphic novelists.

3. Creation-as-research

Creation-as-research, according to Chapman and Sawchuk, “involves the elaboration of projects where creation is required in order for research to emerge” (19). It involves a reflection on both the technology of production as well as the process of creating with it. In the following chapter, I will explore the making of *Toxic City* in connection with other graphic novels.

Painter and art critic John Berger has argued that art is a product of its time, and therefore it is never neutral. The idea of the absence of neutrality in the production of images is underlined in the chapter, along with philosopher Walter Benjamin’s differentiation between expectations from photography as opposed to painting. Graphic novelists Will Eisner, Art Spiegelman, Philippe Squarzoni, Shaun Tan and Scott McCloud are juxtaposed with *Toxic City* and ideas from comics scholars. In particular, the use of avatars and the device of the gutter are given attention as powerful devices to tell personal stories from the margins.

3.1 The Fine Line Between Fiction and Reality

In *Comics and Sequential Art*, Will Eisner discusses comics made for instructional purposes. The author mentions how comics is an excellent medium for pedagogical purposes, because it allows for exaggeration and generalization. Something that would seem confusingly specific with photography can be grasped quickly as a general idea through comics (144). In *Toxic*

City, there are open-ended metaphors that suggested connections between illness and the environment. Illustrating products goo spilling into the universe and becoming threatening asteroids was a way to simplify the idea of toxicity, in a tone that was contemplative more than accusatory or moralizing. The fact that no logos can be seen allows for a generalization of the phenomenon. Furthermore, the use of asteroid collisions to demonstrate the literal danger of the impact of toxicity is an exaggeration that makes it easy for readers to understand what the novel is about, without even using words. It is because of the qualities of comics and graphic novels that the message can be clearly understood, despite the use of metaphors and contemplative imagery. However, my novel was not meant to be strictly informational.

Graphic novels offer media-makers the possibility to express feelings and thoughts about topics that are sometimes difficult, but it requires a form of processing to condense and frame a story. This process represents work. In an interview, cartoonist Art Spiegelman has said: “Therapy is vomiting things up. Art is about eating your own vomit. There’s a therapeutic aspect to all making, but the nature of working is to compress, condense, and shape stuff, not to just expunge it. It’s not just an exorcism” (Milzoff). The fact that a medium can be personal and therapeutic does not mean that it is a less accurate picture of reality. Although one would be tempted to classify graphic novels as subjective in comparison with other media, the binary of objective and subjective is flawed to begin with because no image is truly an objective representation of reality. In the words of John Berger: “Every time we look at a photograph, we are aware, however slightly, of the photographer selecting that sight from an infinity of other possible sights” (10). Every picture is both constructed and interpreted through what Berger calls a “way of seeing”. Producing images means selecting some points of views over others, and therefore, neutrality and objectivity are not productive terms to describe what is going on. The idea that photography or documentary filmmaking would dress a more objective portrait of a topic than a graphic novel is therefore a false assumption, because there is no such thing as a truly neutral, objective image to begin with. I believe that the key difference between illustrated works and photography or filmmaking is the subjectivity that is perceived to be natural to the medium that comes directly from the hands of a maker, without the use of a machine. For Walter Benjamin, it is the mechanical aspect of photography or filmmaking that demands the medium to represent reality (14), whereas a painter has “a natural distance from reality” (13). Since graphic novels do not carry an impression of objectivity, it can be easier for authors to delve into their own personal stories and use bold styles

of expression without fear of accusations of being too subjective. The relief from this burden of objectivity and the embracing of the artist's marks and style is welcome when the topic involves a personal, intimate issue, such as the experience of living with chronic pain conditions. Furthermore, knowing that our interpretation will always remain one interpretation among others is important for media-makers, and this knowledge can be a strength.

In *Saison Brune*, which is a mix between documentary and autobiography, Philippe Squarzoni reveals his worries about climate change and the prospect of getting older. More than simply disseminating knowledge about climate change, *Saison Brune* appropriates this knowledge to make it sensible and personal. Furthermore, the author expresses his struggle to define a start and an ending to the novel, and he chooses instead to make several starts and endings. In an interview, the author mentions that the novel was a project that took six years, including the two first years that were filled with uncertainty (PAco and Pasukare). In the case of Squarzoni, blending documentary and autobiography makes an impersonal topic appear close to home. The author uses metaphors and references to popular movies to talk about the necessity to stop capitalism from destroying the planet – for instance, in a scene where his partner is shotgunning a hoard of Santa Claus (Squarzoni 381). In *Toxic City*, I similarly blended the ordinary and the extraordinary, and used a personal anecdote to make a comment about toxic chemicals being omnipresent in the environment. I am shown having trouble illustrating the story because of striking pain, and therefore I refer to my own struggle with the project of making a graphic novel. Finally, a spaceship destroys a threatening asteroid and someone comes to the rescue of the drifting astronaut, in a move to commemorate the importance of solidarity in the fight for a cleaner environment.

With very few words to anchor thoughts, an audience can make their own interpretation according to their senses and intuition, and wonder about an author's intentions. I believe this is the power of the pantomime graphic novel *The Arrival*, by author and illustrator Shaun Tan, about the struggle of an immigrant's arrival in North America. By using alien-like creatures and symbols, Tan has successfully created a world that appears foreign, and the story becomes a metaphor of how a newly arrived immigrant in search of a better life for his family must be feeling when one does not speak the language of the country they arrived in. The absence of words adds an emphasis on the drawing and the fantastic and confusing universe in which the character must navigate. The making of a fantastic world is, in itself, an important part of making a graphic novel, and *The*

Arrival could then be analyzed as a meta novel. In *Toxic City*, the silent storytelling contrasts with the heavier quotes, and the silent universe is meant to be immersive. In the same way, it aspires to be a meta novel. In *Are You My Mother?*, Alison Bechdel inserts quotes of the authors that she reads, and explains her interpretation in relation to her life and relationships. Towards the end, in one of the many discussions with her mother, the graphic novel is described as a meta novel, where the whole process is meant to be a research on the process of investigating the relationship of Bechdel with her mother. I was fascinated by the amount of details and interpretations of the research that Bechdel did on both herself and the notions of psychology and psychiatry that she came across. Showing quotes that fueled my research within the graphic novel is an idea that comes from Bechdel, and it was meant to add a critical dimension to the novel in addition to a layer of meta.

Using avatars is common in comics and graphic novels. In *Maus*, Spiegelman tells the story of his father, a Holocaust survivor. The characters are drawn as animals depending on their country of origin, according to stereotypes of the era: Jews are mice, Germans are cats (predators of mice), Polish people are pigs, etc. According to comics scholar Charles Hatfield, this play with stereotypes is demonstrated to fail, and in the same way reveal how inaccurate those very images describe the people behind the avatars (140). This unraveling of metaphors allows the author to talk about genocide without oversimplifying the picture (Hatfield 139). Spiegelman discusses the issues of representing genocide and suffering in a way that made sense for him, and allowed him to learn from his creative process: “But I think it’s those animal masks that allowed me to approach otherwise unsayable things” (*MetaMaus* 127). The astronaut in *Toxic City* is the avatar for myself when I feel sick. The trope of space exploration and the dangers associated with it is a background that felt safe for illustrating my perspective, in comparison with a more realistic set-up. Because the reality of chronic pain is constraining, the excitement of space offered the relief that I needed during the making of my thesis. Furthermore, an astronaut is both a researcher and a subject of study, and this double role also applies to me in the course of this particular thesis. Finally, connections can be made between the thin protective layer of a spacesuit in an environment filled with threatening asteroids, and the fragility of the human body. The avatar of astronaut and the trope of space exploration are rich in connotations and possibilities, and they allowed me to say what I could not have said otherwise.

3.2 Semiotics : The Gutter

According to Christiansen and Magnussen, comics are not considered as part of the fine arts, and have therefore been given less attention than film (7). Among other reasons, they posit that academia has prejudice against them because they consist in a hybrid form between illustration and words, and because they have a branch in children literature (8). Early comics research consisted in semiology and structuralist perspectives (Christiansen and Magnussen 12). Sociolinguist Mario Saraceni has analyzed comics from the nonjudgmental perspective of linguistics. According to him, graphic novel and comics are two labels for the same thing, except that the term graphic novel is preferred “for commercial reasons” (4). Authors Will Eisner and Scott McCloud have explored the semiological analysis of comics.

When comics are seen through semiological lenses, they are analyzed as working similarly to a language, in that they possess a grammar containing generative rules and patterns. To illustrate this, Saraceni has distinguished between functional components, and content components. Functional components are similar to functional words in a language, such as conjunctions and determinants (5). Content components are similar to nouns and verbs (5). However, the author describes the gutter as an important element distinct from others: “The gutter is similar to the space that divides one sentence from the next: there is always a certain amount of information that is missing from the narrative and the readers have to provide it for themselves” (9). It is not merely where the panels stop, but also a “conceptual separation” (9). It is in this space that I illustrated toxicity.

In the scene of *Toxic City* where different products and polluters are shown leaking white dots into the space in-between panels, the gutter acts as a literal gutter that drains toxic particles. Since the problem of toxicity is generally a matter of accumulation rather than the use of one product one time, the sources of toxic particles leak, and it results in a threatening entity on the next pages. The gutter acts as a separation between different units while inferring an accumulation of substance, and its space is taking an active part in the story. The conceptual idea of toxicity is deduced rather than pictured.

Conclusion

As an advocate for the popularization of science, I believe that the art of graphic novels is a great way to disseminate important knowledge, and that it is also an excellent medium to make knowledge sensible and personal, with the help of storytelling. Storytelling is able to access types of truths that science's own limitations prevent it from touching. Science fiction in particular can attempt to predict the future, and act as a way to process our own fears and anxiety about a phenomenon. Donna J. Haraway's book *Staying With the Trouble* has prompted a reflection on the connections between critters of this world, and the possibilities of using science fiction, or speculative fabulation, to reflect on social and ecological disasters. In this way, the works of Ursula K. Le Guin and Octavia E. Butler have a strong influence on my work.

Reflecting about the process of making a graphic novel within the medium itself brings a sense of humility to the process of media-making in general. Picturing a phenomenon that is invisible to the human eye and complex to describe with scientific accuracy is challenging, and it requires thinking outside the box. Metaphors are useful but limiting, and symbols can be stereotyping. By using the space in-between panels to represent the environment that surrounds us, I revealed the omnipresence of the phenomenon of toxicity. The environment is the gutter, in the same way that meaning exists in-between sentences. It is barely noticeable and taken for granted, but always there, accumulating toxic particles which end up within the gutters of our own bodies. In this way, I pictured toxicity through a seemingly simple device from the medium of graphic novels: the gutter, as a gutter.

4. Creative Presentation of Research

Throughout the process, I have kept notes and sketches to document the journey of making a research-creation. As Chapman and Sawchuk beautifully summarize: "Knowledge is not separate from the practice of inscription; indeed, it is through the ways we iterate our projects back to ourselves that we come to know" (18). Here is a self-reflective summary of my experience.

Now that I am approaching the end of my degree, I can see that the research was challenged by big factors. The main one is the fact that my health is unpredictable. I can wake up tired after a

ten hours night of sleep, and even on a good day, there is a limit to what I can accomplish before I reach a point where I know that I will not be able to function on the next day. I also have phantom pains that strike at random times. Finishing a project is akin to going through an obstacle course. My motivation is high because I feel that I am very privileged to be where I am, and that I ought to finish this degree and do well, for all of my chronic pain fellows who did not have my privileges. I am here to represent my community of nonbinary spoonies who spend a lot of time curled up in blankets and feeling lost in the void.

After the first year of the MA program, I had to take a year off school to focus on survival and therapy, and to learn how to live with my chronic pain. I had come across a community organization named Breast Cancer Action Quebec, which inspired the idea of making something out of my experience. Webcomics and zines are my go-to comforting distraction every time I flare up. In addition, since illustration is a medium that I have always used to chronicle life events and travels because of its low-tech and flexible qualities, I decided to adapt the creative-research to my needs, and to make it come to life in the form of a graphic novel.

I am considering making a part two to *Toxic City*, which would take the shape of a survival guide for nonbinary people living with gynecological issues. As I have discovered while looking for support online on forums for people who have similar health issues than me, it is difficult to manoeuvre through medical institutions who often dismiss the concerns of patients living with chronic pain. When you are a gender non-confirming person or a person of colour, that difficulty increases. In May last year, I went through a “non-invasive” surgical procedure called uterine embolization. The principle is to momentarily cut the blood supply to the uterus, in the goal of killing the orange-sized fibroid tumor that was hanging in there, and some suspected adenomyosis (a similar disease than endometriosis, but more localized around the uterus). A friend introduced me to Lili Sohn, the cartoonist who named her cancerous tumor Gunther, and I too named my benign tumor: on that day, we killed Alfred, but it took an entire year before my body recovered from the procedure. In *Toxic City Part 2*, I would tell my story, along with practical information on how to talk to doctors about pain and symptoms, and where to find community support.

A part 3 of *Toxic City* would be about healing, in connection with indigenous methodologies and decolonial perspectives. When I came back into the master's program again in

October 2019, I had just become an aunt in the days following a powerful fall storm. A few weeks earlier, there had been a gigantic climate march in Montreal, which was led by Greta Thunberg and young indigenous activists. My thoughts were on future generations inheriting a damaged environment, and what I wished to leave as legacy. I might be infertile because of my uterus issues, but what kind of world do I want for my nephew? What are my responsibilities in this cycle of toxicity, or towards this land that was stolen by my ancestors? I saw this thesis as a way to inform others about environmental illnesses, but it was also a way to process my own thoughts and feelings in relation to my connection with the environment, and a way to explore the similarities between tiny cells and the substance of the universe. I did not research toxicity and colonisation, nor healing perspectives and decolonisation, but I strongly feel that it would be a next logical step of this project.

The Covid-19 lockdown in Montreal started in March 2020, while I was planning and working on the preliminary sketches of the graphic novel. I was going through a battery of tests at the hospital, in order to receive a diagnosis of fibromyalgia. Since we did not know much about the virus at the time, I felt very anxious. I did not want to become sick again, and I was not sure if I was considered at risk or not. I was worried about friends who are immunocompromised, and family that was traveling at the time. I often have a foggy brain, but back then, it was more like a perpetually running steam engine.

Luckily, I had already borrowed a giant pile of books from the library before everything came to an halt. I am still waiting on a diagnosis for the chronic pain and fatigue, and since the hospital is only just catching up with regular patients, I might have to wait for a long time before I can say what exactly it is that makes life hard for me at times. Because I do not have a formal diagnosis yet other than the fibroid tumor that is causing less issues, I had a preference with making a graphic novel that was open to interpretation, that did not require to be precise about my health. Both uterine fibroids and fibromyalgia are known to be environmental diseases, but as long as I don't know what I have exactly, I will not know which words to put on my story. Part 2 of *Toxic City* will have to wait.

I can see that the people who are struggling the most during the pandemic are the same that were already living in precarity before the pandemic: people who live with chronic conditions,

POC, LGBTQIA2+, elders, people with disabilities, people who live in poverty, and women. What I find even worse is looking at how communities that live in areas where environmental diseases are prominent, unsurprisingly, are affected the worse. Diabetes, lung and heart diseases can be caused by living in a polluted environment, and those conditions are prevalent in the hospitalization rates of Covid-19. In the US, Black people and other people of colour are disproportionately affected (Marshall), and the same is happening in Canada (Cheung). As I am writing these words, it all feels like a mass execution orchestrated by capitalism, of which we are being the horrified witnesses. I am holding my breath and bracing for the waves of crisis ahead of us, with the economic and social impacts of the pandemic as well as the ongoing climate change.

As a pansexual, nonbinary person who is also a patient living with uterus diseases and other chronic pain issues, I have experienced mishaps in terms of the inclusiveness of our health system. I hope that this research will participate in a movement to improve how patients are treated, and not only LGBTQIA2+, but also indigenous people, racialized people, people with disabilities, neuroatypical people, and those of us with identities that intersect. We all deserve so much better, in terms of both prevention and treatment of environmental diseases. I think that more than ever before, we need to stand together and use our power as a community.

5. Complications

While writing this paper, I wanted to discuss environmental health justice in a way that would bridge different themes of social justice together and not leave anyone behind, in an intersectional approach – branching to disability, race, indigenous and queer studies, for instance. I was aiming to improvise a holistic research. The issue is that in a creative project, metaphors have the potential to hide the strength of everyone's unique perspectives in the struggle for social justice, rather than elevating those rich differences, and turn them into efficient tactics. Furthermore, while I opted for tackling this project from a very personal point-of-view, I still mentioned how race is a key factor in environmental health, but I have not discussed how indigenous people are also crucially impacted. This is a very important, missing element from this thesis, and it would require an entire paper, rather than a section.

While I tried to cover as much ground as I could, there were many missed opportunities. As we know, theoretically speaking, Michel Foucault's prolific work has been revisited by an impressive number of scholars, and I could have included authors from the field of medical anthropology to deepen some of the ideas that I hinted at in this paper. Furthermore, I would invite curious readers to visit contemporary writers such as John Hardwig and Donna Haraway, and emergent disability studies author Arseli Dokumaci. Haraway's notion of partial knowledge was brought to my attention during the last phase of this thesis. Other avenues that I did not explore were silent graphic novels, ecofeminism, eugenics and utilitarianism as analyzed from the perspective of disability studies, pain studies, zines, webcomics and independent publications, graphic medicine, and art therapy.

I would like to caution about discussing toxicity with a discourse opposing left wing to right wing, or to dismiss any method that would include a dialogue with the corporate world. My friend Anders Bjorn is an engineer in environment, and his expertise is to develop ways for companies to measure and improve the impact that their practices and products have on the environment – a method called Life Cycle Assessment. As he is obviously very conscious of the debate around capitalism and environmental sustainability, I enjoy bugging him about the implications of his work, and asking if the companies' attempts at making their practices more sustainable are really effective, or if they simply represent a marketing strategy. It will take years before we know if the methods developed are effective. One contradiction that I gathered from our conversation in relation to my project is that there are examples of companies that have much more ambitious environmental targets than the ones of the government. I have painted a negative portrait of industries and corporations in general. The material fact remains that we all live within capitalism, and that we must consume and choose between options on the market, if we want to eat, be clothed, survive, and have a good quality of life. My graphic novel itself was crafted on cardboard, with ink and paint made from toxic chemicals. If corporations who do set ambitious environmental targets that include their overall impact on ecosystems reach their targets, and if this was ever to become a norm rather than exceptions, then it would problematize my conclusions. Or perhaps the government should simply listen to scientists and regulate the industries in a way that is truly sustainable, with the knowledge that is already available. Environmental engineers are accused by left-wing activists as being financed by corporations, and therefore as having a bias towards them, or by the conservatives as being biased towards the left, alongside climate scientists.

Ultimately, I would like to warn against this dichotomy, because I strongly believe that working with environmental engineers who are knowledgeable about quantifying environmental impacts and designing environmental solutions are an important part of fighting against both toxicity and climate change.

Conclusion

Gender and race are two factors that influence the likelihood of developing an environmental illness. The current legislations in place at the Canadian federal level are not sufficient to protect us from toxic chemicals. The anecdote of the loosening of environmental protection measures during the Covid-19 crisis in Canada in the spring of 2020 suggests that industries may have precedence over the health of citizens. I illustrated my story with the use of metaphors and an avatar to talk about my chronic illnesses, and I documented my research process through the four modes of research-creation. The humor and vulnerability that is common practice in comics and graphic novels can be efficient tactics against the superficial imagery that is sometimes used to paint the living experiences of chronic illnesses patients. Among others, a few of the artists that have inspired *Toxic City* are Bechdel, Spiegelman, Tan and Squarzoni.

Making a graphic novel about environmental health injustice at the time of the 2020 Covid-19 pandemic was both incredibly challenging and empowering. The connections between social determinants of health, environmental factors and vulnerability to the virus are striking, and I knew very early on that some communities would be drastically more affected than others : women, people of colour, and people who already live in precariousness. Furthermore, the fact that my project partly implied sketching and designing on paper, and reading physical books and novels, has been soothing. When most of our interactions and work involve costly computers and complex digital technologies, analogue methods feel simple, and are often more accessible in terms of cost and knowledge. Touch is an important sense that analogue methods tend to, and it is one that we can feel deprived from during this pandemic. While I chose to use ink, paint and cardboard because they were easier to access and use than digital methods – especially as someone living with chronic conditions that imply dealing with fatigue and brain fog, the pleasure of designing the project and

the meaningful connections that I could see between environmental health and the pandemic ended up rescuing my motivation, at a rather difficult time.

As Lorde famously points out in *A Burst of Light*, for people living on the margins, self-care is a necessity, because the system is designed to disadvantage the communities who do not fit the norm. As Foucault noted in his works on biopower, this injustice has deep historical roots, and is independent from the political power in place. I believe that graphic novels can be both a healing practice and a useful teaching tool. The gutter is a form of margin, and it is interesting to make a connection between being marginalized and using the gutter as a tactic. I am looking forward to further develop this technique in my future graphic novels.

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