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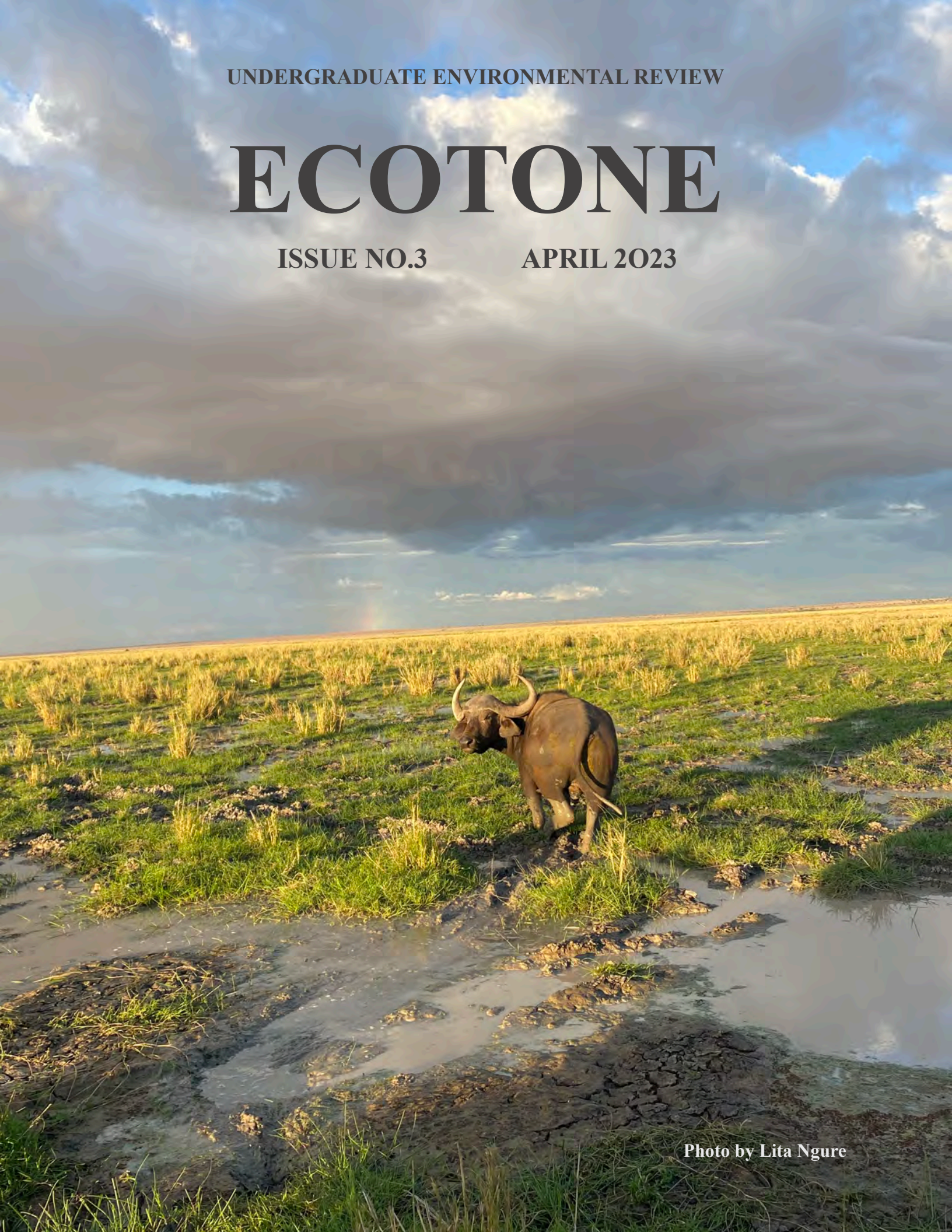

Photo by Lita Ngure

Earthly Unity

by Emily Hospedales

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A Warm Welcome—

I am pleased and honoured to contribute the introduction and welcoming remarks to this year's publication of EcoTone, a journal for students at the School of the Environment to contribute their thinking and perspectives on environmental issues and sustainability.

The creativity and diversity of thought presented in EcoTone highlights the wide range of academic programs, interests and talents of students at the School. This, in turn, reflects the interdisciplinary nature of the School – of our programs and of our faculty, with their diversity of academic interests and research. Embracing interdisciplinarity and a variety of perspectives is critical to understanding and addressing the many environmental challenges we face. Our students are the emerging champions and leaders of the transition to sustainability, and EcoTone gives voice to their engagement.

The return to life on campus and in the classroom this year, after the isolation imposed by COVID in the previous two years, has been such a relief and joy for everyone. The creation and publication of EcoTone is an important celebration of this.

Many thanks to the ENSU executive who worked so hard to make this year's third edition a reality, and to each of those who provided contributions!

David Powell
Undergraduate Student Advisor

The Fate of the World is in Our Hands
by Emily Hospedales

From ENSU co-presidents—

The two of us remember when this journal was created. It was the height of the pandemic, and the Environmental Students' Union's executive team had an insatiable craving for community and connection. When the idea to create a journal for students in the School of the Environment was introduced, we were sold. We both hoped that a journal would serve as an outlet for students to build community with their peers and amplify their voices through their incredible work—and that is exactly what it accomplished. Two years later, we are overjoyed to welcome the birth of the third annual edition of the Environmental Students' Union's student-led academic journal, EcoTone: The Undergraduate Environmental Review.

We were fortunate to witness EcoTone grow from a kindling of an idea into its current success. It has taken countless nights of planning, creating, assembling, and organizing to produce the journal before you today. The essence of EcoTone captures the unwavering spirit and passion of the students at the School of the Environment at the University of Toronto. It encompasses projects from the brilliant young minds of the future, and we are truly honoured to be able to provide a platform for their work.

This year's edition of EcoTone features a variety of topics. From Shaping the Anthropocene to Activism and Justice, it tells a chilling yet hopeful story of how the climate crisis has impacted our lives. The journal's purpose is to encourage and foster the diversity of talents within these campus walls; whether through visual art or written work, EcoTone aims to ignite, inspire, and sustain the fire burning inside and around all of us.

We welcome back old authors and new contributors. In EcoTone, everyone is given a just and equal voice across the School. We would like to extend our deepest gratitude to everyone who made this edition possible: thank you to our ENSU executives for tirelessly planning year-round to ensure the Union can seamlessly serve our peers, thank you to the authors who decided to grace our journal with their fantastic work, and thank you to the Land in which we operate on, for giving us the opportunity to listen to their stories and for allowing us to learn from them. Last but definitely not least, we would like to thank our amazing journal editor, Jennifer Chen, for dedicating her time to making all of this feasible. This journal would not exist without any of you, so from the bottom of our hearts, thank you for your hard work.

We are so proud and excited for you to dive into this journal and make it your own. We hope you enjoy the third annual edition of EcoTone!

Love always,

Jiazhen and Madeleine

Forward—

The earth's damage is unfolding before our eyes. We feel the liquid churn beneath where we stand; we see concrete blocks stacked high; we hear talking heads babble buzzwords on the television. Meanwhile—robins—with their burnt orange bellies, creep out behind sprouting trees. Geese waddle across Harbour street. As droughts wipe away fields of soybeans, people gather and rejoice around stoves in anticipation of a warm cooked meal. We chase for the sporadically fleeting and re-emerging hope hidden under swindling, power-serving narratives. Ecotone compiles voices that call out injustice and celebrates stories that dare imagine a different future. Here, we aim to protect the corners of tenderness we cannot afford to lose. This issue is divided into three sections: "the splintering present", "justice and movements", and "land for the living, land for the healing". We hope that these writings from the undergraduate student body at the school of the environment ignite or rekindle coalitions and solidarities among our physical surroundings. Form a single medicinal plant species to Indigenous women's rights in South America, we unearth and return power to this land and all its residents. We would like to thank all contributors for giving a damn.

Part I
The Splintering Present

Causes of the Current Ecological Crisis

Emily Yuan

The nature of the current ecological crisis is highly complex. One approach is to understand it as a series of wicked problems – problems that are difficult to define, have multiple interconnected causes to other wicked problems, and no clear solution (Hathaway, 2022a). Unfortunately, solutions for a wicked problem only improve or worsen the condition of the issue and can never fully address the problem (Hathaway, 2022b). As a result, attempting to understand and solve the ecological crisis is a daunting task. However, before solutions are proposed, the root causes must be first identified. A few of the fundamental causes of the current ecological crises are Fordism and mass production, the desire for unlimited economic growth, and consumer culture.

Although improvements in technology can improve energy efficiency and decrease the ecological footprint that humans have, technology can also increase the damage that humans have on the environment. The division of labour, standardization of steps, and assembly style production process can be described as Fordism (Smart, 2010, p. 7). Fordism and the beginning of mass production has encouraged mass consumption by making technology such as cars more affordable and accessible to the general population (Smart, 2010, p. 7). Not only do cars pollute more than other forms of transportation such as walking, biking, and public transportation, but an increased population size driving cars also increases the ecological footprint of humanity. Additionally, the political power of corporations in a capitalist society has only exacerbated this issue. For instance, in Los Angeles, the previous lack of a functional rail system can be attributed to the efforts of automobile, oil, and rubber companies to diminish the accessibility of public transport to promote the use of cars (Ehrlich & Ehrlich, 2004, p. 161). Large corporations have lots of political influence through lobbying, and as a result, approximately twenty billion dollars goes towards the building and maintenance of highways in America rather than towards more eco-friendly public transport systems (Ehrlich & Ehrlich, 2004, 178). As demonstrated by the companies in Los Angeles that prevented the implementation of better public transport, technology influenced by capitalist forces can intensify the ecological crisis. Despite the potential of technology to become more efficient, it cannot be the sole strategy used to address the ecological crises. There needs to be a fundamental shift in societal values to change the policies that shape the daily lifestyles of each individual.

Currently, the notion of unlimited economic growth in our society is seen as desirable even though the resources on Earth are limited and high rates of economic growth are ultimately unsustainable. Moreover, economic growth in the quantitative sense is valued over qualitative growth although the most promising solution to poverty is the redistribution of resources ((Hathaway, 2022b; Hathaway & Boff, 2009, p. 30). The idea that quantitative economic growth can single-handedly solve poverty is flawed. The economy, which cannot sustainably grow by much more, would have to increase by a factor of five to ten to reach an acceptable minimum quality of life (Hathaway & Boff, 2009, p. 29). Additionally, the ecological crisis is perpetuated disproportionately by the wealthy and the poor even though the poor are more affected by it – the richest 10% of the population is responsible for almost 50% of greenhouse gas emissions while the poorest 50% only emits around 10% of total greenhouse gas emissions (Hathaway, 2022b). An example that illustrates the error in unlimited economic growth and quantitative over qualitative growth is the Pacific Lumber Company. Initially, the company ethically treated its workers and had sustainable logging practices, however the profit of the company was not as impressive (Hathaway & Baff, 2009, p. 47). After a takeover, Charles

Hurwitz doubled the logging rate of the company to increase profit but at the cost of the ancient redwood forests in California (Hathaway & Baff, 2009, p. 47-48). This shows the conflict between what might be beneficial for the economy and what is better for the health of the planet and how the economy is prioritized. Situations like this are complicated due to psychological factors such as uncertainty of ecological consequences which can lead to overly optimistic thinking (Markowitz & Shariff, 2012, p. 244.) Unfortunately, this optimism can lead to an overestimate of how much the environment can handle and undermine sustainability completely. Economic growth is ultimately meaningless if ecosystems and biodiversity are completely deteriorated. The prosperity of our ecosystems and nature is a necessity before wealth accumulation.

Lastly, consumer culture has become so prominent in modern day society for various reasons. One explanation is how disconnected humans currently are from nature, preventing them from developing an emotional connection to nature that would promote sustainable interaction (Marten, 2010, p. 146-147). Yet, the importance of emotions is crucial to the extent that emotional connection is more correlated with sustainable behaviours than just beliefs (Hathaway, 2022c). Consumerism is so widespread that children nowadays are capable of at least identifying 100 corporate logos but are unable to recognize 10 native plants (Hathaway, 2022d, 59:45). Instead of enjoying the outdoors and emotionally connecting with nature, many people have adopted consumer culture as a "way of life," attempting to find joy by acquiring new material items (Hathaway, 2022d). Consequently, consumption levels are at an all time high. According to Assadourian (2010), between 1990 and 2006 the consumption per person almost tripled even for accounting population growth (p.4). Additionally, as of only 2005, humanity was consuming the resources and services of 1.3 Earths, certainly beyond what is sustainable.

Consumer culture has been facilitated by technology partly due to urbanization since children in cities may not readily have access to the outdoors and become emotionally isolated from nature and other animals (Marten, 2010, p. 146). Moreover, urbanization encouraged the transition from market towns to large, concentrated cities, laying the groundwork for consumer culture to emerge (Smart, 2010, p.13). The fact that younger generations are so disconnected from nature is exactly what needs to be addressed – the very process of reconnecting with nature can have a healing effect (Armstrong et al., 2021, p. 31). Rather than finding value in material goods, humanity needs to find the value and beauty of nature to relieve the immense pressure that is put on the Earth and its ecosystems from current consumption patterns.

Overall, it is evident that the causes of the ecological crises are all interconnected in many complex ways. Fordism and mass production have made technology accessible to a larger population and has increased the environmental impact that humanity has. The idea that high rates of economic growth should be continuous is unchallenged and has led to unsustainable choices that undermine the environment in favour of the economy. Disconnection from nature has led to consumerism becoming a ubiquitous trend. On a more optimistic note, the interplay between the causes of the ecological crisis means that some solutions can potentially address multiple at once. Underlying all these problems are ideological and systemic structures that need to be changed. Although it will not be easy, nature and the health of the planet needs to become a priority over the economy and material goods to allow for systems that promote sustainable lifestyles.

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Centring incumbents: What is the role of fossil fuel companies in the energy transition?

Shreyoshi Roy

A major concern to mankind today is the state of our environment following growing impacts of climate change. The continued warming of our environment and changes in existing natural systems are without a doubt because of anthropogenic activities. It is evident that Green House Gas (GHGs) emissions are the main contributor to this global dilemma. While it is easy to say that all humans must reduce GHG emissions, it would be more efficient to allocate responsibilities to specific groups. Within this paper, top-down strategies and tactics are going to be discussed, targeting energy transition changes within fossil fuel companies. By breaking down impacts of fossil fuel production and consumption, we will be able to explore political, social, and economic aspects that may obstruct successful climate action. Considering the high demand for fossil fuels and its detrimental consumption impacts, changes and alterations within the operational process is required. This energy industry must identify the issues they are contributing to and adapt to current environmental demand.

In 2020, it was noted that fossil fuel contributed to 84.2% of the global energy (Ritchie, 2021). Although emissions from fossil fuels occurred pre-industrial era, anthropogenic activities have accelerated the rates at negatively impact our environment (Friedlingstein et al., 2022). Not only are finite resources being consumed at a much faster pace, but our climate is warming alarmingly fast as well. Following current projections, 2022 is suggested to have record levels of CO2 emissions from the use of fossil fuels. Regardless of environmental factors and improvements witnessed during the COVID-19 outbreak when many factories and operational structures were put to a stop, we continue to abuse non-renewable energy sources. The lack of public incentive to switch to alternative or more suitable energy sources stem from the fear of economic and political loss. As a result, we continue to economically prosper at the expense of our environment.

While changes within the energy sector must be made, it is hard to accept the implications these alterations may have on economies and governments. For many years, as previously stated, fossil fuel has been the predominant energy source providing opportunities for technological advancements. As a result, long-term investments and reliance on this unsustainable energy source has brought us to a position of carbon entanglement (Lazarus & van Asselt, 2018). Since fossil fuel is so heavily integrated into so many industries and communities, there are concerns regarding developmental priorities and safeguarding livelihoods (Lazarus & van Asselt, 2018). Governments currently depend on the monetary benefits from fossil fuel consumption. As a result, it is quite difficult to find immediate solutions to a problem that we have created. Human complacency and dismissive attitude regarding environmental impacts of energy consumption has led us to a position in which our world may fall apart with a reduced supply of energy.

There are a range of incentives for countries or industries to reduce their engagement with fossil fuel. Examples would be for economic gain through trade of sustainable sources of energy or to ensure longevity of an energy supply. For positive outcomes regarding energy transitions, fossil fuel companies and communities need to adopt multiple stages of policy making. Firstly, they must identify the problem and formulate possible solutions. In Ecuador, the government attempted to protect large areas of land with crude oil by preventing drilling. Leaving this untapped oil in the ground would thus reduce the CO2 emissions that contribute to the warming of the climate (Finer et al., 2010). Following this notion, not only would Ecuador be able to conserve its biodiversity and Indigenous territories, but it would also be able to implement a carbon trading system which would economically benefit the country. Unfortunately, the Yasuní-ITT Initiative was not successful due to various reasons. The implementation was not able to reach its peak as the market mechanism did not gain enough traction for sufficient international funding. Additionally, the incorporation of carbon credits and trading is not valid in all existing policies. Although the United Nation's Framework Convention on Climate Change approved the Yasuní-ITT Initiative proposal, it is not validated by the Kyoto Protocol (Lazarus & van Asselt, 2018). This further highlights how a combination of policies do not align in order to achieve the same goals as they may not validate attempts towards climate action. Additionally, it goes to show the lack of international support to raise enough money to put this plan into action. Without this shared vision, Ecuador's climate action plan regarding transitions out of oil consumption were not achieved.

As main producers of global energy, fossil fuel companies have the responsibility to keep up to date with environmental implications of their energy production. For major companies to ensure that they can uphold their supply for global demands, modifications towards sustainable energy must be made. In both developing and developed countries, energy demands will persist, requiring the transition out of fossil fuel to be slow but effective. In theory, changes to renewable energy are beneficial but we are uncertain of sufficient supply to immediate demands. As a result, it is crucial that fossil fuel companies integrate cleaner energy sources into their existing methods in hopes to sustain global energy demands.

Electricity and energy are essential to achieve economic and social prosperity. The UN's Sustainable Developmental Goals targets a range of concerns, the 7th one addressing affordable and clean energy. More precisely, target 7b aims to expand technologies for sustainable energy services in developing countries to ensure that all communities and livelihoods are part of the improved future and not just the richest ones (United Nations, n.d.). In the situation where renewables are not able to compensate for all the global energy demands, the use of Hydrogen acts as a stepping stone in the right direction. Currently, grey hydrogen is produced using fossil fuels such as natural gas or coal (Energy Education, n.d.). Since fossil fuel companies are the largest producers of grey hydrogen, they also have a high carbon footprint, emitting a lot of GHGs into the environment. With the right investment and incentive to move towards cleaner and more sustainable energy, this carbon footprint can be reduced by switching over to blue or even green hydrogen. Although green hydrogen is currently economically unviable due to production expenses, blue hydrogen is a feasible compromise.

Considering the range of perspectives and approaches there are to combating issues, it is almost impossible to achieve a shared consensus. Even at a local scale within Canada, policies are difficult to implement because of different incentives and agendas each province may have. This lack of shared governing impacts Canada's ability to redirect their focus towards clean energy since some provinces specialize in the production of oil. Since the Canadian government heavily depends on oil, it is important to note that there are conversations in favour of blue hydrogen to 'keep the fossil fuel industry in business' (Paradis, 2022). Canadian energy companies such as Enbridge and TC Energy have been strong advocates of hydrogen as a cleaner source of energy. Additionally, Shell Canada is currently working on the creation of carbon capture and storage facilities in Alberta in attempts to permanently remove CO2 emissions from entering the atmosphere. These investments are steps in the right direction for environmental longevity. This also shows efforts from production and supply sides that they are holding themselves accountable for the pollution and environmental damage they cause. Although periodical monitoring will have to take place,

periodical monitoring will have to take place, at this present moment, efforts towards incorporating hydrogen into the fossil fuel industry moves towards net-zero goals.

Nonetheless, like every budding idea, issues may arise. In the case of this blue hydrogen agenda, there are obstacles such as cost, accessibility and up to date technology. Fossil fuel companies are suggesting solutions to the problems that the oil and gas sector have created for themselves. Unfortunately, as a result, their solutions do not combat the pressing issue in the timeframe required. Consequently, solutions outside of technological aspects must be considered.

As previously stated, companies need to incorporate solutions beyond technological aspects such as social and political ones. From an economic perspective, there is a fear that switching out of fossil fuels would lead to a premature retirement of fossil fuels (Lazarus & van Asselt, 2018). However, by examining how fossil fuel markets work attempts to reduce carbon lock in effects can be made. Currently, the demand side of fossil fuels are heavily studied yet there is not enough research regarding the supply side. Alterations like the consideration of blue and green hydrogen are changes within companies that would benefit management of supply sides, management demand expectations of cleaner energy.

If there is always a supply and no restrictions regarding output, companies and organizations will be under the impression that oil demands should continuously be met. While demand side policies to reduce fossil fuel consumptions exist, they are not enough to cap emissions. Changes within the supply side must be implemented to create a united front in energy transitions away from environmentally degrading processes.

To conclude, while we do not want to miss out on potential energy sources of fossil fuels, we must consider the environmental impacts of using them. Since fossil fuel companies have for the most part dominated the energy sector, they must begin considering their long-term plan for when the finite resource is depleted. While immediate demands are met, future investments are currently threatened due to current environmental degradation. As a result, it is the responsibility of fossil fuel companies to act and recognize that supply side measures must be taken to mitigate future threats to their business. By incorporating greener ideas and policies into their current procedures, we can hope that sustainable energy developments can be implemented and shared at global scales. This will ultimately provide long term prosperity for current and future generations, as we all move towards a more sustainable lifestyle.

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The City of Toronto's Response to the Options to Cap and Cut Oil and Gas Sector Greenhouse Gas Emissions Discussion Document

Julia Gavieta

1. Summary

The TransformTO Net Zero Strategy illustrates Toronto's vision of reaching net-zero greenhouse gas (GHG) emissions by 2040, which is more ambitious than Canada's 2050 goal (Environment and Climate Division para.20; Environment and Climate Change 5).

Due to its ambitious goal, Toronto broadly supports aggressive regulations to cap GHG emissions in Canada and, specifically, advocates for decisive action to reduce natural gas emissions win Ontario.

As heating and transportation encompass 93 percent of Toronto's GHG emissions, Toronto is ultimately invested in electrifying its heating and transportation, which requires at least a low-carbon provincial electricity grid (Environment and Climate Division para.12).

Unfortunately, the Ontario electricity grid's primary barrier against net-zero is its dependence on natural gas for flexible, reliable, cost-effective electricity generation during emergencies (Decarbonization 4).

Thus, Toronto holds a stake in greenifying the Ontario electricity grid by advocating for the Discussion Document ("Document") to extend the carbon regulation to include midstream emissions, encompassing those from natural gas transmission pipelines.

And, Toronto advocates for incorporating the Task Force on Climate-Related Financial Disclosures' (TCFD) financial-climate risk assessment framework to ensure investment certainty into renewable technologies, aiding investments into natural gas substitutes for the Ontario grid.

2. Background

Toronto's role in reducing Canada's overall emissions largely presides in the oil and gas downstream subsector, which accounts for 10% of the total GHG emissions of the overall sector. Despite Toronto's lack of authority, it is also interested in cutting midstream emissions from oil and gas pipelines. Concerning energy matters, its jurisdiction extends only to its distribution and consumption, as provincial jurisdiction includes energy production (upstream) and transmission lines (midstream) (CER para.18-20). Hence, Toronto's TransformTO primarily focuses on decarbonizing the downstream, mainly emanating from natural gas distribution. However, Toronto's interests still include ensuring low-carbon energy sources for community-wide usage, which involves midstream emissions within the provincial administration. Thus, it is indirectly interested in minimizing oil and gas production because of its more direct investment to reduce the emissions of Ontario's electrical generation.

2. 1. The TransformTO Strategy

In 2017, the City Council approved the TransformTO to achieve community-wide net-zero GHG emissions by 2040 in Toronto, establishing its official climate change response plan (Environment and Climate Division para.20). Within TransformTO, Toronto has set incremental reduction targets from 1990 levels as: 30 percent by 2020; 45 percent by 2025; 65 percent by 2030; net zero by 2040 (para.7). Moreover, it identifies the city's GHG emission sources as "homes and buildings (57 percent), mainly from burning natural gas to heat space and water; transportation (36 percent), mainly from gasoline used in personal vehicles; and waste (seven percent), mainly from methane released in landfills" (para.12). This briefing will only address the first two sources because it is the most relevant to the Document.

In TransformTO's most recent 2021 Technical Report, it developed the Net Zero by 2040 Pathway (NZ40) that models how the city can eliminate its emissions by 2040 (Toronto et al. 20). Based on this scenario, TransformTO found that natural gas and gasoline must be completely phased out by 2040 as the last remaining emissions will derive from the provincial electricity grid (20-22). As a result, Toronto acknowledged that achieving its end goal necessitates the complete decarbonization of Ontario's electricity grid by 2040 and the expansion of Toronto's electricity system to include heating and transportation (148). Thus, Toronto is ultimately invested in greenifying its electricity system to electrify its heating and transportation, eliminating its main GHG emission sources.

2.2 The Electricity Grid

The Ontario electricity grid is a transmission grid that directly links electricity generation facilities to the municipalities across the province (Ontario's). Since natural gas is the third largest electricity source, encompassing around seven percent of Ontario's total electricity mix, it contributes 28 percent of the province's total electrical generation (Decarbonization 2). Hence, the electricity grid is connected to oil and gas pipelines, delivering natural gas to gas-fired generation facilities. Although only one electricity plant exists in Toronto, the gas-fired Portlands Energy Centre (Ontario's), Toronto receives electricity from facilities across the province. Because Ontario has a deregulated wholesale electricity market, any public- and private-owned plant can contribute to the grid (CER para.19). Consequently, Toronto derives energy from any generation plant across the province. Moreover, natural gas acts as the backbone for Ontario's electricity grid because it offers a "cost-effective solution" with "high levels of certainty" regarding "deliverability and operability," especially with Ontario's current energy squeeze (Resource 10). Hence, Toronto and other municipalities rely on gas-fired power plants during peak demand or electrical failures because they can "start up and shut down within minutes" (Mcclearn para.9). Although Ontario's gas-fired facilities operate only 60% of the time (Ontario para.2), Toronto cannot be fully emission-free unless the grid becomes gas-free. Thus, Toronto would benefit from decarbonizing the entire grid and is primarily concerned with natural gas generation.

3. Discussion/Considerations

Regarding the carbon regulation discussion, the Document emphasizes the interaction between federal, provincial and territorial actors, excluding local actors such as municipalities (Environment and Climate Division 29). As a municipal authority, Toronto is not as directly involved in the matter as Ontario, but it still exists as a separate entity with distinct interests from Ontario. Essentially, although Tronto cannot reprimand any of Ontario's actions that may go against its goals, it can still advocate for its own interests. By addressing the Document, Toronto aims to pressure the Ontario government to consider Toronto's overall interest, reaching net-zero by 2040, at a higher level of political decision-making.

3.1 Scope of Coverage

Though the Document applies only to upstream emissions from oil and gas production, Toronto would benefit if it expanded to include midstream emissions, specifically from natural gas transmission pipelines. Ultimately, the Ontario grid's principal barrier against net-zero is natural gas because it still relies on "the flexibility of natural gas generation to ensure a reliable power system" (Decarbonization 4). Although Ontario contributes only four percent of the

national oil and gas sector emissions, it is still the fourth largest shareholder of the total emissions compared to other provinces (Environment and Climate Division 9). Thus, Toronto encourages the regulation to extend into the midstream subsector, allowing the federal and provincial governments to tackle 90 percent of the oil and gas sector's total emissions, with 84 percent from the upstream and six percent from the midstream (9). Then, municipal governments can undertake the remaining 10 percent from the downstream subsector, eliminating all GHG emissions from the entire oil and gas sector.

Ontario already reached 94 percent emission-free in 2020, but still struggles to replace natural gas-generation electricity (Decarbonization 9). For instance, there was a major controversy this year on whether Ontario would increase natural gas generation to compensate for the Pickering Nuclear Station's initial closure by 2023, potentially skyrocketing the grid's emissions to 400 percent by 2040 (Ontario para.1). Fortunately, by September, Ontario announced its plans to extend and refurbish the facility rather than running gas-fired plants at 100 percent (Jones para.1). Unfortunately, in October, the Independent Electricity System Operator's (IESO) released a report that predicted Ontario's "annual energy demand will grow at an average rate of 1.7 percent a year" from 2023 to 2042 (see fig. 1) (Resource 4). Because of the increasing electrification of transportation and industrial activities, Ontario must increase the supply of "reliable and affordable electric service" to meet this demand (5). They conclude that Ontario must boost its supply capacity by 2,500 MW, with 1,500 MW derived from natural gas, to address the province's long-term energy transition (11). So, regardless, Ontario will continue to rely on natural gas in its short-term plans for Pickering's refurbishment and long-term plans for its forecasted electricity demand increase.

However, the report's analysis of the Impact on Emissions lacks insight into how this increase will affect Ontario's ability to reach net-zero by 2040. It states that the emissions will be "incremental," ranging from a two to four percent increase "over 2021 APO projections," providing no other statistics (10). This does not adequately delineate the long-term impacts of Ontario's constant reliance on natural gas into the foreseen future. In the TransformTO's 2021 Technical Report, it projected that the Ontario electricity grid would become "more GHG-intensive per unit of electricity generated due to nuclear retirements and the addition of gas generation" (see fig. 2) (Toronto et al. 58). So, Ontario's dependence on natural gas into the short term and long term future will negatively impact "Toronto's ability to rapidly reduce GHG, as electrification of transportation and heating is the primary pathway" (58). Both figures demonstrate that the Ontario grid's GHG emissions will likely increase in the coming decades, obstructing Toronto's net-zero goal by 2040.

Furthermore, Ontario's Doug Ford administration has previously expressed its disinterest in funding research and development for renewable energies. For example, a year after the Ford government took power, they cancelled approximately 800 renewable energy projects, costing a total of CAD 231 million (Ferguson para.1). These controversies throughout the Ford administration have resulted in concern regarding Ontario's commitment to invest into renewable electricity generation to replace natural gas. According to the Former Ontario environment commissioner, Gord Miller, "the province has ignored energy planning for the last four years because there was no need [at the time]...but now we're in an energy squeeze…the default option is to up the gas" (Ontario para.8). Thus, Toronto believes that, if the federal government does not cap natural gas midstream emissions, Ontario may not be persuaded enough to invest into renewable energies instead of relying on natural gas to address its short-term and long term energy needs.

3.2. Carbon Leakage

As Ontario's barrier against a carbon-free grid is its natural gas dependency, Toronto would benefit if the federal government imposed the TCFD'S standardized financial-climate risk disclosure framework. It can ensure financial certainty for Ontario investors from natural gas into cleaner substitutes, mitigating extensive carbon leakage from actors relocating their carbon-intensive activities to avoid uncertain carbon regulations (Environment and Climate Change 4). Notably, if the federal government were to expand the carbon regulation's scope into the midstream subsector, it would interrupt the natural gas market's production and distribution. This expansion would make it difficult for Ontario to maintain low costs and low emissions, creating financial uncertainty that would dismay investors. In general, any carbon pricing regulation risks mis-pricing climate-related financial risks, delaying the crucial upscaling of sustainable investments for Canada's national transition into a net-zero economy (Monasterolo et al. para.1; In et al. 2). In Ontario, these mis-pricings risk delaying the needed investments into natural gas substitutes to eliminate natural gas emissions from the electricity grid, subsequently obstructing Toronto's net-zero transformation by 2040.

The Document's cap-and-trade (option one) and carbon tax (option two) proposals lack a framework to collect and process information for investors and stakeholders to evaluate a product or activity's climate-related risks and opportunities, informing their investment decisions. For instance, in option one, the Document states that it will require refinements "to take into account carbon leakage risk, localized competitiveness risks…and long-term energy transition considerations" (Environment and Climate Change 21). So, option one cannot adequately support stakeholders in the net-zero economic transition as it provides no assessment tools to assess the long-term considerations and risks, creating uncertainty. Additionally, in option two, the Document states that it would require changes in the "federal [output-based pricing system] and relevant provincial carbon pricing systems for industrial emissions," meant to aggregate the 'price' of GHG emissions per unit of a given product of activity (23; 4). Hence, the Document itself acknowledges that Canada lacks a standardized assessment tool to aggregate the economic-political cost of GHG emissions compared to sustainable technologies, providing certainty. Overall, the carbon pricing regulation will require a standardized assessment framework to provide financial certainty for sustainable investments, mitigating carbon leakage.

Due to increasing climate-economic regulations within nation-states, investors and stakeholders are increasingly demanding climate-financial risk assessment tools across the globe (In et al. 4). For example, in the TCFD's 2022 Status Report, they collected 42 survey responses from individuals "responsible for making financial decisions related to investing, lending or…allocating capital" (Final 64). They found that 90 percent of respondents used "climate-related financial disclosures in making financial decisions," and 70 percent called for improvements to "increase the usefulness of climate-related financial disclosures," including: (64-65).

Disclosure of "actual and potential financial impacts of climate-related issues on their businesses, strategies, or financial planning;"

Implementation of a "standard scenario to assess the resilience of their strategies to climate change;"

Standardized reporting of climate-related targets across companies;

And the increase in the amount of companies disclosing climate-related financial information.

In response, the Financial Stability Board, an

international non-governmental organization, established the TCFD to "identify the information needed by investors" through a standardized framework that "appropriately [assesses] and [prices] climate-related risks and opportunities" of a given asset or entity (Final iii; In et al. 3). Since the TCFD provides "concise and comparable indicators to measure…economic variables," the TCFD framework imbues market participants the confidence in their investment decisions, especially in sustainable research and development from carbon-intensive energies (Monasterolo et al. 505). As a result, scholars have reported that the TCFD framework has "been well-received by preparers, investors and regulators globally" (Chua et al. 396).

Concerning Canada's case, the TCFD can compensate for what the Document lacks. As explained previously, it already acknowledged Canada's need for a tool that addresses carbon leakage by accounting for long-term transition considerations and aggregating carbon pricing assessments. These concerts align with the TCFD respondent's demands to disclose long-term financial impact analyses and standardize the scenario reports of climate-related information (i.e. targets, consequences, and opportunities) across the economy. Thus, the federal government can prevent carbon leakage by enforcing transparent climate-financial disclosures via the TCFD framework. Toronto believes that if the federal government expands the carbon cap to natural gas transmissions, it encourages the government to employ the TCFD assessment framework to support, rather than strain, Ontario investors to seek natural gas substitutes.

4. Conclusion/Recommendations

According to the NZ40 pathway, Toronto must electrify its heating and transportation systems, tackling 93 percent of city-wide emissions. It must also advocate for eliminating natural gas emissions from its provincial electricity grid, ensuring its electricity-based systems are emission-free by 2040.

Unfortunately, TransformTO concluded that Ontario's reliance on natural gas for electricity generation would continue into the coming decades, steadily increasing the grid's GHG emissions and delaying Toronto's net-zero transformation.

Since Toronto lacks jurisdiction over Ontario, it addresses the Document to advocate for the federal policies that will persuade Ontario to invest in research and development for natural gas substitutes.

Toronto recommends the federal government to (1) expand the carbon regulation into midstream emissions, pressuring Ontario from its natural gas dependency; and (2) provide a climate-financial assessment for investor certainty, coaxing Ontario towards natural gas substitutes.

Therefore, Toronto is broadly interested in federal decarbonization regulations because it is specifically interested in pressuring the Ontario government to decarbonize the electricity grid by 2040.

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The Fast Fashion's Denim Industry - What the Fashion Act Has to Say

Ensi Cullhaj

Fast Fashion is an industry with many moving parts, and a focus on the denim industry production stage within it can help highlight its large scale affects. The industry includes retailers Zara and H&M which can provide fashion at reduced costs. What is not as evident on price tags is negative impacts on health of people and ecosystems in an interconnected system, and often harmful working conditions in creating these clothes. United Nations called this fashion industry the second largest polluting industry, consisting of 8% of carbon emissions and 20% of global wastewater (Bailey et. al, 2022 1).

What makes the fast fashion industry so harmful? It emphasizes having low costs and fast delivery to stores over concerns including pollution (Niinimäki et. al, 2020 190). As United Nations Environment Programme (UNEP) explains, only 0.5% of freshwater is available for human and ecosystem needs (UNEP). This industry uses approximately 93 billion cubic meters of water per year (Bailey et. al, 2022 1). It is estimated to use on average 200 tonnes of water to produce 1 tonne of textile (Niinimäki et. al, 2020 191).

The fast fashion industry's stages generally involves agriculture, production of clothing, transportation to retailers, consumer use and disposal (Rukhaya et. al, 2021 517). Specifically, the denim industry consumes about 11,000 liters of water per pair of jeans and produces about 3.5 billion pairs per year, thus about 38.5 trillion liters of water is used (Pal et. al, 2017 111). There are three stages in the production of jeans, starting with downstream processes that include cultivating natural fibers like cotton, core processes including dyeing and upstream processes such as garment use (Fidan et. al, 2023 8857). This industry, from cotton irrigation to manufacturing jeans, contributes to a high water footprint (Pal et. al, 2017 112). Water footprints of denim clothing identify the total freshwater volume used to produce that clothing across the supply chain (Pal et. al, 2017 114) and the amount of water used that has become unusable for the future (112). The main fiber used in denim is cotton and according to the World Wildlife Fund, producing 1 kilogram of cotton requires 20,000 liters of water (Brewer, 2019 2), corresponding to 1 pair of jeans and T-shirt (Pal et. al, 2017 112). The production of cotton uses 2.6% of global water use, reducing freshwater reserves and causing drought issues where cultivation takes place (Fidan et. al, 2023 8862).

The industry has high water pollution levels as well. Cotton is the crop that uses the most amount of pesticides, pollutants which harm health of field workers, nearby ecosystems and consequently have large scale impacts (Garg, 2020 411). During manufacturing processes for denim many chemicals are used, for example when fabric is dyed, 200 tons of freshwater is used and polluted for every 1 ton of produced textile (Garg, 2020 413). The wastewater from denim production has many toxic chemicals, which can be harmful for wildlife in aquatic ecosystems and human health (Brewer, 2019 2). This contaminated wastewater often is not treated yet still allowed to go from factories to oceans and rivers (Zakaria & Nelson, 2022 4), polluting them (Garg, 2020 418) and creating human health problems (Derisi, 2016 88). This water can be treated to remove some chemicals but not all, a problem compounded as most nations do not want to spend time or money on these services (Derisi, 2016 88).

In fast fashion, many clothing retailers in Western Europe and the United States outsource production (Derisi, 2016 88) to places that do not have strict environmental regulations or required pollution reduction technologies in order to reduce costs for production (Niinimäki et. al, 2020 194). The fast fashion's supply chain is spread out globally – most of the production of fibers

and garments take place in developing countries such as in the Global South, while consumption and designs often developed in developed countries including the Global North, (Niinimäki et. al, 2020 191). People working in these clothing production processes are in poor working and living conditions and receive low wages (Garg, 2020 412). While developing countries who produce most of the clothing are most directly negatively impacted, developed countries mainly buy and use the clothes (Niinimäki et. al, 2020 191).

The Fashion Sustainability and Social Accountability Act can help counteract these problems and help our interconnected system thrive for present and future generations. This is a legislation holding companies indirectly accountable and crucial to be passed as the fashion industry does not currently have environmental standards that are legally binding (Fashion Act 1). This Act is being proposed for New York and would apply to any apparel company with business in New York with $100 million as their yearly global revenue (Fashion Act 3).

This Act is beneficial in contributing to human and ecosystem health as companies would have to work within planetary boundaries (Fashion Act 3) such as having to work according to the Paris Agreement (Fashion Act 4) of 2015 of reducing global warming to 2°C or less (Caretta et. al, 2022 659). It implements fines if companies are not in compliance of up to 2% of their yearly revenues, funds used to benefit communities and workers harmed (Fashion Act 4). Furthermore, the act would require companies to disclose their supply chain, from their providers of raw materials (such as cotton) to retailers (Fashion Act 3). Thus companies would have to be more transparent about, mitigate and remediate their negative impacts on humans and environment throughout their supply chain (Fashion Act 4). When companies' offices for design and production are disconnected globally, there can be limited transparency that makes it difficult for manufacturers to be aware of how raw materials were processed (Niinimäki et. al, 2020 190). Ensuring companies to collaborate with different parts of their supply chain including suppliers, producers and consumers, can increase corporate responsibility in production processes to protect (Brewer, 2019 2) health of our interconnected system. This Act is important as it requires clothing brands to collaborate with their clothing suppliers to efficiently manage their use of chemicals (Fashion Act 4) and water.

However, what these planetary boundaries including water use limits, and companies acting 'out of compliance' for fines to be implemented entail, is not clear in the act, leaving risk of companies to avoid changing their harmful practices in denim production impacting water and communities. Also, this legislation is proposed but not yet enforced in law.

There needs to be a change in paradigm at the systemic and consumer level of viewing water and clothing as limitless and disposable through consumerism, to scarce, crucial and valuable, to improve our interconnected system's health. Applying this paradigm to this Act can increase its effectiveness to reduce water usage, pollution and harmful conditions in production through certain amendments. By implementing set limits on water usage in denim production companies can more easily identify if they exceed these limits and consequently when fines to discourage these acts would be charged. Also the Act lacks requirements on wastewater treatment to avoid pollution or clear requirements for safe healthy working conditions. A change in production to slower fashion helps create an eco-friendlier business model for fashion (Niinimäki et. al, 2020 196) and labour in production would have higher wages and protection (Brewer, 2019 7). By viewing water as crucial and encouraging sustainable practices such as reusing clothes over constantly buying the newest items, can help our interconnected system thrive.

The Act does not clearly identify planetary boundaries the companies have to establish through this supply chain and when they would be considered to be out of compliance and consequently fined. Thus specific limits to water usage in production should be clearly established, which could be done through identifying each company's water footprint. This shows their tangible, regulation or reputation risks from water scarcity (Zakaria & Nelson, 2022 12). These limits could be established through determining the company's water footprint, which has an important role in optimal use of freshwater (Pal et. al, 2017 121).

It is important for consumers to be aware of when products are truly sustainable. Companies tend to label their clothes as green due to products gaining emotional appeal from being eco-friendly, despite not meeting a criteria (Rukhaya et. al, 2021 521). Consumers should be aware of this process to accurately identify companies contributing to sustainable clothing.

The fast fashion industry has negative impacts for environment and society as part of an interconnected system (Garg, 2020 413). Thus it is crucial for this Act with the recommended amendments to become legal at the Canadian national level and eventually internationally, to ensure this system can meet its needs, ensure health of human and nature and possibility to thrive for present and future generations.

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Environmental Regulation to Increase Firm Competitiveness

Aasfi Sadeque

Introduction

With economics as the basis for our way of life, it is no surprise that in the fight against climate change, environmentalism must be assessed through an economic lens. Those hesitant about environmental policy and action argue that environmental regulation on production and trade hampers economic productivity while those for it insist that regulation increases competitiveness, creativity and growth. This paper will argue for the latter on the basis that a progressive economic regulation does in fact increase firm competitiveness while enhancing economic margins for the majority of society.

Climate change is something that will eventually affect all of us, regardless of socioeconomic standing, but the lack of climate policy in economics only exacerbates present inequalities by taking advantage of the poor to make the rich richer. This is the first fallacy in the argument against environmental regulation, the myth that the notion of ‘economic productivity’ is beneficial to all equally. This conveniently ignores the inequality that has been perpetuated by our current economic system, while resisting environmental policies that will actually help marginalized communities, as we know that climate change affects them disproportionately (EPA, 2021).

It is also important to note that environmental regulation is not a new concept to arise from recent climate change concerns, but rather an aspect of governance that can be traced back to settlers in North America in the 1700s, with laws such as General Land Ordinance and the Mineral Lands Act actually promoting extraction and natural resource use (Nelson, 1995). The 1800s saw the conservationist movement, establishing the National Parks system in the US and Canada, but it was not until the early 20th century that people truly began to understand human impacts on the makeup of the environment. With the onset of the dust bowl in the 30s and Rachel Carson’s groundbreaking book Silent Spring (1962), public awareness of the necessity to impose restrictions on resource use and industrialization grew, leading to the first international environmental summit in 1992 at Rio de Janeiro. As we learn more about environmental science and human impact, environmental policy and regulations are evolving, with sustainability, a component of all political, social and economic debates today.

Keeping this in mind, I will argue in support of economic regulation to increase firm competitiveness as man-made capital cannot exist without natural capital and environmental regulation sets the stage for innovation, while opposing the counter-argument, as the lack of environmental regulation actually de-incentivizes competition and innovation. This paper will begin with a brief overview of the definition of economic progress, both in terms of mainstream economics and productivity, as well as a redefined ‘progress’ that centres on the environment and human experience. Then, I will touch on my arguments, supporting them with in-class and outside resources, as well as examples and figures where appropriate. I will end the paper with a brief overview of the main points made, as well as some concluding thoughts of my own.

Economic Productivity and Progress

With the onset of industrialism, we have seen the rise of productivity (and CO_2 emissions), creating a sort of ‘race to the bottom’ wherein firms compete with each other to get the highest output possible at the cheapest price. Within this mode of production, consumption and reproduction, labour is sold on the market with an overwhelming accumulation of

wealth for a small number of people at the top, usually those divorced from the actual production. This distinct division of labour also weakens our relation to nature, both as workers and consumers, with the social and environmental cost of production not reflected by the market price. This reality of conventional economic productivity only looks at face-value markers such as net output or monetary profits (Gordon, 2022).

An ecological economist would argue against one-dimensional measures as such, arguing for a holistic look at the processes that go on behind the scenes, such as environmental degradation from resource extraction or emissions from a factory (Pearce et al., 1989). As described by Marc Breslow in his 1996 article "Is the U.S. making progress? Unlike the GDP, a new measure says 'no'", traditional GDP and indicators as it fails in social awareness, with environmental groups looking for new definitions of progress that are changing with the world and its priorities. As we move forward with climate change a looming challenge, do we really have the luxury to settle for these past definitions of progress? Nonetheless, I will continue this paper with these varying degrees of progress in mind, citing the reasons why I think strict environmental regulation is the best incentive for both of these perspectives.

Natural Capital and Man-made Capital

The perception of man-made capital as being independent of natural capital is not only inaccurate but also elitist as it deems people being removed from nature as higher beings. This is exclusionary as it ignores the vast populations of people that are affected by climate change every day and gives humans the privilege to decide how nature is consumed, rather than accepting that we are part of a cyclical ecosystem. In order to take true climate change action, we must recognize the environment as being all around us, affecting our daily lives, habits, and our economic achievements.

The interconnectedness of nature and the economy has been known for decades with economist and professor William E. Rees stating that "natural capital is a prerequisite for manufactured capital" (1997). This contradicts the idea that protecting nature somehow inhibits economic growth when actually, it is the existence of certain natural processes that allow manufactured economic growth in the first place. These processes could refer to pollination, air filtration, watersheds, and various other ecosystem services (Anderson, 2021). Economic growth that is backed by this natural capital cannot be sustainable if it is depleting or damaging those very resources. In this situation, environmental regulations that protect resources and set boundaries on human impact are working in favour of long-term economic growth, by preserving these essential processes rather than upholding our man-made industries.

Neoclassical economists argue that natural capital is interchangeable with man-made capital, and that future technological advances will make up for climate change impacts, ignoring the ever-increasing reality that our depleted resources may not be able to support such technology (Rees, 1997). Further, it is difficult to place natural capital in terms of market value as these large, global systems operate outside of man-made constraints. In taking a political economy analysis, we can see that there are two contradictions to this line of logic.

Firstly, as capitalism enables the overaccumulation of wealth at the top, it is simultaneously leading to underaccumulation at the bottom, with lower relative wages, and social unrest. Within this hypothetical scenario, we can presume that lower wages would lead to less education and fewer opportunities for the majority of people to take part in creating these technological innovations. Secondly, even if we continue this so-called economic progress

ontinue this so-called economic progress unencumbered by environmental regulation, at some point, natural resources are not going to be able to support technological innovation. Rees (1997) brilliantly explains this point, stating that a more efficient fishing boat will do nothing if our oceans cannot support life forms anymore. Human economic systems were built on top of the intrinsic value of nature, and the existence of the former cannot be supported without the protection of the latter. Though not perfect, this form of analysis says that environmental problems are not inevitable in the course of human nature, but are created by certain constraints that not only harm the environment but also the majority of the people. Government regulations in favour of environmental protection will serve to dismantle this exploitative structure, as human welfare and environmental protection are closely related and interdependent.

Environmental Regulation for Innovation

Building off the idea presented in the previous section, that the human economy is maintained by natural processes, our ideas of economic growth must change to accommodate nature, not vice versa. Environmental regulation can foster firm competitiveness and innovation as it creates new ideas for companies to explore and presents new challenges to solve. The innovation stimulated by well-designed environmental regulation was predicted by the 'Porter Hypothesis' (1991), an idea by Harvard economist and professor Michael Porter. Within this, he argues that successful, profit-maximizing firms would take to the challenge of environmental regulation, utilizing this new space for improvement to their advantage (Porter, 1991). Though the application of this hypothesis in its various iterations (eg. narrow, weak and strong) remains debated across industries, the Porter hypothesis has been proven to be true across multiple studies (van Leeuwen & Mohnen, 2015; Perino & Requate, 2012; Hu et al., 2020). For example, a case study on the construction sector in the EU found that stringent environmental regulation increased investments into more advanced green technology, leading to environmental impacts and improved business performance (Testa et al., 2011). The majority of these studies are done on established corporations operating under environmental regulations that provide monetary incentives for compliance. That being said, as green technology evolves, the momentum will grow, with market analysts expecting the green technology sector to reach $74 billion by 2030 (Flynn, 2022).

The positive correlation between environmental regulation and innovation can be further emphasized with increased government subsidies and investments in sustainable companies, instead of pandering to fossil fuel firms that refuse to cooperate with a changing world. Emission-heavy industries like coal are still receiving trillions of dollars in global subsidies, while renewable fuel sources are struggling with affordability (Parry et al., 2021). Today, consumers want sustainability in their products and services and are willing to pay more money for them (Petro, 2022). Those leading the demand for environmentally friendly companies are young people, Gen Z, estimated to make up 27% of the world's income by 2030 (ibid). This shows a massive gap in the market that should serve as encouragement for both environmental regulation by politicians and sustainable innovation by firms. Customers are looking for brands that align with their values, considering sustainability a major tenant of their purchasing habits; under our supply-and-demand system, we cannot be amplifying the supply of emission-heavy products through artificial price reductions, while ignoring the demand for sustainable solutions.

Here in Canada, ecological (and many conventional) economists argue that subsidies for our fossil fuel industries not only prevent us from meeting our global emission-

reduction targets but also undermine innovation and the economy (Noakes, 2020). In the past, climate change has been a point of contention for Canadian voters. We can assume a lot of that stems from our reliance on extraction jobs that support much of rural Canada. However, journalist Geoff Dembicki (2022) speaks of the role Alberta's Big Oil played in spreading climate change denial and covering up the environmental threat of the extraction industry in the 90s, and how through this propaganda campaign, public support for climate change action dropped considerably. Pro-oil campaigns continue across select provinces today, furthering the lack of cooperation across the country toward effective climate action (ibid). In doing this, markets are artificially controlled by lobbying and misinformation. As demands shift, oil and gas industries are losing billions of dollars in value, with government support essentially the only thing keeping them afloat and prices irreflective of the externalities at play. ExxonMobil lost $184 billion in market valuation between 2014 to 2020, but it has no incentive to transition to clean energy as these government bailouts keep their profits stable (Egan, 2020). Here is an example of the lack of environmental regulation actually hindering competition and innovation, as these subsidies only serve to coddle failing industries, while ignoring real demand. Channelling this money towards renewable energy companies will spur innovation in an industry that needs all the investment it can get in order to become more affordable for consumers, as well as employ the people left behind in the fuel transition.

Inequality and Economic Growth

By now it is well known that climate change disproportionately affects the most vulnerable populations who often had very little to contribute to global emissions in the first place (EPA, 2021). However, in the process, it also exacerbates existing inequalities. As explained by Thomas Picketty in the book Capital and Ideology (2021), inequality is not inherent in the nature of human society, but it is something that is manufactured and upheld by certain institutions and processes. One of these processes is climate change, more specifically, climate change created by the hypercapitalism of wealthy countries and the subsequent lack of environmental regulation. The UN has found that inequality-aggravating impacts of climate change can take the form of exposure to dangerous weather events, housing destruction and climate refugees, as well as climate-induced restrictions to education, healthcare or employment (Islam & Winkel, 2017). The economy is perpetuated by a cyclic system of education, labour, and consumption; persisting inequality hinders all these factors, leading to a systematic failure that harms the quality of life, productivity and purchasing power. The hesitancy of governments to impose strict environmental regulation out of unfounded fears of economic harm only serve to worsen these inequalities, disenfranchising large groups of people from financial well-being or economic success.

Going back to the beginning of the paper with the discussion on progress, it is important to be mindful of the differentiation between growth and equitable growth, the latter of which I will be focusing on as the goal. Whereas growth can mean GDP or profit margin increase, equitable growth refers to a holistically felt improvement in quality of life, including those at the margins of society and the environment (Vandermoortele et al., 2013). Borrowed from the idea of sustainable development, we must recognize that the mobilization of all the people in a society is required for true economic achievement, and inequality stands as a hurdle towards it. The lack of environmental regulation will lead to an increase in environmental degradation, which only increases the number of people affected by climate change. Impacting countries in the Global South and poor communities, these economies will be gravely hurt if we do not take adequate action. More than a social goal, the eradication of inequality has been shown to be an economic booster as well. A cumulative study by the

Organization for Economic Co-operation and Development (OECD) found that in all countries, increases in inequality hinder GDP growth, hurts the labour market and enforce gender gaps that hold back women from economic participation (2015). Climate change and weather disasters have led to a worldwide refugee crisis with a predicted 1.2 billion people displaced because of it by 2050 (Ida, 2021). That number is staggering in terms of the economic impact and the first step towards mitigating this massive economic crisis in the future is to take action now.

Conclusion

Economists hesitant about government environmental regulation often cite the case of the 'Tragedy of the Commons', a theory popularized by Garrett Hardin in 1968 that states that people will not act in favor of preserving something that is a common good (eg. the atmosphere) as they are individualistic by nature, and there is no incentive for one person (or country) to fix something everybody is polluting. This ignores the premise that a world under environmental regulation is not this anarchistic open-access property, but rather communal and state property that can regulate the use and exclude players. Under this regime, theorized by Nobel prize-winning economist Elinor Ostron in her 1990 book Governing the Commons, argues that people want to be part of community arrangements that are based on boundaries, monitoring, sanctions and conflict resolution. Building off this Feeny et al. (1990), examined multiple cases of cooperative common property management can work, promoting economic growth for all, whilst remaining within ecological and governmental boundaries. Environmental regulation is not a hypothetical talking point for politicians anymore, it is essential in order to ensure the survival of our species.

This paper argues that environmental regulation does not impede economic progress and actually stimulates growth by promoting innovation and competition. Man-made capital and markets are inherently dependent on the natural systems that uphold it, and unregulated technological growth cannot be supported by a depleted environment. Further, environmental regulations open up new spaces for innovation and foster creativity that encourages out-of-the-box thinking and is mindful of changing consumer demands. Conversely, the lack of environmental policy has been shown to decrease economic stimulation. Regulations also minimize the effects of climate change by tackling the issue at the cause, preventing the social inequality that has been proven to stem from weather disasters. Appropriate environmental regulation in our economic system is the natural next step for society. They are not a new concept created by environmentalists to curb financial growth, but an aspect of governance and economic planning that have been in place for decades, and as climate change worsens, we must prepare ourselves for necessary changes.

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Growth Versus Progress in Economics:

How Using GPI instead of GDP can Promote Effective Environmental Policy and Motivate Pro-Environmental Attitudes

Aden Fisher

There may be no field as influential to government decision-making as the study of economics. Originally, the term 'economics' stems from the Greek term 'Oikonomia' translating to management of the household or community (Leshem, 2016). However, the modern state of market-based economics seems to have deviated significantly from the field's original focus, and is perhaps best illustrated by the metric of Gross Domestic Product (GDP). The GDP is generally considered the standard measure for governments and organizations to gauge economic performance of a nation or state (Weeks, 2019). In the midst of the growing ecological crisis, evaluating the validity of a metric as influential as GDP is essential. As Nobel prize winning economists Joseph Stiglits and Amartya Sen eloquently state in their book on GDP: "What we measure affects what we do; and if our measurements are flawed, decisions may be distorted" (Stiglitz et al., 2010, p. 2). The goal of this paper is to evaluate GDP as an economic metric of wellbeing and compare it to the newly developed alternative Genuine Progress Indicator (GPI).

As defined by the Organisation for Economic Co-Operation and Development (OECD), GDP is "the standard measure of the value added created through the production of goods and services in a country during a certain period" (2021, para. 1). GDP predominantly sums up three macroeconomic elements: consumption, investment, and spending by government bodies (Breslow, 1996). The idea of GDP is largely credited to Russian economist Simon Kuznets whose idea for a system of national accounting for the US directly led to the development of GDP as a widely used metric (Weeks, 2019). Kuznets' original goal with his paper was not to create a metric of wellbeing. One of the main themes he communicates is that these quantities should not be treated as a direct measurement of wellbeing or even productivity of a nation because of the numerous assumptions that play into computing such a quantity in the first place (1934). In the 1940s, GDP was adopted by the International Monetary Fund (IMF) and the World Bank (WB) as the principal indicator of economic growth (Fox, 2012), further establishing its relevance. In 1993, China became the last major country to use GDP and consequently, the measurement became the official global standard for comparing performances of different economies worldwide (Bove, 2021). In due time, GDP became the predominant designer of policy, as illustrated by economist Joseph E. Stiglitz: "Good economic policy was taken to be whatever increased GDP the most" (2020).

In order to understand the role that GDP plays in relation to environmental issues and the ecological crisis, it is crucial to understand how GDP influences environmental policy. GDP is based heavily on transactional activity, implying that environmental effects such as climate change are merely regarded as economic externalities (Bove, 2021). This notion is somewhat counterintuitive considering that phenomena such as climate change will certainly have impacts on economies in the coming decades, yet GDP is incapable of factoring in such consequences. Furthermore, GDP conflates all sorts of economic activity as 'growth', so tragic catastrophes such as hurricanes and the opioid crisis are increasing the GDP because of the costs associated with the management and recovery processes (Stiglitz, 2020). This likely explains why countries such as the United States have been on an exponentially increasing production and consumption binge since GDP was widely adopted in the 1950s (Anielski, 1999). Economist Victor Lebow stated in 1955: "Our enormously productive economy demands that we make consumption

economy demands that we make consumption our way of life" (Suzuki, 2018, para. 6). This philosophy is inherently harmful for environmental policy as it prompts people to view the natural world as a source of materials for consumption rather than an integrated ecosystem that we depend upon.

In addition to how GDP influences environmental policy, there are several shortcomings associated with GDP as a metric itself. Since GDP considers all types of economic activity as beneficial, this implies there is no distinction between sustainable and unsustainable economic transactions, nor is there consideration of how certain economic transactions may affect the wellbeing of communities. GDP often considers natural disasters from climate change as positive because they lead to government spending in relief and rebuilding infrastructure, as well as increased spending by disaster victims to replace lost property (Bove, 2021). In fact, environmental externalities such as pollution can be considered as a 'double benefit' for GDP because of the financial transactions associated with the original polluting activity as well as the clean-up (Talberth et al., 2007). To the GDP, these are all monetary expenses and thus are beneficial to the economy, with little to no consideration of the trauma and distress endured by disaster victims. Economist Marc Anielski best summarized the flawed nature of GDP in his paper with a satirical quote: "The ideal economic or GDP hero is a chain-smoking terminal cancer patient going through an expensive divorce whose car is totalled in a 20-car pileup, while munching on fast-take-out-food and chatting on a cell phone" (1999).

Policymakers often focus on the change in GDP from year to year, but Stiglitz (2020) claims that it is actually more important to question whether or not the economic growth occurring is sustainable. Although empirical observation does indeed support that GDP rising is affiliated with job growth/creation, the focus should perhaps be oriented more towards questioning the types of jobs being created rather than equating all sorts of job creation as equally beneficial (Bove, 2021).

In reaction to GDP's prominence, many alternative initiatives with a new index have surfaced. One of the leading alternatives to GDP is the Genuine Progress Indicator (GPI), which was developed by national policy institute Redefining Progress (Breslow, 1996). The aim of the GPI was to shift the focus toward sustainable economic welfare rather than pure economic growth (Talberth et al., 2007). The basic methodology of the GPI is to start with the personal consumption data from the GDP, then make appropriate deductions based on harmful factors such as income inequality, costs of crime, environmental degradation, and loss of leisure time (Talberth et al., 2007). Sequentially, additions are made based on beneficial factors like public infrastructure, volunteering, and housework (Talberth et al., 2007). The GPI is significant as an alternative to GDP because it displays a vastly different trajectory. In fact, by 1994, the US GPI was 26% lower than it was in 1973, and on a per capita basis, it had decreased by 42% (Breslow, 1996).

In some ways, GPI seeks to address these environmental shortcomings and motivate pro-environmental attitudes. While GDP-oriented policy attempts to maximize material production and consumption, GPI strives to create a more sustainable economy by minimizing material throughput (Talberth et al., 2007). Furthermore, GPI also attempts to define a nation's progress through a social perspective. The second largest negative adjustment within the GPI metric is the measure of income inequality (Breslow, 1996), which as economist Thomas Piketty strongly emphasizes in his book Capital and Ideology, has been drastically increasing since the great economic transitions that took place under Ronald Reagan and Margaret Thatcher (2020).

Ultimately, although the era dominated by Gross Domestic Product has been

accompanied by a momentous rise in global living standards (Fox, 2012), it is evident that GDP-based approaches are no longer sufficient for guiding economic and environmental policy. In the midst of rapidly growing inequality regimes (Piketty, 2020) and the ever-intensifying climate crisis, other macroeconomic measurements need to be considered in order to ensure that the prosperity achieved in the GDP era is not a momentary flash but rather a continuous state that can be sustained for generations. Philosophically, the use of GPI over GDP represents a paradigm shift in economics that has the potential to redirect the focus of the discipline away from chrematistics and back to its inception of caring for the household, the community, or for the case of macroeconomics, entire nations and the planet that sustains them.

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Market-Driven Regulation: Are Carbon Pricing and Disclosure Of Climate-Related Financial Risk The Solution?

Stefanie Battaglia

There is a concert of economic concerns when it comes to mitigating climate change as nations aim to address GHG emissions, overconsumption/waste, the depletion of natural resources, as well as adapting to the effects of climate change. Using the markets to foster a sustainable economy and, in consequence, a sustainable human world, is a tactic that is more palatable to economists and free-market neoliberal thinkers who oppose regulations. Market-based climate solutions can be seen in policy that looks towards carbon pricing to encourage de-carbonization. However, it largely requires the co-existence of an affordable alternative for fossil fuels or effective use of revenue recycling, to be effective in both reducing emissions and to be well received politically. In Canada, major conflicts of interests arise from carbon-pricing policies since a major part of its economy is based on oil and natural gas exports. The result is that any compromise between environmental, economic, and social interests lead to a complete lack of effective environmental policy. As for the disclosure of climate-related financial risk, I argue that while it prompts the need for immediate climate action, it is clearly not going to enable a successful transition on its own. For these reasons, I argue that carbon pricing and disclosure of climate-related financial risk are not the sole solutions to achieving an energy transition in Canada.

Mark Carney (2015) presents clear warnings about the financial disaster that will ensue if nothing is done to combat climate change; Many industries can go bankrupt due to the disruption in the flow of funds (Carney, 2015). His argument for financial risk disclosure is that it could help companies and governments project what needs to be done to prepare for the financial impacts of climate related events such as increased natural disasters, that effect the economy (Carney, 2015). As, a "too-rapid [or] unplanned transition could materially damage financial stability as oil, gas & coal companies go bankrupt and take down the banking and insurance sectors with them" (Stewart, 2022) (Carney, 2015). This market-based climate action is thus centered around informing people, and businesses about the costs of climate change. It is meant to work in tandem with regulations and carbon pricing mechanisms. Based on its main function – to inform – I agree that this is a helpful tool, it is clearly not going to enable a successful transition on its own. Next, I turn to climate pricing solutions.

The main goal of Carbon Pricing is to reduce GHG emissions using market-based instruments. Carbon Pricing is becoming a popular climate policy across the globe, with 40 countries already using such tactics to reduce GHG emissions (Working Group on Carbon Pricing Mechanisms Final Report, 2016). Carbon Pricing is used to incorporate the negative external costs of oil and natural gas. External costs can be described as the imposed costs or benefits of the production or consumption of goods or services that are not included in the price for such goods or services being provided (Working Group on Carbon Pricing Mechanisms Final Report, 2016). Negative external costs are put on a third party, for example, when the emissions from a gas-running vehicle contribute to climate change; the consumption of a product (the gas-running vehicle) negatively affects third parties by contributing to climate change which leads to extreme weather events that in turn cost them x amount in repairs (Corporate finance Institute, 2022). In other words, it is the inclusion of the indirect costs of pollution (Stewart, 2022). Including external costs in the price of a product is seen as the most efficient way to incentivize consumers (Which includes people, businesses, and industries) to change their behaviour (Working Group on Carbon Pricing Mechanisms Final Report, 2016). The case for Carbon Pricing is if the external costs of

GHGs are included in oil and gas prices, then consumers would be incentivized to choose environmentally beneficial products and thus reduce their own emissions, as well as create a market for zero-emission products (Ibid, 2016). It is often within the interests of the agent marketing the product (oil, natural gas, processed petroleum) which has a negative external cost to not include such externalities, as it would increase the price of their product and, in result, make it much less appealing to consumers to purchase if there are cheaper alternatives (Ibid, 2016).

Carbon can be priced either through a carbon tax or through a cap-and-trade system. Both have advantages and disadvantages for the policy makers involved and consumers. Carbon taxes increase the price of carbon, with the expectation that consumers who can invest in emissions reduction technologies will respond to the increase in price by doing so; While Cap-and-trade systems impose a limit on the total amount of GHG emissions that can be released into the atmosphere per year (Harrison, 2019) (Working Group on Carbon Pricing Mechanisms Final Report, 2016). This allows for a more flexible transition to net-zero since those who are part of the cap-and-trade system can either buy or sell emissions surplus or deficits (Harrison, 2019). For example, for some firms, reducing emissions is relatively easy and for others, it is much more difficult; In the event that it is far too costly for a firm to reduce their emissions, they can essentially pay "someone else to make reductions for them" (Harrison, 2019). Typically, cap and trade systems decrease the cap level of carbon emissions each year, pushing industries more and more over time to become more efficient and eventually zero-emission (Harrison, 2019).

The advantages and disadvantages are sort of reversed for each method of Carbon Pricing. With a Carbon tax, the cost it will have on the economy is very predictable, however it is more difficult to see how much emissions reduce by. Whereas a cap-and-trade system makes it clear how much of a reduction in emissions there will be, but the cost it has on the economy is harder to track (Stewart, 2022) (Harrison, 2019). However, the cost of carbon imposed on consumers is much more visible with a carbon tax rather than in cap-and-trade systems because it is the industries who will see that cost, not consumers (Harrison, 2019). Theoretically, if Walmart had to raise its prices because it had to pay for x amount in solar panels for its stores in Canada, thus people must incur those costs by paying more for their products, but they are not explicitly told so. Whereas people are easily made aware that an imposed Carbon Tax from the government is the cause for an increase in gas prices. As I discuss later, this is what makes carbon pricing, especially carbon taxes, vulnerable to political tactics.

Market-based climate "solutions" such as carbon pricing have their philosophical roots in neoliberalism. In recent years, opposition of direct environmental regulation in fear of its economic costs has stunted any effective environmental regulation. Thus, neoliberal environmental approaches have come to be very influential in the environmental policy arena, as most environmental policies being proposed today are market-based instruments such as Carbon Pricing (Working Group on Carbon Pricing Mechanisms Final Report, 2016). Neo-liberalism actively critiques 'command and control' regulation, for example, an environmental policy that imposes a ban on coal (Stewart, 2022). Common reasoning for this criticism of command and control is that governments cannot predict which areas of the market to support or not, nor to what extent and how it will affect the economy. Because of this, free-market economists often support Carbon Pricing because it is low-cost, and revenue generating for the government (Working Group on Carbon Pricing Mechanisms Final Report, 2016) (Stewart, 2022), while giving emitters a lot of flexibility in how they reduce because it has the least government intervention (Jaccard, 2016) (Stewart, 2022). In result, the neoliberal belief in the free market assumes this will drive more

innovation in clean technology by incentivising the creation of more competitive clean-energy alternatives to already existing, fossil fuel technology that is made less competitive through taxes or cap and trade systems (Working Group on Carbon Pricing Mechanisms Final Report, 2016) (Stewart, 2022). However, as we will see, when environmental policy is left to the market, environmental law is weaker, since there is a general avoidance of any policy that would limit the growth of the economy. This foreshadows many of the issues Canada has with Carbon Pricing, since this market-oriented view for environmentalism conflicts with the basis of the Canadian economy.

For economists, carbon pricing is a favourable approach to achieve an energy transition because it is the most cost-effective way to incentivize change. However, as effective as carbon pricing may seem, Canada's diverse communities, climate, and economy, and their dependence on natural resource exploitation does not allow for carbon pricing mechanisms to work effectively. Due to the variation in climates across the country, the effect carbon pricing will have on provinces depends on their respective abilities to access clean energy alternatives (Working Group on Carbon Pricing Mechanisms Final Report, 2016). For example, the northern territories typically have high consumption of diesel fuel to keep their homes warm in the -40-degree Celsius winters (Ibid, 2016). Moreover, because northern territories are so secluded, their communities often lack adequate "access to capital, low on-reserve investment, and low employment rates" which impedes their ability "to diversify economies or invest in new infrastructure" (Ibid, 2016). Imposing a carbon tax on these communities would exacerbate their inability to have the financial resources to mitigate the effects of climate change itself, let alone invest in expensive new clean technologies that are difficult to operate in such climates. While there can be targeted carbon pricing mechanisms that exclude vulnerable communities from having to pay more for energy (Ibid, 2016), Canada is not suited for carbon pricing, as it is a major conflict of interests for the natural resource-based economy.

While it was argued that Canada would eventually climb out of this dependence when its economy diversified, the potential revenues from oil exports has sent Canada back to depending on oil and gas exports to continue to grow its economy (Carter, 2020). Thus, for Canada, carbon pricing may not be the best first option for mitigating GHG emissions; Since imposing carbon pricing on important firms or provinces that are reliant on natural resource exporting for their economy presents a major conflict of interests among provinces and the federal government. The natural resource exporting and manufacturing provinces' negative response to Justin Trudeau's Carbon Tax illustrates the political implications of imposing carbon pricing in Canada. Alberta's economy is heavily dependent on oil and gas extraction, refinement, and exports to the United States (Carter, 2020). It was proposed by the province's previous NDP government that a carbon tax at $30/a barrel would be implemented if Trudeau approved the Trans Mountain Pipeline Expansion (TMX) project, which directly conflicts with the carbon tax's purpose (Carter, 2020). TMX is very important for Alberta because it will be able to grow its economy through accessing global oil and gas markets (Trans Mountain, 2022) (Carter, 2020). However, if a price on carbon is supposed to deter new investments in fossil fuel energy, then why would a pipeline support a carbon tax? Such contrasting interests between the federal government to move to net-zero, and the Alberta government to export oil, lead to policy compromises that have no real positive impact on reducing GHG emissions.

Additionally, because it is easy for political opponents to point out the added costs a carbon tax imposes on consumers, carbon pricing policies are vulnerable to political attacks. When Justin Trudeau imposed a federal carbon tax to any provinces who lacked a comprehensive carbon-pricing plan, Alberta, Ontario, and Saskatchewan took legal action claiming that this move is unconstitutional (Harrison, 2019) (Carter, 2020). Although the supreme court ruled that the tax was constitutional, this does not mean that the carbon tax policy is safe from conservative party leaders, who could repeal the carbon tax policy if they hold a majority in the federal government. Ontario premier Doug Ford publicly tweeted, "Today's the last day to fill your gas tank before the federal carbon tax makes life more expensive for your family," (Cohn, 2019) to attack Ottawa's Carbon Tax before it went into effect. For the same reasons (conflicting interests and vulnerability to political attacks), no government is willing to price carbon emissions at a rate high enough to cause significant changes in the market. According to Mark Jaccard (2016), no Canadian politician has added more than $30 per tonne to CO2 emissions – only calculating to about 7 cents a litre, which is "a sixth of the increase likely needed to motivate car and truck purchasers to choose electric or biofuel options" (Jaccard, 2016). If the effectiveness of carbon pricing policies depends on how high the price is – meaning prices need to be set high to incentive reductions, any tax set by Canada's policy leaders will not be effective.

In conclusion, carbon pricing and disclosure of climate-related financial risk are not the sole solutions to achieving an energy transition in Canada. This is because of the major conflicts of interests that arise from carbon-pricing policies due the dependence the Canadian economy has on oil and natural gas exports, as well as the failure of such policies to accommodate the vastly different climates in each of the provinces and territories. The result is that any compromise between environmental, economic, and social interests lead to a complete lack of effective environmental policy. As for the disclosure of climate-related financial risk, I argue that while it prompts the need for immediate climate action, it is clearly not going to enable a successful transition on its own.

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Interrogating the Optics of Google Earth

Kaja Chambers

As the Internet became more accessible to the mass public, the Whole Earth Catalogue maintained an optimistic view of this technology and its use as a tool for individual liberation. This paper will track the evolution of techno-libertarianism as presented by the Whole Earth Catalogue and furthered by Google Earth. I will evaluate the viewpoints these resources center, critiquing how they perpetuate anthropocentric, Western ideologies of the natural world and societies' relationship to it. Finally, I will discuss how these perspectives and a "gods eye" point of view perpetuate humans' separation from the natural world, the erasure of non-western cultures, and our alienation from the environmental crisis.

The Whole Earth Catalogue was a vastly influential catalogue that aimed to allow individuals to become self-sufficient through the knowledge, skills, and resources it provided (Wiener, 2018). The Catalogue and its founding members encouraged individual empowerment, renouncing institutions and promoting personal liberation (Weiner, 2018). These countercultural ideals created a network of like-minded people interested in self-liberation, spanning several once-separate subcultures (Turner, 2006, p. 5). These countercultural communities were connected by The Catalogue's founder Stewart Brand, who brought their different ideals, research, and knowledge together to unite them for a common goal; an improved social order empowering individuals and rejecting institutional powers (Turner, 2006, p. 5).

The social and intellectual network created by Brand brought early technologists into discussions on how this idealized social order could be achieved, proposing the Internet as a crucial transformative tool (Turner, 2006, p. 1). Proponents of the Internet as a tool for self-liberation believed that it would allow for a societal revolution in which people would be freed from institutional control and become more self-sufficient than was previously possible (Turner, 2006, p. 5). This ideology, called techno-libertarianism, was primarily based on the optimistic thought that the Internet would lead to a cultural revolution by providing individuals with the means to become self-reliant through better access to information and improved communication (Turner, 2006, p. 4). Brand is often credited with bridging this environmentalist counterculture with technologists and, by extension, originating techno-libertarian ideology (Wiener, 2018).

The Internet was considered a sort of digitized Whole Earth Catalogue, allowing its users to seek information to become self-sufficient, an idea made explicit by Steve Jobs, calling The Catalogue "Google in paperback form" (Wiener, 2018). This connection between the two seemingly different mediums is the individualist ideals the two communities share. These shared values, along with Brand publishing work from early technologists and helping popularize the industry, mean that the effects of this connection still exist today (Turner, 2006, p. 8). The Whole Earth network created a utopian vision of the Internet as a place where information is abundantly available and entrepreneurial efforts are idolized (Wiener, 2018).

One resource provided by the Internet that could, in theory, allow individuals to become self-sufficient is Google Earth. The website has features that allow users to navigate around the globe through a bird's eye view, check terrain information, research travel routes, and find general information about specific locations (Google Earth, 2023). This abundance of information seems to corroborate the techno-libertarian view of the Internet as a tool to expand individual knowledge and become self-sufficient (Wiener, 2018). With Google Earth, an individual user can navigate and access the whole globe from their personal computer,

tablet, or even cellphone.

Using Google Earth as a source of information about the world emphasizes physical facts, geographical features, and numerical data over social and ecological facts. For example, clicking a lake will display the length, depth, location, and how it was formed, but it does not show which species rely on the lake for food, water, or habitat (Google Earth, 2023). Nor does the website display how the lake is used by the local communities around it, whether for water, food, cultural ceremonies, or recreation (Google Earth, 2023). Separating the physical from the social severs the inherent tie between them, leading to a one-dimensional understanding of the Earth.

In addition to a bias toward statistics and figures, Google Earth also lacks information about rural, remote, or otherwise hard-to-reach areas. This is often because the technology that Google Earth uses to capture images for street view requires vehicle access, which may not be possible in off-terrain places. Google Earth cites Wikipedia for the majority of the statistics and figures for its locations, so if an area or site of interest does not have information already available on the Internet, it will not provide the information itself (Google Earth, 2023). Some smaller cities and towns are without any information, particularly in Global South countries (Google Earth, 2023).

This lack of information about remote areas creates ignorance about the cultures of people living in those areas. These areas where data is scarce or missing completely are typically rural in the Global South, resulting in an incomplete vision of those cultures and ways of life. It erases those cultures outside the reaches of Western technology, leading to a focus on Global North societies and viewing other cultures and societies through a Western lens. Not only are communities in the Global South underrepresented, but remote Indigenous communities across North America are also often not represented equally on street view (Google Earth, 2023). The lack of representation for these communities privileges Western and urban cultures, communities, and spaces while simultaneously erasing those of Global South, Indigenous, or rural communities.

As T.J. Demos notes in Against the Anthropocene, images are often curated or edited to forward a specific narrative about the subject it captures, and Google Earth is no different (Demos, 2017, p. 15). Google Earth uses images to portray a particular narrative about the world by centring Western and urban places and communities while neglecting those outside these boundaries. Google Earth privileges visual images over other types of information, and those images center Western urban communities (Google Earth, 2023). These images, therefore, maintain a narrative of Western superiority by presenting Western society as more worthy of representation or research.

The first Whole Earth Catalogue stated that "We are as gods and might as well get used to it," and there is "...power of the individual to conduct his own education, find his own inspiration, shape his own environment….." (Weiner, 2018). This Whole Earth vision is still prominent in society, with many still believing that the human species is somehow superior to the rest of the natural world and is therefore justified in utilizing its resources. Separating nature from society and placing humanity on a god-like pedestal can perpetuate the idea that nature is something to be used for our ends. Nature becomes a resource for humans to use and exploit at will. The idea that with enough information about nature, we can "shape our environment" to best suit our needs has often been used to justify the disruption and destruction of natural systems for personal gain (Weiner, 2018).

Google Earth subtly advances and demonstrates this ideology of humans as powerful gods by placing our point of view above the rest of the planet, leading our egos to follow suit. Techno-liberalism perpetuates the idea that we can somehow control or improve nature with enough information. The idea that more data equates to better problem-solving ignores that the data provided on the Internet often mirrors institutional biases or systems of inequality already persistent in society. The Internet is not a source of information devoid of societal or institutional influence; the two are deeply intertwined. Brand himself admits that much of the Internet's engineering was done by "people with narrow ties who worked nine to five, often with federal money" (Wiener, 2018).

This paper has criticized the overly-optimistic techno-liberal ideology that originated with the Whole World Network and permeates technology and self-liberation discussions today. Google Earth's gaps in information demonstrate that while personal technologies can be valuable tools for self-sufficiency, they have numerous societal and environmental repercussions. These online tools often centre Western, urban, and anthropocentric worldviews while erasing all those who are "other." Technology should not be naively viewed as a perfect resource for self-liberation and instead be recognized as a tool which can be useful in some contexts but is also recognized for its faults.

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Part II
Justice and Movements

by Minh-ly de Reboul

Through this collection of photographic stills, I captured two actions: the RBC off-campus sit-in on March 2nd, calling on the student union to cut ties with RBC, and the climate strike at UofT on March 3rd, 2023, both focusing on fossil fuel financing at UofT.

In the colours and layout of the photos, I try to capture the emotional combination of determination, empathy, and desire for something better in these actions, with green representing new beginnings, renewal, but also a lack of experience, and some focus on red representing the opposite side of resistance. Yellow, as the balancing colour in these photos, will be used as part of a project for a sustainability thinking course that will include the concepts of slow violence, slow justice, and slow lifestyle that oppose the capitalist system we live in

This collective artwork is a reflective space for understanding the gravity of climate change, as well as the capitalist society that ultimately transgresses the movement, how it seeps into various aspects of life, and the need for communities of grassroots environmental justice groups.

Effective Climate Activism: An Ideal Model for Change

Marie Kinderman

Youth leadership in activism has successfully pushed the climate emergency to center-stage. Like other non-violent movements, climate activism claims that violence hinders harmonious outcomes. Gene Sharp attests that violence does not create power because power only emerges from the consent of citizens to be governed (Vinthagen 3). Prominent youth climate organizations like Sunrise and Extinction Rebellion reject this hierarchical model and have decentralized structures. Power is shared amongst members and manifests itself as a collective belief in a new, equitable society. Despite its successes, youth climate activism has not succeeded in shifting the world order to sufficiently address the climate crisis. As a solution, I propose imagining a new climate movement that addresses the flaws of organizations like Sunrise and Extinction Rebellion.

The Sunrise Movement--an American political non-profit that advocates for climate action--attempted to distinguish itself through decentralisation. In theory, a small founding team would decide Sunrise's mission and values and the organization could grow by training its members and replicating this mission and values. Sunrise's founders liked this model but couldn't image the organization running without an oversight body. They decided that individual Sunrise chapters or "hubs" could make their own decisions but that a national body would organize trainings and coordinate national campaigns. However, in practice, the national body has taken on many more responsibilities and eventually become a "distributed organizing machine" (Lawrence and Jaye).

As a member of Sunrise, I read several open letters by other members who demanded transparency from the national body. Fellows and paid staff complained that they were exploited and overworked. Although Sunrise aimed to maintain a non-hierarchical structure, it now functions like most progressive non-profits. The organization could move away from this model by reflecting on the role of its national body and granting Hubs more authority. However, when most non-profit organizations reach a certain size and receive considerable media recognition, they can't function well without oversight. Sunrise is a political organization and receives generous donations so it's not surprising they found it difficult to maintain a decentralized structure.

Based on a typology drawn on research on youth activism, the most impactful form of protest is "dangerous" dissent, which critiques business-as-usual and demands long-term transformation (O'Brien). Dangerous dissent proposes an alternative context for change, usually a post-development and anti-consumerist society. This form of protest is a core part of many climate organizations' strategies, including those of Sunrise and Extinction Rebellion. Like any non-violent action, dangerous dissent can attract attention with flashy and unconventional imagery (Peverini). But it doesn't pose as immediate a threat as disruptive dissent, which includes boycotting businesses and disrupting high-level meetings.

Extinction Rebellion, a UK-based non-partisan climate movement, is shifting their strategy away from disruptive dissent to focus on unifying their organization (Booth). Their previous actions have resulted in property damage like smashing windows and arrest of its members. Chenoweth claims that non-violent groups have relied too much on mass demonstrations to get their message across. In the climate movement, these actions include Global Climate Strikes. Mass demonstrations are not the most effective way to sustain pressure because they are repetitive and don't have specific policy demands. Chenoweth suggests organizations use other non-violent techniques like general strikes and stay-at-home actions because they are more disruptive to economic life.

Environmental movements could be more effective if they were racially and economically diverse. While Sunrise and Extinction Rebellion center diversity and inclusion in their vision statements, their demographic is still largely privileged and white. Lewis and others explain that, generally speaking, white people and people of color define the environmental sphere differently. White Americans have a narrower understanding of environmental issues within the social context because they experience less environmental injustice and social inequality. People of color and economically disadvantaged populations tend to experience more environmental injustice in their daily lives. Working class populations might not have the privilege of time and money to invest in the movement but they don't necessarily care less about climate change (Lewis). If, as Chenoweth suggests, we focus on more efficient methods of organizing, we can diversify climate organizations and avoid exploiting activists and creating an unequal power dynamic.

The Sunrise Movement and Extinction Rebellion have succeeded in generating passion and enthusiasm around climate issues and involving people in the activist movement. On the other hand, they have struggled to maintain decentralized structures, employ a range of protest methods, and build diversity. An ideal climate organization would likely function at a local level, use various, innovative protest techniques, and reflect the people most affected by climate change and environmental injustice. To achieve our goals, we may have to adjust our vision; The ideal society may be out of reach given the current rate of climate change.

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Beyond Divestment: It's Time For A Complete Break-up With Fossil Fuels

Atlas Changulani

October 27th 2022 marked the one year anniversary of the University of Toronto's commitment to divest from fossil fuels. This announcement was a hard-won victory, a massive win made possible by over a decade of relentless student activism and pressure. But as important as this announcement was to the climate movement at UofT, it does not spell out the end of our university's connections to the fossil fuel industry. If anything, this victory is only the beginning of a much larger student movement: one that demands a complete break-up with fossil fuels.

To start with, even the fight for divestment is not yet won. Although UofT as a broader institution has pledged to divest, its three federated colleges—Victoria, Trinity, and St Michael's—maintain their own hefty endowments, and have yet to make any similar commitments.[1] Moreover, the University Pension Plan, of which UofT is a part, maintains between $40-85 million in fossil fuel investments. This includes not only oil and gas, but also coal.[2] Further, given the lack of transparency around investments, it's hard to hold the university accountable to its pledges. UofT claims to have already divested from all direct investments in the past year,[3] but all the proof we have for it is the administration's own word.

However, uprooting the university's ties to Big Oil goes beyond divestment. One of the myriad ways UofT continues to provide the fossil fuel industry both financial support as well as social license to operate is through its partnership with banks, particularly RBC. Since the 2015 Paris Agreement, RBC alone has invested over $262 billion in fossil fuels. This includes projects such as the Coastal Gaslink pipeline, which is being built on unceded indigenous land without free and informed prior consent. These investments make RBC the largest fossil fuel financier in Canada, and the fifth largest on the planet. Other Canadian banks are no different. Together, RBC, ScotiaBank, TD, CIBC, and BMO, the so-called Big Five, have poured over $935 billion into fossil fuels in the last six years.[4] RBC is also currently under investigation by federal agencies for greenwashing after its continual false claims of being a climate leader when it is anything but.[5]

The reason banks seek out partnerships with universities is because students remain one of their most lucrative customer bases. Once a person starts banking with a particular institution, it is unlikely for them to stop. Therefore, banks seek out lifelong customers in students by organizing events, offering scholarships, and partnering with administrations as well as student groups. Furthermore, banks also attempt to appeal to us through student-centered initiatives and strategies, such as RBC's Future Launch Initiative. With such initiatives, they seek to show how much they care for students' lives and futures, which is ironic because their actions illustrate a wholly different truth. RBC has no plans to reduce investments in fossil fuels: in fact, its fossil investments increased in the last year.[6] No matter what it claims, it's clear through its actions that the only future RBC wants to launch us towards is one wrecked by climate chaos.

Yet our university has shown that it has no qualms about partnering with these climate criminals. On October 11th 2022, UofT Entrepreneurship launched a challenge called Tech For A Greener Future, inviting students to explore innovative new ways to use technology to address climate change. It was organized and funded by none other than the RBC, whose executives also held a panel on their own bogus climate plan at the launch event.[7] More recently, on March 6th 2023, Rotman Commerce invited executives from Scotiabank, Canada's second largest fossil fuel financier, to speak on a panel on sustainable investing.[8] Clearly UofT seems to believe that organizations that invest billions of dollars every year in projects that propagate colonial violence and pollute the planet are the very definition of sustainable.

Events such such as these not only allow big banks to greenwash their public images and secure the goodwill of students, but also frame the climate crisis as a problem that can be solved through market strategies and technology. This framing is dangerous. Solving the climate crisis requires nothing short of a radical shift within every aspect of our societies. The longer we allow business as usual to go on unhindered, the smaller our window of opportunity to limit global warming below truly catastrophic levels becomes. We're projected to hit the 1.5°C warming threshold within a decade.[9] That's all the time we've got to phase out fossil fuels and transition to a truly sustainable future. Continuing to finance fossil fuel expansion is nothing short of madness, yet UofT chooses to remain fully complicit in the crimes big banks continue to commit against our collective futures.

It's not just the university administration, however; it's also our student union. The UTSU not only banks with RBC, but conducts several RBC-sponsored events throughout the year, including the annual UTSU Clubs Fair. Further, it is RBC that funds the Student Commons building on College Street, which also has an on-campus RBC branch. This building and this union is meant to belong to students, and so it's deeply shameful that an institution that continues to profit from the ongoing destruction of our futures is allowed a presence in such a space.

Yet a student movement against the continued presence of RBC and other big banks on campus is already in full bloom, not just at UofT but in university campuses all across the country. On March 2nd 2023, members of Climate Justice UofT staged a full-day sit-in at the on-campus RBC branch in the Student Commons, successfully forcing it to shut down for the day.[10] We took this action after almost six months of failed attempts to open up a dialogue with the UTSU about their partnership with the bank. Across the country, students from eleven other institutions held similar actions on their own campuses. The next day, over a hundred UofT students

marched in solidarity with movements across the world demanding an end to fossil fuel finance.[11] One of our demands was to kick RBC off campus. RBC loves to portray itself as a student-backed bank, yet students are increasingly making it clear that unless it divests from fossil fuels and takes genuine steps towards reconciliation, it has no right to be on our campuses.

Another appalling way our university continues to support Big Oil is through accepting fossil fuel funding for research, scholarships, and building projects. Those who have had classes within the Earth Sciences Auditorium have probably noticed the massive plaque that hangs between the gates, which proudly thanks the donors that funded the building. Chief among those are none other than Imperial Oil and Shell. Plaques such as this line a number of buildings throughout the campus, stark reminders of what this university is truly built upon.

These partnerships are not merely relics engraved upon the walls of our classrooms—they are continuing manifestations of our university's complacency in the climate crisis. Perhaps most alarmingly, UofT continues to allow the fossil fuel industry to fund climate research. Such funding allows Big Oil to hold sway over critical research, compromising its integrity, generating dangerous disinformation, and pushing false solutions at a time when the stakes of the crisis have never been higher.[12]

Furthermore, letting fossil fuel companies partner with universities for climate change research makes Big Oil seem like a legitimate partner in a transition away from carbon when in reality it's anything but. Let's not forget that ExxonMobil had realized the dangers of continued fossil fuel production as far back as 1977—and then proceeded to spend millions of dollars promoting disinformation and lobbying against climate action.[13] Big Oil has been waging war on climate science for decades now, and we cannot afford to let the enemy lead our ranks.

Here too, UofT students are beginning to step up. In partnership with the Fossil Free Research Coalition, an international campaign that seeks to end the influence of Big Oil on climate research,[14] Climate Justice UofT has launched petitions, dropped banners, and led multiple teach-ins throughout this year. Inspired by the work of Climate Justice UBC,[15] we're also working on a research project seeking to better understand UofT's financial ties to Big Oil. The Fossil Free Research movement at UofT may only be in its infancy, but our work has already begun to make waves.

UofT's announcement to divest was a massive win, but the fight for a truly fossil free University of Toronto has only just begun. UofT's commitments to sustainability are meaningless as long as it continues to partner with those that seek to render our planet uninhabitable in the name of profit. Divestment has shown that student advocacy is powerful. It's time for us to seize this momentum and ramp up the pressure. It's time to make UofT listen when we say that our futures are far more important than fossil fuels.

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Overcoming challenges to sustainable development

Emma Danniels

While the idea of sustainable development has been around since the Brundtland Report (1987), a modern definition from the University of Alberta reframes the traditionally anthropocentric idea as a process in which "the limits of available physical, natural and social resources in ways that allow the living systems in which humans are embedded to thrive in perpetuity" (Lecture 7, slide 6-10). Sustainable development, therefore, aims to foster mutually beneficial relationships between humans and the environment to ensure the preservation of ecosystem services necessary for our survival (Daly, 2007, pp. 14). Sustainable development also aims to address the socioeconomic inequalities exacerbated by the ecological crisis (Daly, 2007, pp. 25). While there are technological, economic, and value-related challenges to achieving sustainability, this paper outlines how we can do just that by changing our agricultural models, fossil fuel-based economies, and psychology around consumption.

One technological innovation that will help us move towards a more sustainable society is permaculture. This agricultural model, rooted in agroecology, redesigns industrial farming practices to improve soil, air, and water quality (Hathaway, 2016, pp. 15). Permaculture is characterized by diverse species working symbiotically to restore soil and microbes that are integral in sequestering excess carbon from the atmosphere (Hathaway, 2016, pp. 15). The ecological complexity of permaculture designs produce more nutrient-dense and resilient crops that will be necessary for the sustainability of our food systems in the face of the climate crisis (with better energy and water absorption and storage) (Hathaway, 2016, pp. 10). Permaculture, as per the name, is intended to create a long-lasting food system using local, renewable resources that can self-sustain communities and support bioregional economies (Cato, 2012, pp. 22). Some closed-loop permaculture systems in Asia combine fish, ducks, and rice paddies to reduce the use of intensive manual labour, pesticides, and fertilizers (and thus the greenhouse gas emissions that are emitted in the production of these chemicals) (Hathaway, 2016, pp. 20). In fact, the agroecological System of Rice Intensification has increased rice yields by up to 30 % while simultaneously reducing water usage by over 50%, without the use of chemicals such as nitrogen and phosphorous that can lead to adverse environmental and human health (Hathaway, 2016, pp. 13). Permaculture, however, is more than just an agricultural model, but a paradigm that facilitates the development of an ecological worldview: how we see and perceive our relationships with the natural world (Hathaway, 2015, pp. 12) (Lecture 11, slide 11). The permaculture model encourages society to care for the Earth, care for people, and establish a fair share of resources (Hathaway, 2016, pp. 16-7). Permaculture is therefore crucial in addressing the ecological crisis because it builds more sustainable food systems that facilitate a shift in our relationships with the environment.

Some value-related factors that might need to be overcome to implement this innovation are empire, anthropocentrism, and similar ideologies of domination. As complex societies developed from the agricultural revolution, hierarchical power structures and the stratification of labour divisions took precedence (Lecture 5, slide 14). With the high frequency of wars, intensive monocrop agricultural practices fed exponentially increasing populations (Lecture 5, slide 16). Physical labour and technologies such as ploughs became more valuable to accommodate this higher level of food production, as did the idea of property and the ownership of natural resources (Lecture 5, slide 14). This logic came from the separation of humans from the natural world and the domestication of animals and plants (Lecture 5, slide 16). Moreover, empire,

anthropocentrism, and domination, where humans are the only species granted moral standing, threaten the implementation of permaculture design because it does not value the inter-complexities and relationships between humans and the living world (Lecture 4, slide 38). In fact, industrialized agriculture tries to manage and exploit nature to increase food production with the excessive use of pesticides, fertilizers, and practices such as tilling (Muya pp. 1, 1995). However, by exposing children to the living world, this paradigm of domination fostered by separation can be combated. By developing children's biophilia – the innate tendency to connect with nature – society will become emotionally attached to the Earth, encouraging us to protect our ecosystem services (Marten, 2010 pp. 146).

One economic change that might be necessary for sustainability is the adoption of a Green New Deal. This economic and political framework aims to reduce greenhouse gas emissions over the next few decades by divesting fossil fuel funding into renewable energy sources to avoid the worst consequences of the ecological crisis before they become costly (Lecture 9, slide 39). The deal also addresses economic inequalities and social justice issues by creating high-paying jobs (ten million over ten years) and improving environmental health with the restoration of wetlands, forests, and farms (Lecture 9, slide 42). Rather than using fear to motivate people to take climate action, the Green New Deal frames the issue around a positive vision of change that inspires people to work for the collective good, thus creating a more just and sustainable society (Lecture 9, slide 39).

A technological factor that poses an obstacle to the Green New Deal is fossil fuels. Coal, oil, and gas have been heavily relied upon for the energy sector across the developed world (Ponting, 2007, pp. 265). With the industrial revolution, a growing population, and high energy demands, the nineteenth century saw an enormous rise in energy production and consumption, with coal consumption increasing nearly 100-fold from 1800-1900, becoming 90% of the energy share (Ponting, 2007, pp. 280) (Lecture 6, slide 7). Despite immense climate research available to the public, politicians, and scientists, coal production is still on the rise outside of Europe, despite being the most carbon-intensive energy source (Ponting, 2007, pp. 281). Oil and natural gas reserves have been excavated so quickly that they are likely to be exhausted by the end of the century (Ponting, 2007, pp. 281). Using technologies like electricity, transportation, and internal combustion engines have facilitated this reliance on fossil fuels (Lecture 6, slide 11). One of the significant concerns with implementing the Green New Deal are the economic losses from descaling fossil fuel production and building the necessary infrastructure to support a net-zero economy (Lecture 9, slide 43). While the Green New Deal aims to increase jobs in the renewable energy sector, lobbyists and industry leaders resist this economic reform (Lecture 9, slide 43). One way to move towards a reduced carbon energy plan is to invest in nuclear energy, which already has the infrastructure, specifically in Ontario and Alberta (with uranium mines), to support this transition while stimulating the economy (Winfield, 2006).

After the industrial revolution, capital was necessary to mobilize war-time economies in the early twentieth century (Assadourian, 2010, pp. 28). High levels of consumption, therefore, were encouraged. However, even after these war measures were decommissioned, society was left with a culture of consumption that measured success concerning economic growth and corporate profit, with a disregard for ecological damage (Assadourian, 2010, pp. 28). If we move towards a more sustainable society, we must shift our values from finding life satisfaction in goods and products to finding satisfaction in the community (Harper, 2001, pp. 306). Given the social and ecological costs of high consumption levels, it is necessary to shift the

paradigm to only consume basic needs while finding fulfillment in giving back to the community and restoring planetary health (recognizing our interdependence) (Harper, 2001, pp. 306). These changes can help shift our current worldview into an ecological one that facilitates these sustainable lifestyles, reducing our waste and use of resources (Lecture 11, slide 11).

An economic factor that threatens this paradigm's adoption is our current growth-based financial system. Gross Domestic Product (GDP) is the accounting framework that measures growth by excavating natural resources for profit (Hathaway et.al, 2009, pp. 32). This inherently encourages the overconsumption of products by corporations and governments who value success based on “cancerous” economic growth (Hathaway et.al, 2009, pp. 22). Moreover, GDP is a poor indicator because it functions in a world defined by finite resources (Hathaway et.al, 2009, pp. 33). Growth-based economics, therefore, pose an obstacle to shifting our cultural values because we equate the buying and selling of products as norms and rituals that we use to seek spiritual and ego satisfaction (Daly, 2007, pp. 17) (Lecture 6, slide 29).

Based on my analysis of sustainable solutions for the ecological crisis, the most effective strategy moving forward would be to replace GDP with the Genuine Progress Indicator (GPI). GPI measures progress based on qualitative development rather than growth based on capital gains and exchange (Hathaway et.al, 2009, pp. 32). This novel framework encourages a paradigm shift from consumption and anthropocentrism towards a more ecological worldview (Hathaway et.al, 2009, pp. 32). GPI would also help in the development of bioregional economies – self-reliant communities living within the confines of their geographic and environmental features – that play a role in permaculture design (Cato, 2012, pp. 22). The Green New Deal that works for environmental justice and a net-zero economy is only possible with reforms in the energy industry and thus our current economy (Lecture 9, slide 39). Moreover, this economic and cultural shift is necessary if we are to stay within our planetary boundaries and utilize our resources sustainably.

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#activism: Opportunities and Challenges for Activists Organizing Online

Jiazhen Sun

Within several decades, the internet has revolutionized how people connect, providing a platform for inciting social movements. With its ability to disseminate information and organize actions, social media has paved new avenues for activists to rally advocacy groups to foster a culture of active engagement and social change. Furthermore, the paradigm shift in communication has enabled advocates to leverage social media's widespread influence to drive individuals toward greater collective action. Thus, it is imperative to investigate the efficacy of online platforms in prompting social change by analyzing the benefits and obstacles associated with using social media to initiate and cultivate social movements while drawing lessons from the #noDAPL movement as a case study.

The emergence of social media at the beginning of the millennium has quickly sent it catapulting to becoming an integral aspect of modern life, transforming how we interact and access information globally. Before the advent of social media, social movements were often a difficult and time-consuming process. Historically, activism campaigns were often challenging and daunting, fraught with obstacles and limitations. Spreading awareness was a challenging and restricted process, as activists had to rely on conventional methods of communication, such as flyers and word of mouth, to spread their message. These traditional approaches posed limitations in scale and reach, hindering the growth and impact of social movements. Access to funding and resources, censorship, and government crackdowns posed significant challenges, particularly for those in rural or marginalized communities. The need for a centralized platform for communication and organization made it even more challenging to spread knowledge and coordinate efforts across different regions. Enter social media platforms: opportunities were suddenly open for immediate and extensive communication for those seeking to establish and expand social activism. The propagation of online networking platforms has facilitated a new era of participatory culture, with users contributing to a vast array of content, from digital activism to citizen journalism. The rise of online media platforms has revolutionized the way social activism is marketed. Suddenly, a myriad of options became available. The global reach of these platforms allowed access to wider audiences, streamlining the distribution of information and the mobilization of large activist groups. Ultimately, social media enabled greater collaboration and coordination among activists, efficiently marshalling resources and efforts toward a common goal.

Using the internet to leverage social movements presents several challenges. First, the inaccessibility of technology can limit the participation and voices of those who cannot reach the internet, ultimately hindering the formation and growth of online social movements.
The oversaturation of online information can present a significant obstacle in utilizing social media to build social movements, and it can be incredibly arduous to filter through countless sources to reach the right audience and effectively communicate the correct information. These platforms also risk becoming echo chambers where people with similar beliefs and opinions congregate, forming a mass or mob mentality and isolating individuals with opposing views. Finally, it is worth noting that co-optation can considerably dilute the impact of a movement. The campaign’s focus and direction can be compromised when it becomes co-opted by outside interests, resulting in too many competing voices that weaken its effect. When corporations or powerful organizations sponsor social movements and gain control over the messaging or crusades used by the

movement, it can shift focus toward the sponsor's interests. Government intervention can pose problems by limiting the campaigners’ ability to organize and communicate effectively. Tactics such as censorship, surveillance, and crackdowns on protests can hinder activists from sharing their message and gaining traction, affecting individuals' willingness to participate in social movements and limiting their overall impact.

A closer dive into the #noDAPL movement can provide a more intimate and realistic insight into social activism in the wake of social media influence. Known colloquially as the Dakota Access Pipeline protests, the #noDAPL was a protest movement that emerged in response to the construction of the Dakota Access Pipeline (DAPL) in the United States in 2016. (Estes & Dhillon, 2019) The pipeline was intended to transport crude oil from North Dakota to Illinois. The proposal was met with widespread outrage and criticism, as it meant invading lands considered sacred by Native American communities and threatened the safety of the local water supply. The movement gathered a diverse coalition of Indigenous peoples (such as members of the Standing Rock Sioux Tribe), environmental activists, and concerned citizens to protest the pipeline's construction and advocate for protecting Indigenous sovereignty and environmental sustainability. Social media platforms such as Twitter, Facebook, and Instagram were employed to galvanize supporters and raise awareness about the cause. #noDAPL gained substantial coverage, with celebrities, politicians, and other public figures joining the fight. Although it received considerable support, the movement faced many complications, namely legal battles, disinformation, altercations with law enforcement, and accusations of violence. (Center for Constitutional Rights, 2018) During the protest, rumours were spread by supporters of the pipeline and opponents of the movement to discredit the protesters. (Kaposy, 2017) (Calma, 2022) Supporters of the pipeline and other opponents would use false information to undermine the credibility of the protesters and the campaign. This generated confusion and mistrust among followers, leading to a decreased turnout at the protest site and undermining the trust and solidarity among the group. Government intervention and violence also played a significant role in the outcome of the protests. The state of North Dakota mobilized a large police force to the protest site, resulting in violent clashes between police and protesters. In an additional effort to quell the protests, law enforcement agencies employed aggressive tactics such as surveillance and arrests to suppress the movement. (Mack, 2017) Despite the condemnation of using force against peaceful protesters, the hostile and intimidating environment made it increasingly challenging for activists to continue their demonstrations. The acts of aggression displayed by law enforcement agencies during the protests were difficult to ignore, and the impact of this on the morale of the activists was far too detrimental to sustain long-term momentum. Despite the efforts of activists, the Standing Rock Sioux Tribe's legal battle to stop the project was ultimately fruitless, and the pipeline's construction continued.

Social media's emergence has incontestably transformed the way social movements operate and communicate. While it can facilitate the spread of information and mobilize large groups of people to support a common goal, it can also produce new challenges, such as propagating misinformation and risking co-optation by powerful opponents. As exhibited with the #noDAPL movement, social networking platforms can be a double-edged sword, amplifying the voices of marginalized communities and raising awareness about injustices while exposing activists to surveillance, repression, and violence. Ultimately, though, the effectiveness of social media in promoting social movements hinges on its intended application and how individuals and groups will choose to

navigate the complex challenges it presents thereafter.

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Individual Empowerment and Collective Environmental Change

Emmeline Caplan

Introduction

Developing a sustainable system with a more equitable distribution may seem unachievable to many, but it's certainly not. First, it is important to acknowledge that in a planet with a human population over 8 billion, there are countless ways to approach sustainable development and an innumerable set of combinations as to what a sustainable lifestyle could look like. However, amongst this infinite cloud of possibility is an approach to sustainable development proposed by University of Columbia Professor Philip Kitcher. Kitcher (2018) suggests that the pursuit of ecological sustainability in the face of an ecological predicament, which is the tradeoff between allocating resources to help those in need today vs protecting those of tomorrow, requires a worldwide adaptation of an ideology centered in giving everyone an equal opportunity to pursue their dreams and simultaneously reduce our ecological footprint. Should this analysis be successful, the feasibility of adapting this ideology and approaching sustainable development, should seem promising.

Digesting a New Ideology

For different individuals and nations, adaptation to sustainable development processes will be harder for different reasons including cultural, social, political, economic, and individual preference. In many developed countries, like Canada, the United States, and most in Western Europe, their current lifestyles are associated with an ecological footprint between 4 to 8 times larger than those in developing countries like Ethiopia, Pakistan, and Bangladesh (The Global Footprint Network, 2010). For these consuming developed countries, lifestyle changes pose social and political challenges as individuals and governments will need to re-evaluate and adopt a radically different perception of the environment and the resources they consume (Liboiron, 2021). Furthermore, to achieve sustainable development with a more equitable distribution of resources, developed countries should share sustainable technological innovation and resources with developing nations as we all share the common enemy of global warming (Kitcher, 2018).

For the others, the worldwide adoption of this ideology may be welcomed as they are already environmentalists or parts of cultures engaging in environmental stewardship, such as ecotheologists and indigenous groups (Liboiron, 2021).

Lastly, for those directly affected by environmental stress now, such as heightened food and water stress in coastal areas and poor and marginalized communities, the adoption of this ideology may face less resistance to ensure their survival (UN Environment (Ed.), 2019). Without any efforts to attain sustainable development in developing countries nor developed countries not offering any assistance to those developing countries and to its marginalized communities, the UN International Organization for Migration (2023) predicts that there will be 25 million to 1 billion environmental refugees by 2050.

Irrespective of the individuals initial outlook on sustainable development, the motivation for ongoing, adaptable strategy in approaching sustainable development is essential for making any effective global change. So how do we effectively introduce this new ideology into a continuously growing population with unique experiences, cultures, and personal values?

Importance of Individual and Community Empowerment

The polarization between individuals supporting and not supporting climate change

science may not be due to inefficient science communication, but rather from conforming to distinctive conflict of interest (Kahan et al., 2012). Kahan et al. (2012) research uncovered that individuals act in their personal interest to form the similar beliefs as those in their community and with whom they share ties with for a variety of reasons. Note, Kahan et al. (2012) also states that the influence of an individual's view is weighted less than a view of a collected aggregation, however, this contradicts their conclusion and reduces the acknowledgement that an environmentalist community is built up by an aggregation of individuals.

All in all, there is great weight that an individual has towards changing the ecological footprint from an individual to community scale. Through actions like the butterfly effect, not littering on your neighbor's lawn out of respect can cascade into recyclable and waste management conscious communities focusing on their local community's environmental health and social wellbeing. Furthermore, an aggregation of these communities can lead to environmentally conscious and empowered communities contributing significantly to environmental integrity and potential political advocacy (Kahan et al., 2012). Therefore, the feasibility for sustainable development may rest largely upon local community leaders to step up and show the feasibility of environmental action and empowerment.

The Conscious or Subconscious Alteration of an Individual's Ecological Footprint

Optimistically speaking, the overall benefits from the initial environmental actions, such as healthier local vegetation and air quality, can encourage a positive feedback system of decreasing individual footprint (Kahan et al., 2012). This includes individual investment in green energy, reduce single use item purchases, and upcycle items (Kahan et al., 2012). However, additional social, political, and economic barriers exist between and within different social communities making sustainable development more complex, but not impossible (Chancel, 2020). The feasibility associated with this ideology is dependent on the ongoing conversation between individuals to make long term lifestyle changes and to do so within the next couple of years.

Additional Challenges and the Role of Science and Government

The emphasis of community empowerment shouldn't be interpreted as directing blame of environmental crisis on individuals, because most environmental degradation is the result of our economic and political structure (UN Environment (Ed.), 2019).

As a result of unsustainable urban/rural planning and long-lasting effects of colonialism, e.g. reduced access to fresh produce and public transport in marginalized communities, environmental friendly processes and products have long been seen as an option for higher income communities in developed countries (Chancel, 2020). This is due to economic evaluation systems like GDP excluding the material's environmental impacts, thereby causing relatively accessible but environmentally degrading sources like fossil fuels to be cheaper than green alternatives (Chancel, 2020).

Therefore, in addition to social empowerment, it is essential for governments to fund environmental science communication programs, incorporate citizen science and local knowledge, and re-evaluate our economic systems to accelerate proactive risk management and environmental policy (UN Environment (Ed.). (2019).

Conclusion

Unfortunately, the narrative of environmental science has been driven away from social science for too long. It's the fundamental need for a sustainable planet and sustainable home that are essential for environmental scientists and policy makers to keep in mind when it comes to enacting global change. Through proactive planning, inclusive discussion, interdisciplinary policy reconstruction, social empowerment, and much more, a means for a sustainable future can be attainable. Furthermore, attaining sustainable development with an equitable distribution of Earth's resources is feasible and is now up to the policy makers, scientists, cultural leaders, and individuals to believe, empower, and act.

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Discussing the Necessity of Ownership for the Women Rebel in Tariquía

Abril Masola

Part A: Introduction

The indigenous communities of the National Flora and Fauna Reserve of Tariquía (referred to as NFFRT) in southern Bolivia derive benefits from the reserve's land without having formal land tenure. This essay argues that the communities in the Reserve have a complex web of access to the lands, and the entrance of oil companies would disrupt their structural and relational mechanisms to access. Community land ownership, rather than state ownership, would not ensure that all community members can benefit from the land and resources if their modes of access are undermined. As well, internal and gendered dynamics within the reserve may not guarantee the success of formal land tenure. While the women-led communities have access maintenance to the land and its resources, they generated their own access control through their resistance. This essay will present the struggles of the women of Tariquía and analyze the various ways that the women derive benefit from the land and its resources despite these struggles. Moreover, this essay will consider different forms of access and establish how the women of Tariquía are protecting their land without formal land tenure.

Part B: The Web of Access

While the Reserve is presumably state-owned, the women of Tariquía and their communities derive benefits from its land and establish their access to it and its resources under Ribot and Peluso's definition. Ribot and Peluso (2003) define access as "the ability to derive benefit from things" (153). On the other hand, they contrastingly define the owning of property as the "right to benefit from things" (153). Thus, their definition of access is broader which allows a wider range of social relations to be considered rather than only focusing on property relations (Ribot and Peluso 2003, 153). Access is not one-dimensional, instead, it includes various "webs of power that enable actors to gain, control, and maintain access" (Ribot and Peluso 2003, 155). Moreover, the women of Tariquía have access to the land and resources of the NFFRT because they derive benefits through "agro-ecological production, fishing, and beekeeping" (Chávez and López 2018, 409). This access is mediated and determined by "forms of self-governance" (Chávez and López 2018, 409). The benefits that the women and their communities derive from the lands occur through the structural and relational mechanisms that constitute their access.

There are various structural and relational mechanisms that consolidate the communities' access to the NFFRT. One of these would be access to labor and labor opportunities. This form of access includes the "ability to labor for oneself and maintain access to employment with others" (Ribot and Peluso 2003, 167). Additionally, rights-based modes of access are "sanctioned by law, custom, or convention" (Ribot and Peluso 2003, 161). It can be argued that the communities have rights-based access because where they live and derive benefits from is legally a Reserve. This complex web of access is not guaranteed to always work as the government opened the land to oil drilling despite these modes of access existing. Therefore, the issue is not whether the communities have access, but rather if the government respects their rights to this access.

While the Reserve communities maintain access, the state exerts access control and would do so even if the community were to own the land since the state would have to support and respect land ownership. The state is the "ultimate mediator, adjudicator, and power holder" above the rights-based and structural mechanisms of access that the communities have (Ribot and Peluso 2003, 163). This is seen in how the Bolivian

government, especially under President Evo Morales, has undermined environmental state policies and replaced them with extractivist-friendly legal measures that encourage the entrance of oil companies into the NFFRT (Chávez and López 2018, 409). These projects would harm the land and its resources, threatening the ten communities' (within the NFFRT) ability to derive benefits from the "material goods that make their lives possible" (Chávez and López 2018, 409). The government of Bolivia, by allowing and encouraging oil projects in the reserve, is not just threatening the communities' ability to conduct the activities necessary for their labor and subsistence, but also threatening self-governance that maintains the peoples' modes of access (Chávez and López 2018, 409). Additionally, states do not tend to grant land ownership to indigenous communities because they rather "manage local people as subjects to whom privileges, rather than rights, are delegated" (Ribot and Peluso 2003, 163). Thus, states may prefer letting communities live in the Reserve as a privilege without providing them with ownership rights.

Even if the communities of the NFFRT had proper land ownership over the land and could exert full access control, that does not mean that everyone would benefit. Gender dynamics impede formal land tenure from being a viable and sustainable option. The entrance of oil companies is not the only threat to the women's access to the Reserve's land;as capital, patriarchy, and colonialism expropriate "the reproductive labor of women, their traditional knowledge, and their ability to farm self-sufficiently" (Chávez and López 2018, 409). These capitalist and masculine elements disrupt the "social reproduction of life, the means of existence, and communally organized work" both from outside and within the Reserve (Chávez and López 2018, 409). The presentation of these three pressure points in the defense of the NFFRT (capital, patriarchy, and colonialism) allows for a postcolonial intersectional analysis of the women's struggle.

Nonetheless, the implications of race could have been examined more by Chávez and Lopéz, as gender relationships that discriminate and implicate women do not occur in a vacuum, and have connections to racial and cultural differences (Mollet and Faria 2013, 122). Moreover, the women of Tariquía's defense of the land for the sake of their access, self-sufficiency, and the "future of their children" essentially challenges the "mechanisms of patriarchal mediation" that "attempt to impose and reproduce logics to asphyxiate and permanently block women's actions" (Chávez and López 2018, 410).

One of the mechanisms of patriarchal mediation, according to Chávez and López (2018), is oppressive enclosures. These are power structures "founded on violence against women's bodies" and can be embodied economically, politically, and culturally, with an underlying aim to "contain or quash efforts to defend life, rupturing and fragmenting them" (Chávez and López 2018, 410). Oppressive enclosures intend on making the strategies employed by the women invisible. This demonstrates how the effect of social institutions have gendered outcomes that limit the possibilities of "unfolding agency" (Schölley and Padmanbhan 2017, 981). Oppression also creates a division within the families of the women, as a "form of private and public violence" and makes their struggle a matter within and outside Tariquía (Chávez and López 2018, 409). Therefore, even if the women's resistance to oil companies resulted in formal land tenure, this does not mean that their agency and power would not be undermined by the gender dynamics within the reserve.

Gender dynamics are not the only element that may limit formal land tenure, as the communities of the reserve still have their internal differences. There was no unanimity by the communities in resisting the entrance of the oil companies. Only six out of the ten communities arrived at a consensus "that they would work to stop the state-capital

offensive" of oil drilling (Chávez and López 2018, 409). This means that four communities of the NFFRT accept, or at least are indecisive, about the entrance of oil companies. In their article, Agrawal and Gibson (1999) disrupt the view of indigenous communities as "mythic communities" that always agree in decision making because they use "locally-evolved norms and rules to manage resources sustainably and equitably" (633). This view does not account for the internal dynamics and differences of the communities, and how the individuals' agency and self-interest affect local decision-making. Thus, believing that formal land tenure is the only fix to guarantee the NFFRT's protection lacks depth and is not realistic.

While Chávez and López (2018) do not explain why the remaining four communities do not participate in the women-led resistance, the communities have a right to their self-interest as "actors within communities seek their own interests in conservation programs, and that these interests may change as new opportunities emerge" (Agrawal and Gibson 1999, 637). There are many possible reasons why the four communities do not actively resist the entrance of the oil companies. Perhaps they believe they can derive economic benefits from oil projects in the area, or they do not see their access as threatened. The idea of formal land tenure as a universal fix and sustainable response to help indigenous struggle over land and resources means subscribing to the view of the "mythic community." This view sees communities in stable harmony with their wants and interests and disregards internal conflict (Agrawal and Gibson 1999, 640). Therefore, the communities of the NFFRT are not mythic communities.

Rather than owning the land, the women-led movements have shown that political struggle can work in keeping oil companies out and maintaining a degree of access control over the land and its resources. The communities' access to resources and land is constantly subverted by the state and oil companies. Thus, the women of Tariquía organized a political struggle to protect the NFFRT and their modes of access (Chávez and López 2018, 409). The women's social movement took a physical form by organizing a four-day march from Tariquía to the city of Tarija (Chávez and López 2018, 408). Moreover, the women's resistance took a legal-political approach with the creation of the Defense Committee. The Defense Committee is an "autonomous associative space" that is capable of disputing the efforts of large, "state-instructed" unions that seek the entrance of oil companies into the Reserve (Chávez and López 2018, 409).

Neville (2015), describes the importance of identity in social movements, especially for the mobilization of groups "based on shared allegiances" as it requires "strategically activating certain identities" (28). The women of Tariquía have successfully started a social movement by keeping true to their identity in connection with the land. The communities "frame their struggle" as the defense of the human and non-human lives that inhabit the Reserve (Chávez and López 2018, 409). The participants of the resistance share more than common care for the nature of the Reserve, but see all inhabitants as living in "interdependence with one another" and creating an identity with nature that faces the "threat of collective dispossession" (Chávez and López 2018, 410). Formal land tenure may not be the fix necessary for the indigenous communities of the Reserve to maintain their access, as the state may always intend on infiltrating and exploiting the lands for its benefit. Instead, political and physical resistance has successfully maintained the communities' access and their connection to the land (Chávez and López 2018, 410).

Part C: Conclusion & Further Inquiry

The women of Tariquia's struggle to prevent the entrance of oil companies demonstrate how important the Reserve's land and resources are to the women's lives and livelihoods. The women maintain various webs of access to the land. This access is threatened by the potentially destructive effects of oil drilling. Indigenous land ownership would not fix the constant threats to the land and resources because it would rely on a postcolonial government respecting tenure rights. Additionally, land tenure would not necessarily be wanted by everyone within the community, as gender dynamics and discourse within the Reserve may not guarantee sustainable and uncomplicated ownership. Thus, the women's social movement and various forms of resistance have successfully protected their access to the Reserve without formal land tenure rights. Further research on the implications of the "mythic community" concept, as analyzed by Agrawal and Gibson (1999), in political-ecological literature is necessary. The mythic community view may reduce indigenous communities into perpetually sustainable and socially stable utopias when this is not realistic, and may not be the case internally, allowing for an overlook of complex social dynamics.

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Practitioners' Current Experience and Future Expectation of the Impact of Climate Change on Urban Agriculture in Toronto

Aden Fisher

Introduction

Urban centres present many issues surrounding food security and sustainability. Cities are characterized by large human populations concentrated within a small geographical area, which leaves them inherently reliant on a large quantity of food imports to sustain their inhabitants (Bricas, 2019).

To respond to this need, urban agriculture (UA) serves as a positive force for both combatting anthropogenic climate change and fortifying food security within a city (Bricas, 2019). UA is defined as "activities connected with the growing, processing, and distribution of food and food-related products in and around cities" and is a feasible option for cities to reduce their carbon footprints (Mulligan et al., 2018, p. 134).

Toronto, Canada represents a large urban megalopolis with a fast-growing urban agricultural scene. However, the complexity and uncertainty surrounding environmental problems such as climate change make them more difficult to address through meaningful political action (Carter, 2007). This unpredictability is felt particularly among practitioners of UA in Toronto, especially when considering how little research exists regarding how climate change will impact agriculture within the city in the near future – or how it may have already begun to do so.

This independent studies project consisted of semi-structured qualitative interviews with practitioners of UA within Toronto and the GTA, with a focus on gaining insight around two principal research goals:

Understanding to what extent practitioners of UA believe climate change has already begun to affect urban farms and gardens in Toronto

Determining how practitioners believe climate change will affect these urban farms and gardens in the coming years, and to what extent they are making preparations

Methods

This project set out to address a gap in the existing literature surrounding climate change and urban agriculture in Toronto. Practitioners of UA are arguably the most qualified actors to speak with when trying to understand how climate change is impacting the city. By the nature of their profession, they are spending significantly more time interacting with Toronto's nature and ecosystems than the average urban dweller. Furthermore, they have a vested interest in maintaining adequate yields and preserving the health of Toronto's ecosystems.

The study was conducted via semi-structured qualitative interviews with different practitioners of UA throughout Toronto and the Greater Toronto Area. The interviews consisted of questions directly pertaining to the experiences of the practitioner.

The 11 participants span a wide range of subdisciplines within UA and suitably reflect the diversity of this field. They comprise representatives of three rooftop farms, two community farms, two backyard farms (involved in community supported agriculture), one commercial farm, one UA-support network, one school-garden program, and one UA community engagement site. The interview data was analyzed using methods of thematic analysis, which consists of qualitatively analyzing the data for commonly recurring themes that capture an important aspect in relation to the proposed research goals (Braun & Clarke, 2006).

Findings

The main theme relating to the first research goal was increased unpredictability in the practitioners' field of work. The most commonly discussed topic in the interviews was the perceived changes to the growing season, with many reporting that the growing season appears to be extending later into the year. However, the participants also discussed how this extension of warm weather has also been accompanied by increased volatility in the heat and dryness patterns. This unpredictability can be damaging to the development of UA in Toronto. A UA-networker participant discussed their concern with how this unpredictability may dissuade urban farmers who are new to the field.

Importance of Adaptability

The predominant theme with regards to the second research goal relates to many of the practitioners' emphasis on adaptability. Despite many of the practitioners clearly indicating their belief that climate change has already begun to impact their farms and gardens in unpredictable ways, they were often keen to discuss many of the strategies they have employed to combat this unpredictability. This adaptability presents itself through use of pre-established techniques, adjusting the conventional types of crops grown and planting schedules, as well as focusing more on soil health at the farm/garden. Further, the diversity that characterizes UA also represents a form of adaptability. The broad, fast-growing nature of UA in Toronto provides ripe conditions for collaboration and sharing lessons with each other.

Urban Agriculture as a Catalyst for Climate Action

A final theme that emerged from the interviews carries significance with respect to the role UA practitioners play in the midst of the climate crisis. Unprompted by any leading questions, many practitioners spoke to their motivating factors behind their work or their aspirations of what they hope to accomplish through their work. Further, although the majority of practitioners were open about the fact that UA is unlikely to 'solve' food insecurity in a city as large as Toronto, many of them spoke to how UA has the potential to incite greater systemic change with respect to issues such as climate action and the greater food system. Evidently, the co-benefits of UA beyond simply a means of food production represent one its greatest strengths for inspiring environmental consciousness.

Discussion/Conclusion

With regard to current experiences, the practitioners gave plentiful evidence to believe that climate change has already begun to affect their field of work. For the most part, the practitioners' experiences align well with the near-future climate projections on the city (Ligeti et al., 2006; Government of Canada, 2020). However, their personal accounts provide a more qualitative understanding of these projections, as well as a more nuanced interpretation of their associated consequences. Through the interviews, it is evident that climate-induced unpredictability is presenting itself in various forms.

Despite the clear indicators of climate change already beginning to impact UA in Toronto, the resilience of the UA community provides hope for the field to continue to prosper as the unpredictability intensifies. Due to the typically smaller size of an UA plot in comparison to that of a rural one, practitioners in the urban environment are better suited to care for underplayed aspects of traditional farming, such as organically maintaining soil health. Additionally, one of the greatest attributes of the urban environment is how well it lends itself to collaboration and diversity of approaches to solving problems; both of which are essential in a future characterized by uncertainty. The UA community is certainly concerned about the changing climate and the effects it will have on our society over time, but is largely optimistic with regards to its capabilities to

maintain their farms/gardens in the short to medium term.

In discussions surrounding climate change, many practitioners emphasized the role they believe their work plays in environmental education. This applies to both direct education about climate change as well as the reconnection with nature that occurs through engaging urban inhabitants with ecologically-sound food production. Evidently, the idea that urban farms and gardens help engender feelings of biophilia is not a novel concept (Grebitus et al., 2017; Lin et al., 2018), but what is perhaps more notable is the recognition among UA practitioners of the role they can play (and are already playing) in facilitating greater change.

The results of this study also suggest that, moving forward, the UA community in Toronto would benefit from playing into the strengths that the urban environment lends itself to. As climate change continues to manifest itself in the city, establishing urban agricultural networks as a space to communicate and share experiences among practitioners would be advantageous. Further, emphasizing the role UA can play in facilitating greater change to food and climate policy can help practitioners better communicate the significance of their work and contribute to the upscaling of UA in Toronto.

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The Role of Indigenous-Led Environmental Assessment in Environmental Justice and Rejecting the State

Clover Chen

Both Indigenous nations and the Canadian state have legal protocols to conduct assessments of the environmental consequences of extractive industry projects. Indeed, the Trans Mountain Expansion (TMEX) proposal to expand the existing Trans Mountain pipeline and tanker system induced impact assessments by both the Canadian National Energy Board (NEB) and the Tseil-Waututh Nation (TWN). TWN's approach to environmental assessment is founded in a worldview that contrasts with the Canadian state's approach. I will argue that the TWN assessment is an important precedent for Indigenous nations exercising rights related to environmental justice, sustainable self-determination, and legal plurality. In this paper, I will first define environmental impact assessments and summarize the case conflict of the Trans Mountain proposal. I will next identify and explain the implications of the different worldviews present in this case conflict. Finally, I will discuss how the TWN assessment plays a crucial role in exercising rights for TWN and other Indigenous nations.

An impact assessment (IA), or environmental assessment (EA), are interchangeable terms that describe the process of assessing the risk of a proposed project's potential environmental impact on the local natural environment and communities (Arsenault et al., 2019, 120). EAs prescribe a recommendation to proceed with a project or not based on whether the project's potential environmental harm exceeds a predefined threshold (Stewart & Harding, 2021, 6). In 1972, Canada mandated environmental assessments and has since acknowledged the importance of Indigenous participation in these processes (Arsenault et al., 2019, 121). Specifically, Section 35 of the 1892 Constitution Act of Canada provides the legal foundation for the obligation to consult with and accommodate Indigenous peoples when planning any activities that may impact Indigenous lands (121).

Tseil-Waututh Nation (TWN) is a distinct Coast Salish nation (Assessment, 2015, 10). They have lived and occupied their unceded territory for time immemorial, including the Burrard Inlet and surrounding waters (10). In 2009, TWN adopted a Stewardship Policy that is "an expression of Tsleil-Waututh jurisdiction and law" and mandates a review of any proposed development in TWN territory (6). The review helps TWN make an informed choice about consenting or withholding support (6). In December 2013, Trans Mountain submitted its TMEX proposal to the NEB for a risk assessment. Trans Mountain, a subsidiary under Kinder Morgan Canada, proposed the expansion because the additional infrastructure provides added storage, two new pipelines, and an expanded dock complex to move nearly triple the volume and frequency of crude oil through the pipelines and tanker exports (Assessment, 2015, 43). The added infrastructure would increase economic profits and expand Canadian oil exports to new international markets (Stewart & Harding, 2021, 9). The proposed tanker traffic would move through the Burrard Inlet and the last 28 km of the expanded pipeline are in TWN territory and are thus subjected to TWN's Stewardship Policy (Clogg et al., 2016, 12).

In May 2015, TWN published its Assessment of the Trans Mountain Pipeline and Tanker Expansion Proposal. The document was the first of its kind, including TWN's traditional knowledge and two decades of TWN's work to restore the Burrard Inlet (Stewart & Harding, 2021, 16). The TWN assessment concluded the potential harm was too great and withheld support from the TMEX proposal. At the time, the NEB was the federal agency responsible for regulating pipelines, and so carried out the IA for

Canada, operating under the 2012 Canadian Environmental Assessment Act mandate (Stewart & Harding, 2021, 8). In May 2016, the NEB's IA report concluded that the TMEX project was "not likely to cause significant adverse environmental effects" and approved the project construction, directly opposing the TWN's Assessment (NEB 2016, xii). In May 2018, the Canadian Federal government bought the TMEX from Kinder Morgan to resume the construction that was halted from the court challenges and political opposition (Thurton, 2022). TWN continued to resist and in August 2018, TWN legally challenged the TMEX in Tseleil Nation v. Canada (Attorney General) and forced the NEB to conduct a second IA (Stewart & Harding, 2021, 9). In February 2019, the NEB published its Reconsideration Report, nearly identical to their first IA but with the added consideration of the impacts of increased shipping traffic (9). While the NEB's new conclusion stated that the project was indeed likely to cause significant environmental damage, it once again approved the project because of the economic benefits and mitigation measures of the TMEX project (9).

Before I begin my analysis of worldviews present in the environmental assessments and the case conflict, I want to acknowledge my positionality as a non-Indigenous settler living in Tkaronto. In the context of Indigenous environmental assessment and the TMEX case conflict, my personal experiences limit my knowledge and understanding of how extractive industries can impact ways of life for Indigenous peoples, specifically those from TWN. I have not been to the region affected and have not cultivated relationships with the people or the land there. Thus, I must rely on and am grateful to learn from Indigenous scholars and TWN's documented legal and cosmological principles for my following analysis.

A worldview is a particular position that informs how people make sense of their world and their meaning and place in it. An environmental worldview is an extension of these fundamental beliefs and shapes the relationship between people and the natural world. Environmental worldviews are founded on belief systems that are represented in legal orders and their legislative frameworks. Within the TMEX case conflict, TWN represents an Indigenous environmental worldview that conflicts with the Western environmental worldview. The Western worldview is characteristic of extractive industry corporations, such as Kinder Morgan, and the Canadian government. It is clear, based on the TMEX proposal and Canada's approach to IA, that the Western environmental worldview understands the natural world through a capitalist perspective. In this worldview, natural resources are something to be extracted for profit, despite the potential for environmental damage. Even though EA is required by Canadian law, its ultimate goal is to mitigate risks in order to proceed with extractive development (Bernauer, 2020, 491).

Although there are many distinct Indigenous nations, they share a common environmental worldview that values reciprocal relationships and the protection of the natural world (Assessment, 2015, 53). In the specific case of TWN and their assessment, Coast Salish stories, teachings, and ancestral laws are the worldview foundation that extends into legal principles and protocols (52). The Assessment engages with three TWN legal principles. First, the sacred obligation of TWN to "protect, defend, and steward" the land (53). Second, the obligation to maintain and restore cultural, spiritual, and economic conditions for TWN to thrive (54). Third, there are consequences for individuals and the broader nation for failing to be "highly responsible" toward the land (55). It is thus clear that the conflict between the three parties in the TMEX case study comes from the fundamental differences in environmental worldviews, and by extension, their impact assessments. While the NEB's IA aims to mitigate risk and compromise between

corporate interests and environmental harms, TWN's approach aims to stop the project if it violates harm thresholds. The distinct IAs conducted by TWN and Canada's NEB are founded on different legal principles and policies, different relative aims, and different founding values.

These differences between the two environmental worldviews do not exist in a vacuum. Instead, the legal, economic, and social structures of capitalism and colonialism reinforce Western worldviews and minimize Indigenous worldviews. These factors create a power imbalance between TWN and the extractive industries allied with the Canadian government. In practice, colonial and capitalist social relationships develop through Western EA practices in Canada (Bernauer, 2020, 490). Scholars critique the EA process for focusing on risk mitigation rather than empowering the affected Indigenous nations with a veto to discard projects with unacceptable environmental risk (Bernauer, 2020, 499). In that sense, EA is intimately connected to and biased toward extractive industries (490). Resource extraction projects increasingly use impact and benefit agreements that formalize relationships between Indigenous communities and corporations and award certain benefits to Indigenous communities (Dylan et al., 2013, 62). While this fulfills the duty to consult and accommodate, the EA process is embedded within unequal power relations and legitimizes capitalist extraction through compromising environmental well-being for community benefits (Bernauer, 2020, 491). However, TWN's sacred legal obligations, ancestral teaching, and wealth of land-based knowledge from generations of knowledge transmission reinforce the Indigenous environmental worldview and delegitimizes the Western extractivist worldview. The TWN's Assessment allows for a holistic assessment of the project, including biophysical impacts, such as oil spill risk and management, but also the cultural, spiritual, and economic impacts of the project (Clogg et al., 2016, 13). In that sense, the scope of TWN's IA goes beyond the scope of a Western IA model. Moreover, the TWN's Assessment as a collection of this body of knowledge has broader significance concerning environmental justice, sustainable self-determination, and legal plurality.

Environmental justice is a social movement to address the inequitable distribution of environmental burdens and benefits due to systemic structures such as racism and colonialism. The TWN's Assessment conclusion and process maintain environmental justice by advocating for the people and land the TMEX will disproportionately impact. They also allow the TWN community to speak for themselves rather than have the Canadian government speak and draw conclusions for them. Sustainable self-determination is an Indigenous movement that seeks to enact rights through a combination of individual and community-based responsibility, rather than seeking recognition and rights from the state (Corntassel & Bryce, 2012, 160). The sustainability aspect of the movement comes from its goals to transmit knowledge and cultural practices to future generations and aims to honour longstanding reciprocal relationships with the natural world (156). The TWN's Assessment is a body of knowledge that is founded on and includes traditional knowledge and land-based teachings from TWN. The process of conducting the Assessment and the withholding of consent is an exercise of the sacred obligation and jurisdiction of the TWN, as expressed through the Stewardship Policy. In other words, the TWN's Assessment enacts self-determined and responsibility-based rights independent from the sovereignty of the Canadian state. The TWN's Assessment is thus also an example of how a plurality of legal orders can co-exist and equally inform development decisions in a partnership between Canada and Indigenous nations. Yet the current power imbalance in EA processes undermines this potential legal plurality and partnership. In the TMEX case, the NEB subsumed the TWN Assessment

under the NEB evidence (Baptiste, 2022). By doing so, they did not recognize TWN's governance authority over the matter and did not weigh it into their own decision (Baptiste, 2022). While the TWN's Assessment is groundbreaking in itself as a process and exercise of sovereignty, the Canadian government still must be held responsible for putting its laws and policies that recognise Indigenous sovereign rights into practice.

In summary, the case study of the TMEX proposal showcases two contrasting environmental worldviews. Indigenous and Western worldviews and approaches to EA clash because of fundamental differences but also systemic power structures that reinforce colonial and capitalist legacies. Although the TWN's Assessment is a beacon of hope for environmental justice, sustainable self-determination, and the possibility of legal plurality, there is more progress needed for the Canadian government to uphold Indigenous sovereign rights in EA contexts and in general.

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Goldmine and Cyanide: Environmental Justice Crisis in Ahafo, Ghana

Ronglan Cao

Introduction

Cyanide is one of the most toxic substances on Earth. Mild toxicity from cyanide could result in headaches, weakness, irritation, and vomiting, while a dose between 50-200mg of free cyanide could rapidly result in convulsion, paralysis, and death (Obiri et al., 2006). However, mining industries also extensively use cyanide leaching to obtain gold from its ore (Obiri et al., 2006). Most of the mining companies in Ghana utilize cyanide extractive techniques because it allows for effective extraction from low-grade ores, which was promoted to be a safer alternative than mercury (Brüger et al. 2018). However, the lack of safety regulation of cyanide usage in Ahafo, Ghana, has resulted in multiple spillages that pose serious environmental and health concerns to the local communities (Anyidoho and Crawford, 2014; EJAtlas, 2018). The EJAtlas estimates the cyanide pollution due to gold extraction conducted by Newmont Corporation has negatively affected 50,000 Ghanaians (EJAtlas, 2018).

Exposure and Impacts

Humans can be exposed to cyanide by drinking contaminated water, breathing air, or touching soil containing the compound's traces (Obiri et al., 2006). Workers at the mine often become exposed to cyanide by directly touching contaminated surfaces, making dermal absorption the most common occupational route of exposure (Anyidoho and Crawford, 2014). Workers without proper protection are at high risk of acute intoxication through oral or dermal exposure, which can rapidly develop into respiratory arrest and even death (Obiri et al., 2006). Cyanide facilitates its toxicity through binding cytochrome oxidase that halts electron transfer in mitochondria, ultimately stopping the production of ATP. Thus, the brain and the heart are especially vulnerable to cyanide poisoning as these organs have high demands for ATP (Kwaansa-Ansah et al. , 2017). Sodium Cyanide solution utilized for ore extraction often forms complexes with heavy metals. The treatment plant would then release metal-cyanide complexes into the surrounding environment as effluents. These cyanide-containing compounds can persist in water and soil for a long time (Obiri et al., 2006). Under weakly acidic conditions, these complexes dissociate and create free cyanide -- the most toxic form of cyanide to organisms (Obiri et al., 2006). These released cyanides are absorbed and bioaccumulated in plants and animals, especially aquatic species that reside in contaminated water sources (Eisler, 1991). Fish and many aquatic invertebrates show species-sensitive toxicity from cyanide exposure; cassava and cocoyam have also been found to accumulate cyanide ions (Kwaansa-Ansah et al., 2017).

Vulnerability and Environmental Justice Significance

Therefore, individuals that consume fish or crops contaminated by cyanide are at high risk of subchronic and chronic exposure. Subchronic exposure to cyanide could lead to nausea, vomiting and milder symptoms. Chronic exposure has been found to cause thyrotoxic and neuropathic conditions in adults (Obiri et al., 2006). WHO has set 0.2 mg/L as the maximum limit for cyanide in water and 10 mg/kg in cassava, which was exceeded in several regions in Ahafo (Kwaansa-Ansah et al., 2017). The negative impact of cyanide on thyroid functioning can adversely affect the development and cognitive ability of children and the elderly population (Soto-Blanco., 2009; Risher, 2010). After being fed with cyanogenic crops or water, pregnant goats and mares showed increased abortions and offspring with defects (Soto-Blanco., 2009). In addition, people of advanced age produce less iodinated thyronine which maintains the normal function of the thyroid gland, making them more susceptible to cyanide toxicity (Risher, 2010).

The issue of cyanide pollution at Ahafo is not simply a health concern but an environmental justice crisis. Individuals with a high dependency on cassava and fish in their diet are also more likely to experience chronic cyanide poisoning (Kwaansa-Ansah et al., 2017). However, some populations might have difficulties shifting their diet due to poverty or a lack of access to uncontaminated foods (Kwaansa-Ansah et al., 2017; EJAtlas, 2018). Farmers and fishers are at risk of unemployment due to the negative impact of cyanide on agricultural and fishery products. In addition, land and water contamination have rendered many farmlands and streams unusable, resulting in a higher poverty ratio (Anyidoho and Crawford, 2014). Furthermore, many unemployed individuals at Ahafo experience difficulties getting jobs in the mining industry due to a lack of experience. As a result, some local individuals have adopted illegal artisan mining to make up for their livelihood, leading to more cyanide and mercury exposure from unprotected ore leaching (Macdonald, 2016). Illegal mining activities are also associated with a higher prevalence of physical assaults and violence against women (EJAtlas, 2018; Anyidoho and Crawford, 2014).

Recommendations

Local activist groups have pointed out that the negative impacts of gold mining have outweighed the benefits that Newmont Corporation brought to the community and that the crisis has not been met with a closure (Anyidoho and Crawford, 2014; EJAtlas, 2018; MRU SCO Platform, 2022). Recent news and studies at Ahafo did not show signs of substantial compensation to the local communities. (MRU SCO Platform, 2022). Individuals affected by cyanide contaminations were often informed about the spillage after they showed adverse symptoms of toxicity (Obiri et al., 2006). In addition, women, youth, and individuals living in poverty are still experiencing marginalization that minimizes their participation in decision-making on the mining operation and benefits sharing of profits. (Burke and Werker, 2021).

The struggle of communities against the adverse effects of the mining industry is a complex environmental justice issue which requires multiple actions that address the issue at both a physical level and a policy level. First, Government and mining companies should adjust mining-affiliated policies to promote community engagement and fund programs that provide accessible training. This training should increase employment among local community members and increase the effort for monitoring and upgrading the cyanide storage facility. Second, community members, especially women, must be better informed about cyanide toxicity symptoms and what individuals can do to protect their rights against unjust exploitation. All members living in the contaminated regions need to receive uncontaminated drinking water supplied by the mining company and the government. Lastly, organizations like WACAM should receive additional support to improve communication between the community and power actors.

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Protecting the Haldimand Tract: Indigenous Sovereignty and the Haudenosaunee Confederacy

Madeleine Frechette

The Haudenosaunee Confederacy is the oldest participatory democracy on Earth. Formed through the Great Law of Peace, as given to Aionwatha by the prophet Peacemaker, the Haudenosaunee Confederacy is comprised of the Mohawk, Oneida, Onondaga, Cayuga, Seneca, and Tuscarora nations. The nations were united for the common purpose of maintaining harmonious relations and living conditions both within and outside of the Confederacy (HC, 2021). Over the last several centuries, the Confederacy has confronted numerous environmental issues that have jeopardized such harmonious relations and undermined the self-determination and well-being of the Six Nations. In the last year, the Confederacy has enacted a moratorium on development in order to oppose illegal development on their traditional territories along the Haldimand Tract. In this paper, I argue that the moratorium on development on the Haldimand Tract is fundamentally concerned with Indigenous sovereignty. I specifically argue that the moratorium represents a larger, centuries-long effort by the Haudenosaunee Confederacy to exercise its legal, political, and land sovereignty. In the following sections of this paper, I will define key terms, explain the details of the moratorium, and explore the implications of the moratorium on Haudenosaunee legal, political, and land sovereignty.

Key Terms

In order to understand how and why the Haudenosaunee Confederacy has confronted illegal development on their traditional territories, two key terms must first be defined: 'Haldimand Tract' and 'sovereignty'. The Haldimand Tract refers to a heavily populated sect of land in southern Ontario. Currently, the Tract covers around 950,000 acres of land along the Grand River (Taekema, 2021). As compensation for the four million acres sacrificed by the Six Nations through their alliance with the British during the American Revolution, the Haldimand Proclamation of 1784 reserved the Tract for the Haudenosaunee and their descendants (Protect The Tract, 2021b). However, in the centuries following the Proclamation, the Tract lands have been encroached upon, stolen, and developed by agents of the colonial settler state. Today, the official Six Nations reserve, Six Nations of the Grand River, is situated on around 45,000 acres of Tract lands, the equivalent of about five percent of the total area (Duric. 2021b).

In the broadest terms, sovereignty refers to the authority of a polity or nation-state to control its own people and systems of governance. However, in the context of Indigenous environmental science and knowledge, the notion of sovereignty is much more expansive. Indigenous sovereignty is primarily concerned with the ability of Indigenous nations and peoples to fulfill their nation specific responsibilities. According to Cree author and activist Sharon Venne, such responsibilities are passed to Indigenous nations by the Creator and through the natural world, including through relations with more than human beings (Watts, 2013). In this regard, Indigenous sovereignty rejects Western conceptualizations of sovereignty that are solely concerned with the enforcement of legal and political power hierarchies. Anishinaabe and Haudenosaunee scholar Vanessa Watts (2013) explains that Indigenous sovereignty is instead characterized as the obligation and ability of Indigenous peoples to fulfill their responsibilities to their nations, neighbouring nations, and broader territorial communities through legal, political, economic, personal, and land-based interactions with human and non-human beings.

Moratorium Overview

On April 20, 2021, the Haudenosaunee Confederacy Chiefs Council announced a moratorium on all development in the Haldimand Tract. According to the moratorium, no development can occur along the Tract without the free, prior, and informed consent of the Haudenosaunee (Duric, 2021a). This moratorium is part of a centuries-long effort by the people of the Confederacy to assert their sovereignty despite uncontrolled colonial development on unceded Six Nations lands. The announcement was made amidst legal battles related to 1492 Land Back Lane, a site of resistance established by Six Nations people to protect their homelands from the development of the McKenzie Meadows subdivision (Ottenhof, 2021). The moratorium also builds upon the Chiefs Council's Land Rights Statement, which outlines Haudenosaunee land ethics and calls for the renewal of treaty relationships (Protect The Tract, 2006).

Legal Sovereignty

Development upon Haldimand Tract lands has undermined Haudenosaunee legal sovereignty. Illegal colonial development upon unceded Haudenosaunee lands has violated the terms of the 1784 Haldimand Proclamation, which was established between the Crown and the sovereign nations of the Confederacy. While the moratorium is immediately based upon the settler state's violation of the Six Nations' land rights, as affirmed in the Haldimand Proclamation, development upon the Haldimand Tract is also inherently connected to traditional Haudenosaunee legal agreements. Illegal developments on unceded Haudenosaunee lands have violated the Dish with One Spoon treaty, which establishes the conditions through which the Haudenosaunee and their allied Indigenous and non-Indigenous neighbours can share the lands of the Great Lakes region for the mutual benefit of all human and non-human beings (Daigle, 2022). In this regard, active participants in the illegal development on Haudenosaunee lands have disregarded both the legal sovereignty and treaty agreements of the Six Nations. As such, a fundamental goal of the moratorium is to obligate Ontarians to honour their responsibilities to Haudenosaunee law as treaty people on Dish with One Spoon territory.

Political Sovereignty

The political sovereignty of the Six Nations is also implicated in this moratorium. While development along the Haldimand Tract has occurred without the consent of the Chiefs Council, numerous projects have been approved by the Six Nations Elected Council, which many Six Nations people do not consider to be a legitimate political authority (Protect the Tract, 2021a). In this regard, the moratorium advances Haudenosaunee political sovereignty, as it was created and implemented by traditional hereditary leadership rather than elected chiefs and councils. The political sovereignty of Haudenosaunee women is also implicated, as colonially imposed external governance structures are rejected in favour of matriarchal governance, through which the Chiefs are chosen by Clan Mothers (HC, 2021).

Land Sovereignty

This moratorium is also concerned with land sovereignty. Illegal colonial development along the Haldimand Tract has undermined the ability of Indigenous nations to maintain relationships with the more-than-human world over the last several decades. However, through this moratorium, the Haudenosaunee intend to exercise their jurisdiction over their traditional territories in order to protect their lands from further colonial exploitation. As such, the Six Nations will be better equipped to protect the Grand River watershed and its surrounding ecosystems and fulfill the responsibility to maintain the health of the Dish for future generations.

Conclusion

Ultimately, the Haudenosaunee Confederacy Chiefs Council's moratorium on development along the Haldimand Tract is another chapter in the Haudenosaunee Confederacy's centuries-long journey in exercising its legal, political, and land sovereignty under settler colonialism. In standing up against illegal colonial development on their traditional territories, Six Nations people are fulfilling their legal, political, and land-based obligations to their broader territorial communities. In doing so, they can better maintain harmonious relations to one another, their neighbouring nations, and the more than human beings across their ancestral lands.

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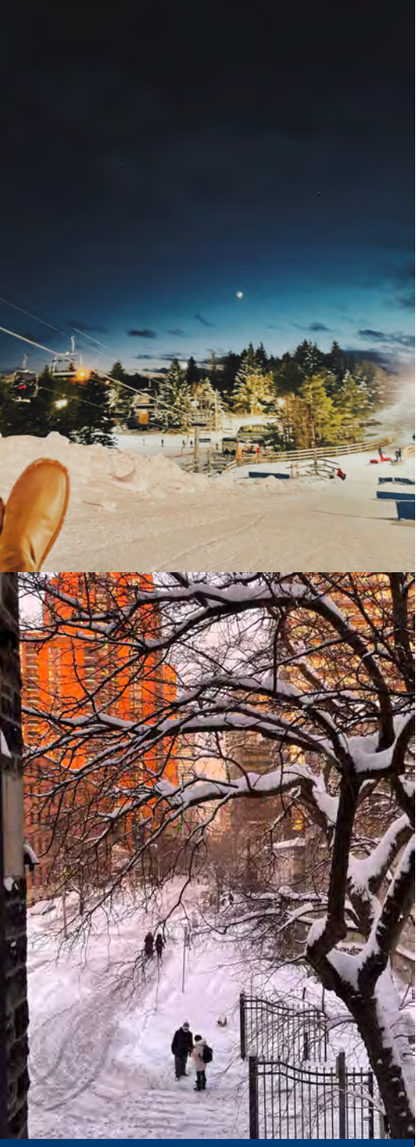

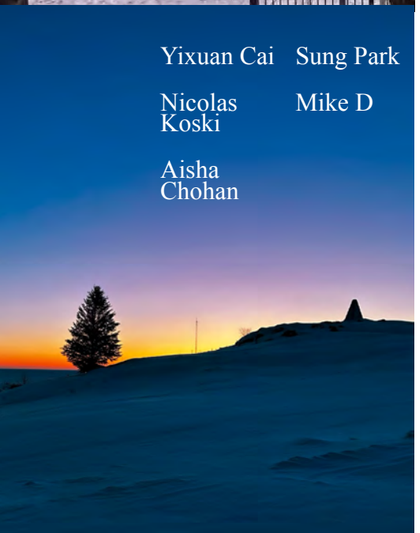

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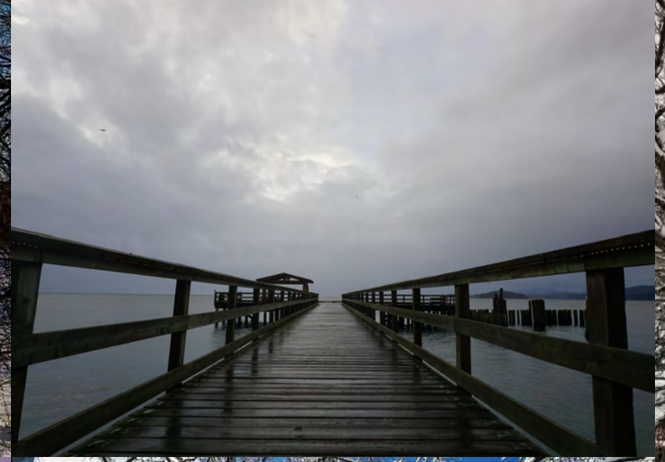

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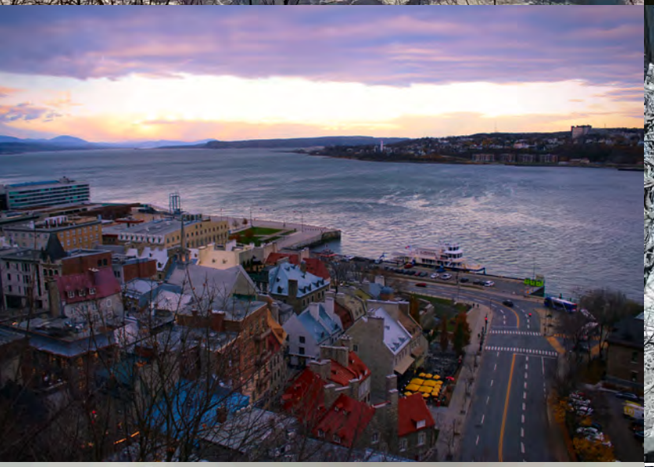

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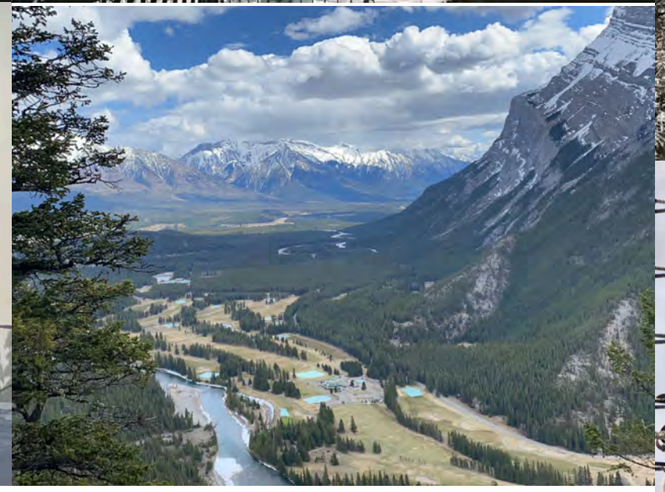

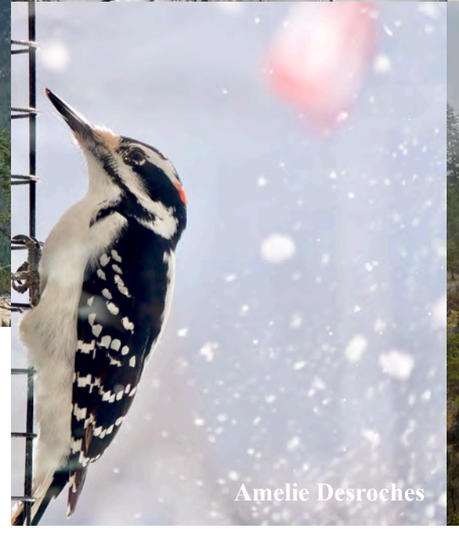

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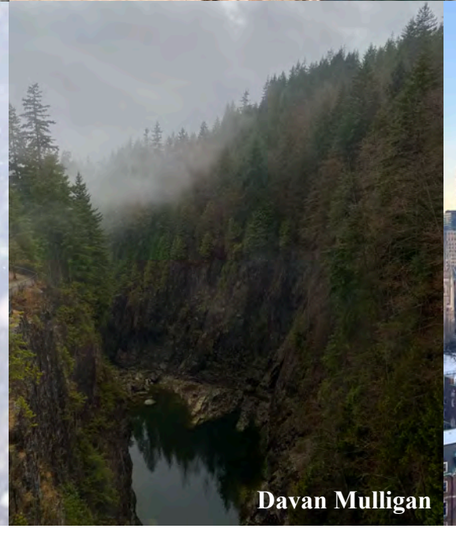

Davan Mulligan

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Part III
Land for the Living
Land for the Healing

A Peaceful Path by Emily Hospedales

Time is Fleeting.

Alexandra Schneider

The pressure of time weighs heavy on my chest.

I hear the clock ticking as every minute slips away, did I spend it meaningfully?

I hurry through life constantly looking over my shoulder, waiting for the flames to rise behind me,

For Earth to become once again nothing more than a floating rock.

Time is fleeting.

I have already mourned the end of my lineage.

The knowledge of past generations will not be passed on, it will end with me.

I am a pitiful optimist to think I could have children, that I will see them grow up and grow old. That I will grow old.

Time is fleeting.

Every waking moment must be precious,

I must spend it only with meticulous thought.

I must enjoy life and experience the joy more intensely.

It may not all be here much longer in its verdant state.

The planet's time is conditional on me.

Time is fleeting.

I must make an impact, change the world.

I must convince everyone the planet is dying.

Convince everyone time is fleeting

Rejuvenating Earth

Stuart Ralston

Nature is woven into the very fabric of The Prélude, William Wordsworth's epic poem that illuminates his journey to becoming a poet. Many days of his childhood are spent exploring the Lake District in England where he grew up. Here, the nature he experiences becomes imprinted on his soul, giving him vast pools of artistic inspiration and rejuvenation for his growth later in life. This time in nature, and subsequent time spent back in nature in adulthood, also instills a deeper sense of connection to all that is around him, and it shows in the passionate language throughout his poetry. At the same time, this representation is not perfect and does have limitations in the way Wordsworth focuses a bit too heavily on the individual instead of the broader picture, although the glimpses of nature that he does give in the poem offer a heartfelt starting off point to explore the earth. William Wordsworth's The Prélude breathtakingly represents all the amazing things we can learn from nature by detailing his life's journey alongside it to show a way of healing both ourselves and the Earth.

Throughout his life, Wordsworth has gained deep pools of inspiration from the nature around him. Beginning in childhood, he becomes captivated by what he notices when he opens his senses up to the hills and valleys. Green grass, a blue sky without bound, mist over the sea at dawn. The Earth is like poetry in motion before him that finds a place in his heart, offering curiosity and imagination. In adulthood when he returns to nature, the streams of wind flowing across the landscape remind him of these possibilities, nature as a source of for artistic insight. When he stops and notices this, it all becomes clear in one moment:

> Nature by extrinsic passion first
>
> Peopled the mind with forms sublime or
>
> fair,
>
> And made me love them
>
> ……
>
> I held unconscious intercourse with
>
> beauty
>
> Old as creation, drinking in a pure
>
> Organic pleasure from the silver wreaths
>
> Of curling mist… (Wordsworth 59, 61).

Here, Wordsworth describes how nature first instilled in him insight into creativity and passion. Even when he might not have noticed its full potential at the time during childhood, his being was imprinted with this boundless imagination and the ability to see new possibilities. The act of writing poetry and its very essence also contains these ideas; opening our eyes through bridging gaps with metaphor, rhythm, imagery, and forms. By using words in unconventional ways, it breaks us free of previous limitations and hindrances. Moreover, the diction used in these lines emanate with his love and respect for the earth and all that it has given him. The imagery of him drinking inspiration from the earth also highlights his awe of what he sees, beauty old as time and sources of life and artistic creativity. Through growing alongside nature, he develops these innate outlooks on life.

Additionally, Wordsworth describes how nature and himself have become joined as one in both life and art. In this next passage from book 2, he comments on his gratitude for the earth throughout his life:

> From Nature overflowing on my soul,
>
> I had received so much, that every
>
> thought
>
> Was steeped in feeling; I was only then

Contented, when with bliss ineffable

I felt the sentiment of Being spread

O'er all that move and all that seemeth

still

……

… o'er all that glides

Beneath the wave, yea, in the wave itself,

And mighty depths of waters (87).

The imagery Wordsworth uses here is very intimate, demonstrating his profound feelings of connection. He describes moving over landscapes and through seas, entwined throughout. The nature detailed in this passage also evokes feelings of movement in how he physically glides over the earth. This movement is also representative of the movement and flow of his lines of poetry as they glide through each word. His soul and writing are moving as one with the earth, each complimenting the other. Nature influences his poetry, and the poetry opens him up to see deeper into nature. In this passage Wordsworth also illustrates how the earth gives him a more pronounced sense of feeling, imbuing each of his thoughts. In turn, this ability to feel more deeply enhances his poetry and breathes new passion into his work. Furthermore, Wordsworth uses the word 'ineffable' here, demonstrating the power of nature to spark feelings beyond mere words; to give energy to deep-seated holistic sensations of the heart. Some of the best poems speak to what cannot be said in words and inspire us to truly feel. The connection gained with nature inspired him with pools of artistic insight to infuse in his poetry, offering a doorway in which others can feel the earth around them more deeply.

In The Prélude, Wordsworth also demonstrates how nature can have a rejuvenating and healing effect on our souls. As he experiences nature, it becomes embodied in his own being. Before going on a morning walk at dawn in a vale near his home, he tries to put his feelings into words as he experiences this breathtaking moment:

How shall I seek the origin? where find

Faith in the marvellous things which then

I felt?

Oft in these moments such a holy calm

Would overspread my soul, that bodily

eyes

Were utterly forgotten, and what I saw

Appeared like something in myself, a

dream,

A prospect in the mind (85).

The permeating healing he feels in this instance is described as an almost holy feeling of calm that spreads through his whole body, almost like a warm light. Wordsworth goes on to detail how his physical senses begin to melt away, revealing a profound sense of connection between himself and the earth as though there is no barrier between one ending and the other beginning. The mind, body, soul, and earth appear to move throughout each other. Additionally, he speaks of trying to find the origins of these feelings brought forth by nature. Nature and the earth are so unfathomable that it is almost impossible to uncover all of it. However, in both the entire work and this passage, Wordsworth attempts to come as close as possible to approaching essences of nature, and each time he does so, it adds to his love towards life and the healing and connection he receives from it.

Moreover, this same healing is also described previously in the first book of The Prélude on page 63. Here, Wordsworth tries to give a voice to the immense impact nature has had on his growth:

The scenes which were a witness of that joy

Remained in their substantial lineaments

Depicted on the brain, and to the eye

Were visible, a daily sight; and thus

By the impressive discipline of fear,

By pleasure and repeated happiness,

So frequently repeated, and by force

Of obscure feelings representative

Of things forgotten, these same scenes so

bright,

So beautiful, so majestic in themselves,

Though yet the day was distant, did

become

Habitually dear, and all their forms

And changeful colours by invisible links

Were fastened to the affections (63).

The first few lines of this passage paint such a beautiful picture of the engraving of nature on his very being. Him revealing how the earth was imprinted on this brain inspires feelings of profound connection, as though each move with the other. Wordsworth goes on to remark at how these experiences of nature, occurring so many times in his childhood, became part of his memory forever, bringing rejuvenation throughout his life. Even though they happened so long ago, those magnificent moments interlaced with his heart and never left him. This demonstrates the silent power of nature to offer us energy and life, both directly and indirectly. In addition, Wordsworth blends his writing of poetry together with the memories of nature using the beautiful imagery of 'invisible ink' and 'changeful colours'. The images and feelings from nature are written onto his soul and imagination.

Furthermore, the healing and artistic inspiration that Wordsworth describes as emanating from nature through his work in The Prélude open us up to care for and connect more deeply with both the earth and the people around us. The adoration with which he depicts nature throughout the poem lends itself fully to this kind of relationship. One such passage that highlights this loving connection is in book 12:

… By love subsists

All lasting grandeur, by pervading love;

That gone, we are dust, - Behold the fields

In balmy spring-time full of rising flowers

And joyous creatures; see that pair, the

lamb

And the lamb's mother, and their tender

ways

Shall touch thee to the heart; thou callest

this love,

And not inaptly so, for love it is,

Far as it carries thee. In some green bower

Rest, and be not alone… (467).

In this passage Wordsworth elegantly depicts love as permeating and pervading through all of nature; in every plant, every animal, every human, every field. Love is represented here as holding all life together, a red thread connecting everything, and without it 'we are dust'. This connection and love go hand in hand: the more we see our deep-seated

connection with the earth, the more we love and care for it, and the more we love it, the more connections we see. The earth and us, 'for love it is'. When we glimpse ourselves in another creature, our empathy has the chance to grow, and we begin to see that the health of one affects the other. At the end of the passage, Wordsworth shows that when we open ourselves up to this love we feel 'not alone'. No matter where we are, we are connected to life.

Similarly, Wordsworth descriptions of nature in The Prélude instill a more sincere connection with the people around us and ourselves. Through Wordsworth's reconnection with nature in his adulthood, he talks about meeting people along his excursions in the countryside:

> I prized such walks still more, for there I
>
> found
>
> Hope to my hope, and to my pleasure
>
> peace
>
> And steadiness, and healing and repose
>
> To every angry passion. There I heard,
>
> From mouths of men obscure and lowly,
>
> truths
>
> Replete with honour; sounds in unison
>
> With loftiest promises of good and fair
>
> (447).

On top of the healing, peace, and artistic creativity he gleamed from nature, he also gained a deeper connection with the people around him and relished in the conversations he had. Phrases like, 'sounds in unison' really aim to heighten this connection, as though their voices are joined in one harmony. Additionally, when he first describes the people he meets as, 'obscure and lowly', it highlights how they might be viewed through the eyes of someone who does not care to really be present and form that connection, that passes by without a second thought. Wordsworth follows this up by commenting on how profound they are when simply talked to and given the opportunity to be with. There is so much to be missed in life when we go on autopilot and fail to notice what's actually around us: "… where if we meet a face / We almost meet a friend" (445). He also comments on walking in nature as a way of centring himself and becoming more aware of his feelings. They give him opportunities to find peace, heal, and connect to who he truly is. This passage beautifully highlights the incredible ability of nature to reveal a more heartfelt connection to the earth, ourselves, and the ones around us.

One thing I would like to note are the limitations in Woodsworth's representations of nature and our connections to it in The Prélude. First written more than 200 years ago, there appear to be some ideas that lean more on the individualistic side of things and miss the full picture. An example is in book thirteen when he reflects more on nature and poetry:

> That Poets, even as Prophets, each with
>
> each
>
> Connected in a mighty scheme of truth,
>
> Have each his own peculiar faculty,
>
> Heaven's gift, a sense that fits him to
>
> perceive
>
> Objects unseen before…
>
> ……
>
> Creative and enduring, may become
>
> A power like one of Nature's (453).

Here in this passage, it almost feels like

Wordsworth is portioning poets away from nature and from the rest of humanity. In the first lines he relates poets to prophets, and that they have a unique gift bestowed by heaven. This gift appears to mean that only they can truly perceive nature, and that this ability is beyond the reach of anyone else. This becomes a problem in that it doesn't seem to allow for everyone to fully experience what nature has to offer, only poets or a select few. Although Wordsworth goes on to say in The Prélude that his goal is to open other people's eyes to nature and life through his poetry, it still leaves out the option for others to learn from nature firsthand. Moreover, the end of the passage seems to separate the poet's power from that of nature, as though the two powers are not joined as one already. In addition, he raises poetry up to an unnatural standard with the word 'enduring'. Nothing in nature is enduring; though some geological formations like mountains can last millions of years, eventually everything changes. Just like nature, so too will poetry change over time. Even The Prélude will change meaning throughout the years and different ideas may last on while others might fade away. But this is also what makes poetry so special; it's a snapshot in time from the mind of someone living on this earth, filled with all their experiences and thoughts gained through this brief encounter with life. It's unnatural to assume that any piece of art or person will be the be all and end all of everything, and that's okay. Wordsworth wrote these lines of poetry years and years ago, and many ideas were brought forth from it to write my essay here today.

Finally, I would like to touch on why this representation of nature is so important for life today in our relationship with both the planet and the people around us. It seems that our connection to the Earth is fading with each new year. We are treating the planet with utter disregard, like just a resource to be extracted, and it's showing. The effects of climate change, caused by our destructive burning of fossil fuels, are getting worse and worse with little action being taken to curb these practices. And this is only one of many examples in how we are destroying the one planet we call home. What I hope to shine a light on with this essay is just how important nature is for our wellbeing, health, and creativity. I also hope that as our deep connection to the earth is demonstrated repeatedly in these passages of The Prélude, we open our hearts to care more for nature. The biodiversity of life is what keeps the earth healthy, every flower, human, sheep, tree, and insect. If even one ceases to exist, it can have catastrophic consequences for the intricate web of life that it is a part of. Additionally, this deep connection we can open up to will offer us a chance to build more genuine relationships with those around us, and not just disregard people based on outward appearance. What is so special about The Prélude is that it reminds us to return to the earth that gave us life, to remember what we are a part of, and to live! In Wordsworth's words, "I breathe again" (29)!

In conclusion, William Wordsworth's representation of nature in The Prélude, documented through his relationship with it growing up, demonstrates its deep-seated capacity to offer creative inspiration, healing, and connection if we just pause to notice. And although there are limits to this particular representation of nature, what is presented is a small, breathtaking glimpse into the vast pool of what is around us. With his poem, Wordsworth inspires future generations to look deeper into the amazing planet we call Earth, continually searching deeper, feeling more, and experiencing all nature has to offer. In doing so I hope we can gain a deeper appreciation for what gives us life and begin to heal the world.

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Photos by Emmeline Chaplin

Through the Looking Glass: A Self-reflection on Mortality on the Journey to Ecological Consicousness

Jiazhen Sun

"The way we regard land and nature will determine the level of our self-regard."

The inauguration of the twenty-first century invited myriad transformations into the lives of humanity. One could say that humans have been on this self-discovery journey to uncover knowledge long before the start of this century. Indeed, humankind has had a long history of innovation and curiosity; this inherent drive to comprehend the world around us placed us at the summit of the ecological hierarchy. The rapidly changing times have enabled us to examine our relationship with nature from a different perspective; at the same time, it has forced us to redefine our connection and role in the natural world. According to bell hooks, the degree to which we value ourselves is linked to our attitudes toward the environment and the natural world. (hooks, 2009) Essentially, our respect and care for land and nature reflect our self-worth. Through her sentiment, we are led to contemplate the extent of interconnectedness between humans and the earth. It prompts us to consider philosophical questions that pertain to our sense of self and our relationship with the spaces we inhabit. Our individuality has been, and will continue to be, defined within the confines of nature. As proud, egotistical beings, this may be a tough pill to swallow: to admit that we are not all-powerful and are still restricted by the laws of nature may be more difficult to conceptualize in this day and age, as we seem to be filled with unlimited potential. However, the issue surrounding our identity being interdependent with the land is complex and entwined with social, philosophical, and historical factors.

As the veil of technological novelty is ripped off, the realization of consequences begins to dawn on us. A turn in intention marks this century for several reasons. Technological progression in the past has been propelled by natural evolution: revolutionary accidents we stumbled across rather than anticipated events. An illustration of this is how pivotal moments in human history, such as the rise of civilization or the advent of agriculture, were not deliberate choices but events that occurred spontaneously. In contrast to current times, our ancestors were content with taking only what they needed from the environment. They became satisfied enough to enter a period of stagnancy, which was still slow enough to parallel the homeostatic pace of nature, by exercising portion control and avoiding overconsumption. Progress was sporadic and unintentional. In this commodified age, the main distinction that sets us apart from our predecessors is our attitude toward technology. We treat modern technology as an "enterprise" and lifestyle that we are a part of instead of viewing it as a "possession" that is simply a part of our life. (Jonas, 1979) Correspondingly with the cycles of nature, technology was meant to be used as a tool to propel us forward. As Dreyfus and Kelly described, "the improvements of technology are impoverishments as well." (Dreyfus and Kelly, 2011) They explain this concept through the analogy of global positioning satellites (GPS). Using a GPS saves us the trouble of exploring foreign terrain. At the same time, however, it strips away our navigation and survival skills. While taking away this need for ability, technology stunts our development. The article also poses an interesting question: are we now controlling the GPS, or is it navigating us to get where it wants to go? Over the years, we have allowed the tables to turn on us. Instead of controlling technology, technology has governed us. We developed because we wanted to survive. With this worry gone, modern technology is pursued deliberately for power and greed, with no intention of wanting to better our lives or the planet.

In the past, we regarded technology the same way we regarded nature: resources we relied on to survive. This primitive method allowed us to stay grounded and connected to the

process, and we remained aware of our identity in this world. We are not the rulers of the Earth; we are merely a small part contributing to a bigger life cycle. In Touching the Earth, hooks described working with and as fellow organisms of the natural world as *healing*. (hooks, 2009) This primal relationship allows us to be in close proximity to the land upon which we stand. By interacting with the land, the earth sustains us spiritually, connecting us to a sense of belonging and reverence for life. The idea of our identity tied to our affiliation with nature is further supported in hooks' explanation of the mind/body split. When slavery was widely prevalent in North America in the 19th century, Black people lost the space to communicate with nature. They were not living for themselves, and their bodies were reduced to labour. Consequently, their souls and individualities were lost and depleted during that devastating era. Once that bond with nature was compromised, it became incredibly easy for them to become foreign to nature and their self-worth. How we define ourselves is rooted inherently in the natural world. Their connection has been severed. As the last glimmer fades in a dark chamber, we succumb to being consumed by the unknown.

Religion has been an essential foundation in our developmental history. Much of the last few centuries have been dominated by faith, our moral rights and wrongs determined by their beliefs. The decision to disassociate from denominational authority has garnered mixed reactions. On the one hand, we are shifting into a free world where people can think and act outside a monopolized practice. It promotes individualism, which can never really be perceived as a bad attribute in today's society. However, given that we have acted under a predominantly religious society for a large portion of human civilization, learning to adapt to a secular world has proven to come with unintended consequences. Religion, down to its essence, circulates the idea of community. Putting aside the moral debate about imposing a politically correct ideology onto others, we can appreciate the benefits it has bestowed upon society by providing people with a sense of community and belonging. Sure, secularity fosters growth and development, but how many people are profound enough to pursue their so-called "individualism"? Humans, like many other animals (yes, it is crucial to remind ourselves occasionally that we, too, are a part of the food chain and not higher beings), are social. We crave inclusion and gather into groups. From a psychological perspective, much of our identity is contingent on adolescent social interactions. Hence, it is important to acknowledge the impacts of living in a secular era and the estrangement it creates between ourselves (as well as the natural world).

In discussing losing a sense of self-regard, Hannah Arendt brings up an interesting concept. The world alienation she mentions is a by-product of the overconsumption of technology. (Arendt, 1998) The distance between us and the grounded earth is rapidly shrinking while the alienation continues to grow. This sense of isolation (or ego) further drives a wedge between the already expanding crevice in our relationship with nature. World alienation encapsulates humans' contempt for our natural place on Earth and our apathy towards the environment. Thus, it goes to show that if our connection to nature is not repaired, there can be no empathy to exist.

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Medicine in Tulsi

Devajyoti Chakraborty

Abstract

Tulsi (Ocimum tenuiflorum) has attained a near-mythical status in India. Although it is worshipped by millions of people as a deity, it also has numerous medicinal properties. This nexus of factors has made the plant of significant importance in Indian households. While the plant made its first impressions in India over 5,000 years ago, due to its medicinal properties, the plant proliferated throughout Asia by the early traders. Due to its versatility with applications as an antimicrobial agent to being utilized as mouthwash, Ayurvedic doctors have made Tulsi (Ocimum tenuiflorum) an essential part of their medicinal cabinet. This plant's wide-ranging roles in the environment and its multitude of benefits to human health have made it one of the most recognizable plants in all of India.

Fig.1

Plant Origins

Kingdom - Plantae Subkingdom - Viridiplantae

Infrakingdom – Streptophyta Superdivision – Embryophyta

Subdivision – Spermatophytina Class – Magnolipsida

Superorder – Asteranae Order – Lamiales

Family – Lamiaceae Genus – Ocimum

Species - Ocimum tenuiflorum

Tulsi originated in the north-central region of India and now is native throughout the eastern world tropics. In ancient India, this plant was used extensively in Ayurveda and was known as the "The Queen of Herbs". The habitat of Ocimum tenuiflorum varies from sea level to altitudes of up to 2000m. The natural growth of the plant occurs in moist soil all over the globe. Tulsi (Ocimum tenuiflorum) is of importance in Hindu culture. Thus, it is harvested in semi urban areas in order to be supplied to temples.[1] The plant has a wide distribution across the world, it can be found in Asia, North and South America, and Oceania. [2]

Fig.2

In reference to the above map, the origins of the plant can be located in the north central region, while it is now being cultivated across the globe.

Ecological Roles

Tulsi (Ocimum tenuiflorum) has several roles to play in the environment. It gives out oxygen for 20 hours a day and also releases ozone for 4 hours a day. Moreover, tulsi (Ocimum tenuiflorum) also forms nascent oxygen, which helps the environment by absorbing harmful gases like carbon monoxide, carbon dioxide, and sulphur dioxide. [3] With the increased rates of air pollution over the past decade, tulsi (Ocimum tenuiflorum) can be of use in combatting this issue. For example, in the area near the Taj Mahal, it has been planted to help protect this wonder of the world against environmental pollution.[4] The plant is valuable since it produces anti- inflammatory and antibacterial compounds that help lower air pollution levels.

Traits of Adaption and Resilience

Over millions of years, tulsi (Ocimum tenuiflorum) has evolved to form certain distinct characteristics that have helped it survive in the ecosystem. It is an upright bushy shrub that grows up to 18 inches. As it has grown taller, the plant has been able to receive much more sunlight than its low-lying counterparts.[5] They also have hairy stems that sprout oval leaves with serrated edges. These hairy stems, also known as trichomes can be helpful in multiple manners: trichomes can be insulating by keeping frost away from leaf cells, and they can also reduce evaporation by protecting the plant from wind, heat and protect the plant from herbivorous insects. [6]

Human Influence

Tulsi has been cultivated by humans for over 2000 years in India. In ancient India, this plant was used extensively in Ayurvedic practices and was also worshipped as a deity. Across India, the plant is cultivated over an area of 25,000 ha and leads to the production of about 250 tons of oil. The process of artificial selection is also relevant in tulsi (Ocimum tenuiflorum) since it was favoured over other plants by farmers due to its medicinal properties. In the US, scientists have also attempted to genetically engineer tulsi (Ocimum tenuiflorum) to increase its pharmaceutical value. A team in Washington led by an Indian American scientist is hoping to increase a compound called eugenol in the plant as it has been shown to control breast cancer. [7] The plant has been considered invasive in certain regions of the world. For example, it is considered invasive in Cuba and as a weed in Malaysia, Puerto Rico, and Guam.

Plant Influence

The reason this plant was worshipped in ancient India was due to its large array of medicinal properties. Tulsi (Ocimum tenuiflorum) may be ingested as whole leaves or be made into a hot, bitter tea. There is a staggering amount of evidence that proves that this plant can affect the human body on physical, chemical, metabolic and psychological levels. It has been demonstrated that tulsi (Ocimum tenuiflorum) can counter metabolic stress through the normalization of blood glucose, blood pressure, lipid levels and psychological stress through improving memory and cognitive function. In ayurvedic practices, it is said to homogenize vata and kapha within the body. Vata is supposed to govern blood flow, breathing, and movement of thoughts in the body. On the other hand, kapha is responsible for the overall stability, sustenance, and support of our physical bodies. Research conducted at labs has shown that tulsi (Ocimumtenuiflorum) protects against toxic chemical-induced injury by increasing the body's levels of antioxidant molecules such as glutathione and intensifying the actions of antioxidant enzymes such as superoxide

dismutase and catalase. Drawn-out physical effort, physical restriction, introduction to cold and over-the-top commotion upsets homeostasis by prompting physiological and metabolic pressure. At the point when the ability to adjust to these stressors is surpassed, maladaptation happens to bring about harm to biochemical pathways, organ capacity and well-being. By improving various cellular and physiological adaptive functions, adaptogenic herbs such as tulsi are able to protect against this damage. It has also been proven that tulsi (Ocimum tenuiflorum) has antibacterial, antiviral and antifungal activity against many pathogens responsible for human infections. [8]

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The Ecology and Medicinal Value of the Medicinal Leech (Hirudo Medicinalis)

Laura Landau Remy

Abstract

The medicinal leech, Hirudo Medicinalis, has been maneuvered by humans for its medicinal value since Ancient Egypt. Currently, the leeches are primarily distributed in the northern part of the European continent. The animal acts as a parasite, sucking the blood of a host as a form of feeding. Human manipulation has decreased the leech population across Europe. With the development of science, its application changed to using the species' saliva as an anticoagulant. Supported by secondary sources, such as articles and scientific journals, this report will study the leeches' value in the medical field and their importance in the ecosystem.

1. Leech Origins

A. Scientific Classification (Taxonomy)

Kingdom: Animalia

Phylum: Annelida

Class: Clitellata

Order: Hirudinida

Suborder: Arhynchobdellida

Family: Hirudinidae

Subfamily: Hirudinariinae

Genus: *Hirudo*

Species: ***Hirudo Medicinalis***

Figure 1: Scientific classification of the species Hirudo Medicinalis [1].

Figure 2: Illustration of the species Hirudo Medicinalis [2].

B. Native Origins, Habitat and Distribution

The leech species Hirudo Medicinalis is native to the Palearctic, meaning the northern part of Europe, Asia, and northern Africa [3].

This species is considered amphibious, needing both water and land to survive. Their ideal habitat would be a small freshwater pond with mud and reeds at the bottom (Figure 3). The small pond must contain tadpoles and frogs, as it is their primary food source [3].

Figure 3: Image showing an ideal habitat for the Hirudo Medicinalis species [5].

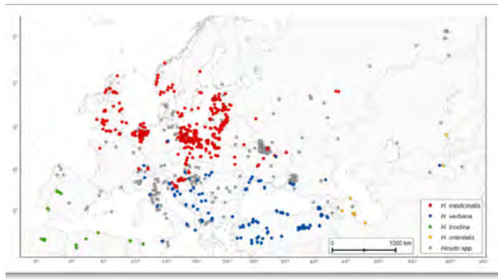

Figure 4: Map showing the distribution of five medicinal leeches' species; Hirudo Medicinalis, the species in question, is represented by the red dots [4].

As shown in Figure 4, Hirudo Medicinalis is mainly distributed in the northern part of Europe but can also be found in the continent's west and south area. Research and sources have proven the finding of this specific leech in 17 countries in Europe and Asia [4].

2. Ecology

A. Significant Ecosystem Roles

Hirudo Medicinalis participates in the symbiotic relationship with another organism, where the species plays the role of a parasite (Figure 5). The action of feeding with the host's blood starts when the leech explores the host's skin and finds an appropriate place to pierce its jaws and then suck its blood [5]. Opposite to the parasite, most hosts are mammals, but amphibious, such as tadpoles and frogs, are extremely important for feeding young medicinal leeches [5]. This is because they are not capable of initially piercing the thick mammal skin. In contrast, feeding off amphibious is easier because they have thinner skin than mammals [5].

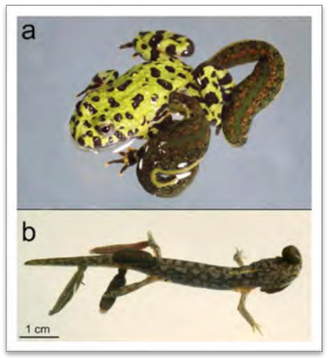

Figure 5: Image displaying the medicinal leech (a. adult, b. young) acting as a parasite in two different hosts (a. fire bellied toad, b. half-grown newt) [5].

B. Significant Adaptative Traits

During the winter, this species buries itself under the pond's mud or objects at the edge to avoid the low temperature. With the rise in temperature, the leeches can sense when a possible host is near because of water movement, motivating them to swim towards it to feed off their blood [5].

3. Human Influence

Hirudo Medicinalis' current status varies depending on the country. It is important to note that in distribution research, this species can sometimes be mistaken for the closely related Hirudo Verbana. Therefore, the data concerning the status and distribution could be flawed [5]. Nevertheless, the International Union for the Conservation of Nature and Natural Resources considers this species threatened and part of the red data list, as well as Britain and several other countries [5].

The main reason for the threat to the species lies in the fault of humans. Researchers discard the possibility that the past intense exploration of leeches for medicinal use is to

be blamed because people would throw them in the nearest pond whenever they were used, allowing them to continue living and reproducing. However, the exploitation of medicinal leeches for experimental biology is appointed as a cause for the decrease in its population because, in this situation, many leeches are used for experiments and then killed. Besides that, human development concerning cattle and horse management has also been pointed out as a possible cause for leech threats due to the switch of ponds for throughs to hydrate the animals. Consequently, the leeches encountered a decrease in the number of possible hosts, making it impossible for them to feed and grow [5].

4. Animal Influence

Humans have maneuvered this species of leeches for medicinal use since Ancient Egypt. Over the centuries, the leech's medicinal value has changed how it is approached with the development of science. Specifically, we can see this substantial change starting from the birth of the 19th century, with the use of leeches for bloodletting, and later at the end of the century when the manipulation of its saliva containing anticoagulating properties was masterminded [6].

Bloodletting was the first use discovered by humans. During its popularity peak at the beginning of the nineteenth century, leeches were used to take out an individual's blood as a way of any disease treatment. François-Joseph-Victor Broussais, a renowned physician at that time, would prescribe bloodletting to all his patients because he believed that any disease was a consequence of an excess buildup of blood, and the solution would be removing the blood from the body. The process was quite simple; a doctor would prescribe a number of leeches which could amount up to 80, for the patient, and the animals would suck out the blood from the person's body area required for treatment. At that time, the areas assigned more treatment were part of the bodies that could not be applied to other forms of bloodletting. In addition, leeching was way less painful than the alternative methods, such as the fleam and the scarifier, explaining the sudden boom in leech use in Europe [6].

After its decline, caused by developments in the medicinal field, the human exploitation of leeches took a significant pause in history until a man named John Berry Haycraft discovered a new use for the species. In 1884, John created a pure anticoagulating preparation derived from the leech's saliva biological active ingredients (Appendix A), which he later called "Hirudine," inspired by the species' scientific name [6]. The preparation contained an ingredient called hirudin (Figure 6). It is a thrombin-binding protein with a sulfated Tyr63, which increases the binding affinity, resulting in an effective inhibitor for thrombin activity [7].

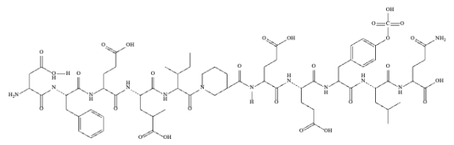

Figure 6: Structure of the anticoagulating ingredient hirudin [9].

However, it was only in 1981 that an American biologist called Roy Sawyer dedicated his work to the breeding and farming of leeches for drug discovery and clinical use. This process was mainly used in minor clinical surgeries where a site of injury had to be contained not to develop blood coagulation [6, 8].

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Molecule	Molecular mass	Potential function	References
Small molecules			
Histamine	111 Da	Increasing vascular permeability in the host	Baskova et al. (2008a)
Serotonin	176 Da	Not known	Baskova et al. (2008a)
Steroid hormones	272–362 Da	Not known	Baskova et al. (2008a)
Modulators			
Inhibitor of C1 complement component	60–70 kDa	Inhibits the classical pathway of complement activation	Baskova and Zavalova (2001)
Saratin	12 kDa	Binds to exposed host collagen in ruptured blood vessels and inhibits attachment of von Willebrand factor	Domogalla (2005); Gronwald et al. (2008)
Calin	65 kDa	Binds to exposed host collagen in ruptured blood vessels and inhibits attachment of von Willebrand factor; prolonged after-bleeding?	Munro et al. (1991); Deckmyn et al. (1995)
Enzymes			
Hyaluronidase	27.5 kDa	Cleaves hyaluronic acid in host extracellular matrix	Hovingh and Linker (1999)
Collagenase	Approximately 100 kDa	Cleaves collagen in host extracellular matrix	Rigbi et al. (1987b)
Apyrase	45 kDa	Cleaves adenosine 5′-diphosphate (ADP), inhibition of platelet activation	Rigbi et al. (1996)
Destabilase	12.6–12.9 kDa	Cleavage of isopeptide bonds in stabilized fibrin, thrombolysis	Baskova et al. (2001); Baskova and Nikonov (1991); Zavalova et al. (1993)
Protease inhibitors			
Antistasin	15 kDa	Inhibitor of tissue kallikreins	Söllner et al. (1994)
Eglin C	8.1 kDa	Inhibitor of neutrophil elastase and cathepsin G	Braun et al. (1987); Junger et al. (1992)
Leech-derived tryptase inhibitor	4.3–4.8 kDa	Inhibitor of tryptase	Sommerhoff et al. (1994); Stubbs et al. (1997)
Leech carboxypeptidase inhibitor	7.2–7.3 kDa	Inhibitor of carboxypeptidase B, fibrinolysis?	Reverter et al. (1998)
Hirudin	7.1 kDa	Inhibitor of thrombin, blocking formation of fibrin clots	Bodong (1905); Markwardt (1955); Stone and Hofsteenge (1991); Ascenzi et al. (1992); Nowak and Schrör (2007)
Eglins	5–38 kDa	Protection of crop content from untimely proteolysis	Seemüller et al. (1980); Rigbi et al. (1987a); Roters and Zebe (1992); Baskova et al. (2008b)
Bdellins	8.1 kDa	Protection of crop content from untimely proteolysis	Fink et al. (1986); Rigbi et al. (1987a); Roters and Zebe (1992); Baskova et al. (2008b)
Antimicrobial agents			
Destabilase	12.6–12.9 kDa	Lysozyme-like activity (cleavage of cell wall components of bacteria), defensin-like activity (inhibition of bacterial growth)	Zavalova et al. (2000, 2006); Baskova and Zavalova (2008)

Appendix A: Leech's saliva biological active ingredients and their potential functions [7].

Nature Deficit Disorder: Our Struggle of Reuniting with Nature

By Fiona (Chenge) Wan

Understanding “Nature-Deficit Disorder”

I have “nature-deficit disorder,” and I know you do too. Today’s technological advancement is estranging human connection with nature, with the younger generations especially vulnerable to addiction of the online world. The increase in screentime, the lack of sunshine and the detachment from nature are all instigators of “nature-deficit disorder.” American journalist, Richard Louv, introduced “nature-deficit disorder” as a non-medical diagnosis of the growing gap between children and nature (Louv, 2011). The inverse relationship between technology and nature exacerbates seeing our developing dependence on electronics. Owing to poor urban planning, prevalent traffic, diminished nature education and evanesced green space, human's bond with nature is unwittingly loosened. Additionally, through scientific research, the nature-deficit disorder is found to be a cause of diminished use of senses, attention difficulties, conditions of obesity, and higher rates of emotional and physical illnesses (Louv, 2019). Furthermore, the imbalance between our interaction with the virtual and the real world causes illnesses that could only be cured with time spent in nature, yet we cannot lift our eyes from the screen. With more time spent indoors and less outdoors, people are becoming “less alive” and less prone to pro-environmental attitudes (Suttie, 2016). Therefore, identifying and ameliorating nature-deficit disorder is crucial to the well-being of our current mental health and for generations yet to come.

Detached from Nature: My Experience with Nature-Deficit Disorder

In my entire life, my interaction with nature was somewhat limited. Growing up, my family moved to several residences, including four condos and two houses, so I felt I lacked a sense of belongingness in each neighbourhood. Feeling the need to build instantaneous friendships, I prioritized my time connecting with people and neglected nature.

The first time I truly interacted with nature was during my Grade 5 camp experience. I was three hours away from Toronto, living in cabins in a setting not artificial, not filled with tall buildings, but a forest far away from the confined civilization. It was shocking to me how “uncolourful” nature can be. Unlike the polychromatic advertisements I saw on TV, nature has subtle shades of green and blue, nothing too blinding to the eye. In the five days there, I canoed, hiked, swam, danced around the campfire, and morning dipped into the lake, and allowed my eyes to embrace a new scheme of colours: colours of the nature. I even went on my first ambulance ride to the local hospital for an unknown allergic reaction. Introspectively, I saw my “allergy” to nature as a sign that nature has not yet boosted my immune system to adapt to the ever-present nature.

Since the camp trip, I became drawn to more activities in nature. Hiking became a personal favourite, changing routes now and then to bring nature’s silhouettes into focus with my eyes. When the COVID-19 pandemic emerged, it aggravated my desire to go out into nature. Each day, I wake up feeling confined and depressed, even on days with beautiful weather. Wanting to escape from reality, I resorted to social media and online platforms to remediate my anxiety, not knowing my temporary escape would only worsen my nature-deficit disorder.

Looking out the window and into my verdant backyard relieved my weary eyes from prolonged periods of screen time. Eventually, after a few headaches and back pains, I began placing my yoga mat on the grass to do stretches and learned meditation in the shade. Slowly, I realized how little I tiptoed into this lovely place only a few metres away from my bedroom, and how regretful I was to not noticed this sooner.

Reconnecting with Nature: Time at My Sit Spot

Moving to downtown Toronto took a lot of adjustment in my daily routine and adaptability to the urban chaos. My sit spot is located in Queen’s Park, right beside the Al Purdy statue (Figure 1). Always passing the statue on my way to campus, I never took a second to stop and sit. In my peripheral vision, I always knew there was a statue there, but my mind was too focused on non-nature-related topics. The truth is, I never cared to spend time in nature since the start of my university life.

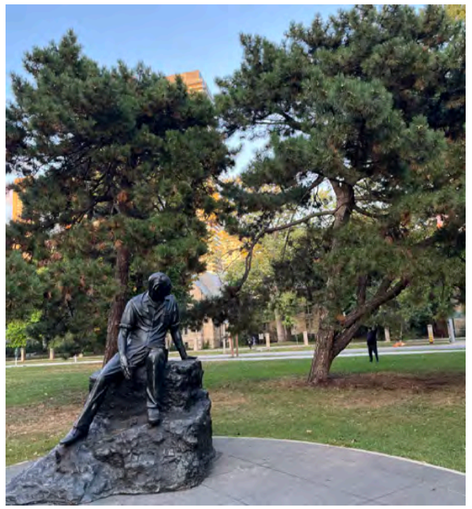

Fig.1

Spending regular time in my sit spot was an epiphanic experience. My weekly visit to the statue no longer made me a random pedestrian who passes by, but rather someone who treated the statue as their destination. Even in the freezing weather, the view is still fascinating if you focus in the moment. Every Monday at 4 pm, I observe UofT students glide by, wishing they would take a second to stop with me (Figure 2). Sometimes, I eavesdrop on their conversation, often about tests, assignments and deadlines. Shifting away my attention from the people, I began to

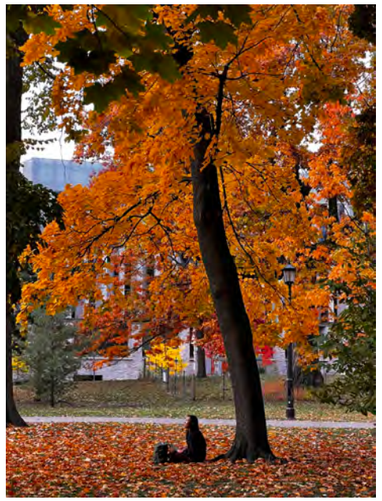

Fig. 2

realize the natural environment I have overlooked all along. The squirrels racing to climb the Austrian pine tree, snow covering the frosted grass, and the refreshing wind blowing on my face made me appreciate this green space besieged with the urban jungle. While trying to focus on nature, my attention is often distracted by the strident sirens, the unavoidable chatters, and the rumbling of the subway beneath me. To this, I wonder: can nature-deficit disorder ever be cured in an urban setting? Although being in Queen’s Park improved my interaction with nature, the experience felt transient and the feeling was fleeting. Ultimately, spending time at my sit spot for the past month was only a temporary pain reliever as living in an urban setting deteriorates my nature-deficit disorder faster than it is relieved.

A Full Circle: Connection of Nature-Deficit Disorder to Sustainability

I believe identifying and alleviating nature-deficit disorder is a crucial contributor to improving sustainability. To meet our current needs and the needs of future generations, nature-deficit disorder plays the role of diagnosing those who are disconnected from nature and aims to reunite their long-lost relationship with nature after their digital dependency. In today's technological world, a barrier between nature and human beings is established as oppositional. In particular, Louv described "nature remains the "other"; humans are on it, but not of it" (Louv, 2011). Unknowingly, our human nature of living and thriving in nature 5 million years ago transformed into living in high-rise apartments with modern interiors. Technology has brought us electricity, convenient transportation and communication tools, and a new style of living that is often unsustainable. Therefore, nature-deficit disorder is an admonition to restore our absent connection with nature; in fact, distinguishing ourselves from nature is fundamentally inappropriate, since we are a part of nature all along.

From a rational viewpoint, finding the antidote to nature-deficit disorder and achieving sustainability will undergo the same process. Louv introduced the idea of "Three Rings." The First Ring consists of traditionally funded, direct-service programs, such as nonprofits, that focus on institutional efforts to reconnect humans to nature. The Second Ring comprises individual contributions through the form of volunteerism. Lastly, the Third Ring focuses on "a potentially vast orbit of networked associations, individuals, and families" (Louv, 2011). Similarly, I anticipate that improving sustainability will incorporate a progress akin to the Three Rings for solving nature-deficit disorder. Both issues are widespread, and therefore, require collective forces to mend with the help of all three rings.

Final Thoughts: My Attitudinal Change Towards Nature

The readings, my experience at my sit spot and learning about nature-deficit disorder motivated me in acknowledging the importance to maintain daily interaction with nature. Time and time again I think nature-deficit disorder is incurable, yet Louv demonstrated through the No Child Left Inside movement that hope is still there (Louv, 2009). By enhancing our personal connection with nature, there is one more person in the world recuperating from nature-deficit disorder. Reading through Louv's work was informative, yet he implies a bleak reality between the lines. How did we become so isolated from nature so fast? Why did we create technology to turn us against nature? These questions feel depressing to ask, knowing that I too, am a long-term patient of nature-deficit disorder.

Optimistically, I remind myself that small changes are the first step toward fundamental reform. Thus, I began to incorporate more nature time despite heavy workloads. Using the same time as a movie, I explored a new trail where I had an immersive experience hiking in the woods. Not only was the experience refreshing, I retrieved a familiar but forgotten feeling of peacefulness. Day after day, slight changes in my routine made me aware of the little surprises nature can bring, knowing that screen time will never create the same magical effect on my mind.

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The "Richest" Nation in the World: What the Future Holds for the Exploitation of Mining within the Democratic Republic of the Congo, in the Face of Climate Change

Ava Taborda

In theory, due to its rich agricultural and mineral lands the Democratic Republic of the Congo (DRC) should be one of, if not the wealthiest state in the world (Jackson, 2019). However, due to centuries of colonialism, exploitation and extraction, the region has been set leaps and bounds behind its western counterparts, and acts of colonialism and extractivism that subjected the DRC to a state of inferiority are the reason for its periphery stance within the global world today (Jackson, 2019). This paper will explore the possible impacts of climate and environmental change within the DRC, whether the history of extractivism within the state will continue given the impacts of climate change, and how these factors may impact the land and the people. Within this paper, the longstanding history of the exploitation within the DRC will be elaborated on. Furthermore, within this paper questions surrounding how climate change will impact the abundant resources within the DRC and whether this will lead to a demise of the "easy transfer" of minerals from within the periphery nation to the western world will be explored. Focusing on the growing demand for electric vehicles and by extension lithium, I will examine how increased mining of lithium in the DRC will impact the population and their response to rising temperature levels. Literature on extractivism will be used within this paper to examine how colonial and present day extractivism within the DRC exploitates and appropriates the people and raw materials within the state allowing for the further development of the western world. Cedric Robinson's theorization of racial capitalism proves significant when viewing the case of the DRC in relation to climate change, as the theory sheds light on the colonial history of extraction within the state using Congolese people within the Atlantic Slave Trade, to modern day exploitation through minerals such as copper, uranium, coltan, tin, etc... Racial capitalism also proves significant within this paper as it allows for the understanding of capitalism and how it feeds on slavery, violence, imperialism, and genocide (Kelley, 2017). This theory is extremely evident when viewing the violence, exploitation, and degradation of the land and people of the DRC and may provide reasoning for how climate change may further impact the state, its resources and population.

The History of the DRC and its Colonial Impacts

In 1482, the Kingdom of the Congo was invaded by Portuguese explorers, the never-ending road of exploitation of the DRC began with the use of its people within the Atlantic Slave Trade. Citizens of the DRC were taken and sent to the western world to aid other nations in their development, failing to have the opportunity to seize the development of their own land at the time (Jackson, 2019). This exploitation of the people and state of the DRC was the first stepping stone to its future exploitation by King Leopold the Second of Belgium. King Leopold forced the citizens to work the land in inhumane working conditions for decades to export ivory and rubber (Jackson, 2019). Those who did not conform to the working conditions and regulations set in stone by King Leopold were killed, raped, and beaten (Jackson, 2019). Eventually, leaders demanding independence from Belgium initiated the independence movement in 1960. Prior to the independence movement and still today the societal norm for those within a majority of the DRC is mining, whether it be through carrying out the physical labour, or adopting cultural norms associated with the task; mining takes precedent within the routines of a Congolese individual (Baloji, 2021). Even

the lives of children within the DRC are impacted by the mining culture, as an estimated 400,000 children work within the mines accumulating less than 2 dollars a day for their underage labour (Lawson, 2021). In present times, mining patterns within the DRC entail mass cobalt mining on behalf of corporations like Apple, LG, Samsung, and many more as the nation is home to over 70% of all cobalt mining (Lawson, 2021) (Frankel, 2016). Gold, diamonds, and zinc are among other rich minerals mined and exported from the DRC on behalf of large western corporations, the abundant lands of the DRC hold up to $24 Trillion USD in untapped mineral deposits across the nation today (Ojewale, 2022). The future impacts of climate change on the DRC brings up questions of whether the potential to mine the mineral rich lands will continue, and therefore whether exploitation and extractivism on behalf of the west will increase within the nation.

Extractivism within the DRC

Extractivism is a theory that is based on "socio- ecologically destructive processes of subjugation, depletion and non-reciprocal relations occurring at all levels of practices" (Chagnon et al., 2022, p. 762). This theory can be understood as the appropriation and exploitation of the resources within a natural environment in mass quantities, without the accompaniment of industrial processing (Chagnon et al., 2022). The theory of extractivism furthermore parallels ideals of capitalism and exploitation within world geographies and uses the vulnerability of colonial states to its advantage to obtain its main goal of over- extraction in a state (Chagnon et al., 2022). Chagnon et al., furthermore state that patterns of colonialism contribute to the over- extraction of minerals and commodities within periphery nations towards the core, leading to the development of the western world and the marginalization of the southern states (2022). The DRC has a longstanding history of extractivism, as mentioned earlier, the state has been exploited for its abundant resources and human labour for the gain of the western world, with these practices continuing today (Baloji, 2021). As society wakes up to the realities of the climate crisis, the demand for electric vehicles may increase over the next decades, with that the demand for cobalt mining to make lithium batteries will increase as well; leading to the exploitation of rich mines within the DRC (Frankel, 2021). The extractivism of the land and citizens within the nation will continue to occur; according to the Washington Post, there are workers of all ages within these mines and the demand is only seen to increase because, "the world needs what Congo has" (Frankel, 2021). These unsafe working conditions can only prove to negatively impact the people of the DRC, and furthermore accurately depicts the case of ongoing extractivism within the nation (Frankel, 2021) (Chagnon et al., 2022).

A key example depicting the histories of both colonialism and extraction within the DRC is the mining town of Manono, which was super-exploited within the early 20th century for its abundance of natural resources. The Belgian colonizers were able to exploit the area and develop the rich land to increase their outputs of minerals such as tin within the cassiterite deposits (Regine, 2022). The Manono mine was exploited for its Tin between the years of 1919- 1982, over 100 million cubic meters of tin were extracted from this mine within the 63 years of production (AVZ, n.d.). Once the DRC had become an independent state, the extraction on behalf of the Belgian colonizers came to a cease as well as the prices for tin. Today in the state a large percentage of the population attempts to mine what is left within the cassiterite deposits under unsafe conditions with no adequate materials (Regine, 2022).

Now, given the demand for electric vehicles in the developed world, Manono is left in a state of industrial ruins as the present-day search for lithium plagues the mining town and its people. The history of colonialism within Manono depicts the case of a mining town being overtaken by patterns of extractivism on behalf of colonial powers, and once stripped of its valuable resources, being left to fend for themselves in their time of revolution and independence.

In recent years, Manono can still be seen as a site of extractivism through the AVZ Manono Project (AVZ, n.d.). AVZ Minerals Unlimited is a company based in Australia aiming to exploit the rich minerals within the DRC, specifically within Manono, which have access to "one of the world largest lithium rich LCT (lithium, caesium, tantalum) pegmatite deposits" (AVZ, n.d.). According to AVZ, the available mining area is large enough to develop a plant which will process the ores found within Manono. If production goes according to plan the people in Manono and surrounding areas have been promised access to fundamental rights that they are currently lacking such as roads, schools, hospitals, etc.… (Regine, 2022) (AVZ, n.d.). The increase in demand for lithium and its use in the production of electric cars, is a spearheading factor in the exploitation of Manono and the reopening of the Manono mine. Therefore, the project itself is often viewed as a sustainability haven in the west as it will contribute to the increased production of electric vehicles. On that note, lithium mining through the Manono Project is framed by AVZ as an incredible opportunity for all parties. What has failed to be acknowledged however is what Wanger describes as the detrimental consequences that the environments and people within Manono will endure due to the increased mining (2011). The over-extraction of lithium mining within regions such as the DRC may lead to the decline of freshwater availability and an increase in water pollution (Wagner, 2011).. The increased likelihood of chemical leaks may lead to the further marginality of the people and biodiversity within these periphery states where lithium is being mined (Wanger, 2011). To put full trust in the hands of a capitalist institution such as AVZ proves to be unsettling given the past colonial extraction and capitalist exploitation of the DRC and its people. The people of the DRC, more specifically, the people of Manono, may believe the claims of equitably distributed resources and wealth from AVZ to be truthful, however nothing is definitely promised. Issues of labour conditions also blur the vision of these people as they wait in anticipation for the promised benefits this new deal may bring (Regine, 2022). Now, the historically exploited state continues to be extracted in the face of sustainability and the people as well as the environments within the DRC will continue to suffer at the hands of the western world. The hunt for lithium on behalf of the west, regardless of how it may impact those in the developing world and their natural environments, therefore proves that the roots of colonialism and extractivism still stand strong and to this day (Regine, 2022).

Racial Capitalism and its Relation to the DRC

According to Robinson, racial capitalism is the concept that capitalism and its ideals stemmed from feudal order and were strengthened by patterns of exploitation and racialism in the west (Kelley, 2017). Capitalism and racialism are therefore not separate but linked to one another as the roots of capitalist society are dependent on slavery, violence, genocide, colonialism, and imperialism which marginalize People of Colour (Kelley, 2017). The case of the DRC is a prime example of racial capitalism at work. Throughout the history of the nation, the DRC has been exploited leading to violence within the state allowing for the easy transfer of goods within the nation which benefit and strengthen the developed world (Jackson, 2019). Even though the DRC is independent, patterns of exploitation still prove that the western world has a significant grip on the land and people within the state. Using a racial capitalist lens when viewing this topic contributes to the understanding that black radical tradition is mandatory when creating bonds to structure and grow one's life, however through acts of racial capitalism they are stripped away and destroyed (Mullings, 2022). To understand Racial capitalism, one must therefore also understand the significance of Black Radical Tradition. Black Radical Tradition can be defined as a collection of blood, sweat, and tears within the cultural, intellectual, and hard work by Black people, towards dismantling the political, social, economic, and structural norms and values within society which are rooted in colonial and racist ways of knowing and being (National Center of Institutional Diversity 2019). The term Black Radical Tradition aims to address not only the roots of slavery which stand firm within society and maintain the marginalization of Black people but also the role of capitalism in maintaining the degradation of People of Colour (National Center of Institutional Diversity, 2019). In the words of Robinson, Black Radical Tradition can be understood as, "a revolutionary consciousness that proceeded from the whole historical experience of Black people and not merely from the social formations of capitalist slavery or the relations of production of colonialism" (Robinson, 2000, p. 169). Black radical tradition, therefore, is associated with resistance against structural forms of oppression and is viewed as a cultural phenomenon that surrounds collective action toward anti-slavery and anti-colonial efforts (Al- Bulushi, 2022) (National Center for Institutional Diversity, 2019).

Furthermore, the theory of racial capitalism is described as the actions of white people, within powerful institutions historically and presently acquiring welfare and natural resources through the exploitation of people and nation states viewed as inferior and unworthy of equitable treatment (Kelley, 2017). Understanding racial capitalism is therefore mandatory in understanding the ongoing exploitation of the DRC. The acts of the western world, and their view of Black Congolese people within the DRC as dispensable is a direct progression of the racial capitalist regime. These acts of exploitation on behalf of the western world will negatively impact people within the DRC as the increased mining of their lands will only strengthen the consequences they face from the climate crisis.

Cobalt Mining Fuelled by Racial Capitalism within the DRC

The western world still has a colonial grip on the DRC which is seen through increased cobalt mining within the state throughout the past decade. Cobalt is a mineral that is used in many technologies today; 5- 10 grams of cobalt is used to produce our smartphones, 1 ounce is within our laptops and 10-20 grams within electric vehicles (Frankel, 2016). As of recent studies, over 60% of the world's cobalt resources are found within the DRC, making it yet again a highly populated extraction site on behalf of capitalist power hungry institutions (Lawson, 2021) (Frankel, 2016). The qualities of these cobalt mines however are below any suitable human living and working standard and contribute to the degradation of Black lives within the DRC. These mining patterns degrade the environment and place the population at a higher risk to the exposures of climate and environmental change in the future. Over 255 thousand Congolese people mine for cobalt daily, with over 15% of these miners being children (Lawson, 2021). Within these mines workers are being paid from 0-2 dollars per day in search of cobalt to maintain the demand of large tech companies such as Apple, LG, and Samsung (Lawson, 2021). The lives of these workers ranging in all ages are seen as dispensable at the hands of the western corporate machine, instead what is prioritized is that the demand for cobalt is met, regardless of any fatalities and human rights violations that accompany the task.

After a visit to one of the largest cobalt mines within the DRC, The Washington Post stated that over 100,000 employees mine with their hands rather than with adequate mining tools (Frankel, 2016). Furthermore, cases of death and injury are extremely prominent and normalized within these sites, depicting how insignificant the capitalist regime views these bodies to be (Frankel, 2016). Cobalt is the most expensive mineral within lithium- ion batteries which are needed to produce the majority of electric vehicles on the market. In the past 5 years the demand for cobalt as well as lithium-ion batteries has tripled- this exponential increase is said to be due to the demand for electric vehicles within nations such as Canada and the United States (Frankel, 2016). The demand for Cobalt by the year 2025 is said to increase to over 75000 tonnes, leading to increased patterns of extractivism within the mineral rich state of the DRC and the further exploitation of their people through inhumane employment processes (Frankel, 2016) (Lawson, 2021) (Ojewale, 2022).

The world depends on Congo for its cobalt demand, so therefore the foreseeable future entails the continuous exploitation of the land and people within the DRC allowing for the ideals of racial capitalism to thrive. The racial capitalist patterns of cobalt extraction may furthermore harm those within the DRC as well as their biodiversity and planetary wellness (Lawson, 2021). The extraction of cobalt within the DRC leads to increased global warming through its production process.The cobalt mining processes consists of clearing land, building roads and importing grand machines which emit toxins into the air, causing harm to the environment (Lawson, 2021) (Frankel, 2016). The production of cobalt extraction emits high levels of carbon dioxide and nitrogen dioxide into the atmosphere which greatly contribute to Africa's global emissions stats rather than on behalf of the racial capitalist corporations who are doing the digging (Lawson, 2016). With an increase of carbon and nitrogen dioxide in the atmosphere, the people within the DRC are subject to mass food and water insecurity, mass natural disaster occurrences and rising temperature levels (Plant with Purpose, n.d.). Overall, it becomes clear that patterns of racial capitalism within the DRC are continuous under the neoliberal regime. The working conditions of these mines are inhumane and clearly violate the Universal Declaration of Human Rights and depict that the degradation of Black Lives and Black Radical Tradition is necessary under the capitalist regime; furthermore, proving that race is inseparable from capitalism. On that note, it becomes seemingly evident that in the face of climate and environmental change, the most vulnerable populations will suffer through the increased extraction and exploitation of their land on behalf of the powerful institutions who deem them as insignificant.

Concluding Thoughts

When viewing the case of the DRC, theories such as extractivism and racial capitalism offer answers to the questions surrounding future climate and environmental changes and how these changes may impact the longstanding history and current exploitation of the land. The case of the AVZ Manono project depicts acts of extractivism upon the DRC people and land, following in the colonial history of exploitation and contributing to the perceived inferiority of the state on behalf of the western world. As capitalism strengthens, the treatment of Black people worsens, as proven through the theory of racial capitalism. Therefore, the projects of extractivism within the DRC that view Black lives as dispensable grows as well. With increased mineral extraction comes the increased risk of these marginal communities facing the brunt of climate change consequences at the hands of the capitalist regime. Questions surrounding the future of our planet in relation to changing climate and environment are uncertain, however through using fact-based research and viewing the histories and current trends of exploitation within periphery states, one may begin to understand how nations such as the DRC will be impacted at a greater extent than their western counterparts to the consequences of climate change.

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The Role of Indigenous-Led Environmental Assessment in Environmental Justice and Rejecting the State

Clover Chen

Both Indigenous nations and the Canadian state have legal protocols to conduct assessments of the environmental consequences of extractive industry projects. Indeed, the Trans Mountain Expansion (TMEX) proposal to expand the existing Trans Mountain pipeline and tanker system induced impact assessments by both the Canadian National Energy Board (NEB) and the Tseil-Waututh Nation (TWN). TWN's approach to environmental assessment is founded in a worldview that contrasts with the Canadian state's approach. I will argue that the TWN assessment is an important precedent for Indigenous nations exercising rights related to environmental justice, sustainable self-determination, and legal plurality. In this paper, I will first define environmental impact assessments and summarize the case conflict of the Trans Mountain proposal. I will next identify and explain the implications of the different worldviews present in this case conflict. Finally, I will discuss how the TWN assessment plays a crucial role in exercising rights for TWN and other Indigenous nations.

An impact assessment (IA), or environmental assessment (EA), are interchangeable terms that describe the process of assessing the risk of a proposed project's potential environmental impact on the local natural environment and communities (Arsenault et al., 2019, 120). EAs prescribe a recommendation to proceed with a project or not based on whether the project's potential environmental harm exceeds a predefined threshold (Stewart & Harding, 2021, 6). In 1972, Canada mandated environmental assessments and has since acknowledged the importance of Indigenous participation in these processes (Arsenault et al., 2019, 121). Specifically, Section 35 of the 1892 Constitution Act of Canada provides the legal foundation for the obligation to consult with and accommodate Indigenous peoples when planning any activities that may impact Indigenous lands (121).

Tseil-Waututh Nation (TWN) is a distinct Coast Salish nation (Assessment, 2015, 10). They have lived and occupied their unceded territory for time immemorial, including the Burrard Inlet and surrounding waters (10). In 2009, TWN adopted a Stewardship Policy that is "an expression of Tsleil-Waututh jurisdiction and law" and mandates a review of any proposed development in TWN territory (6). The review helps TWN make an informed choice about consenting or withholding support (6). In December 2013, Trans Mountain submitted its TMEX proposal to the NEB for a risk assessment. Trans Mountain, a subsidiary under Kinder Morgan Canada, proposed the expansion because the additional infrastructure provides added storage, two new pipelines, and an expanded dock complex to move nearly triple the volume and frequency of crude oil through the pipelines and tanker exports (Assessment, 2015, 43). The added infrastructure would increase economic profits and expand Canadian oil exports to new international markets (Stewart & Harding, 2021, 9). The proposed tanker traffic would move through the Burrard Inlet and the last 28 km of the expanded pipeline are in TWN territory and are thus subjected to TWN's Stewardship Policy (Clogg et al., 2016, 12).

In May 2015, TWN published its Assessment of the Trans Mountain Pipeline and Tanker Expansion Proposal. The document was the first of its kind, including TWN's traditional knowledge and two decades of TWN's work to restore the Burrard Inlet (Stewart & Harding, 2021, 16). The TWN assessment concluded the potential harm was too great and withheld support from the TMEX proposal. At the time, the NEB was the

and withheld support from the TMEX proposal. At the time, the NEB was the federal agency responsible for regulating pipelines, and so carried out the IA for Canada, operating under the 2012 Canadian Environmental Assessment Act mandate (Stewart & Harding, 2021, 8). In May 2016, the NEB's IA report concluded that the TMEX project was "not likely to cause significant adverse environmental effects" and approved the project construction, directly opposing the TWN's Assessment (NEB 2016, xii). In May 2018, the Canadian Federal government bought the TMEX from Kinder Morgan to resume the construction that was halted from the court challenges and political opposition (Thurton, 2022). TWN continued to resist and in August 2018, TWN legally challenged the TMEX in Tseleil Nation v. Canada (Attorney General) and forced the NEB to conduct a second IA (Stewart & Harding, 2021, 9). In February 2019, the NEB published its Reconsideration Report, nearly identical to their first IA but with the added consideration of the impacts of increased shipping traffic (9). While the NEB's new conclusion stated that the project was indeed likely to cause significant environmental damage, it once again approved the project because of the economic benefits and mitigation measures of the TMEX project (9).

Before I begin my analysis of worldviews present in the environmental assessments and the case conflict, I want to acknowledge my positionality as a non-Indigenous settler living in Tkaronto. In the context of Indigenous environmental assessment and the TMEX case conflict, my personal experiences limit my knowledge and understanding of how extractive industries can impact ways of life for Indigenous peoples, specifically those from TWN. I have not been to the region affected and have not cultivated relationships with the people or the land there. Thus, I must rely on and am grateful to learn from Indigenous scholars and TWN's documented legal and cosmological principles for my following analysis.

A worldview is a particular position that informs how people make sense of their world and their meaning and place in it. An environmental worldview is an extension of these fundamental beliefs and shapes the relationship between people and the natural world. Environmental worldviews are founded on belief systems that are represented in legal orders and their legislative frameworks. Within the TMEX case conflict, TWN represents an Indigenous environmental worldview that conflicts with the Western environmental worldview. The Western worldview is characteristic of extractive industry corporations, such as Kinder Morgan, and the Canadian government. It is clear, based on the TMEX proposal and Canada's approach to IA, that the Western environmental worldview understands the natural world through a capitalist perspective. In this worldview, natural resources are something to be extracted for profit, despite the potential for environmental damage. Even though EA is required by Canadian law, its ultimate goal is to mitigate risks in order to proceed with extractive development (Bernauer, 2020, 491).

Although there are many distinct Indigenous nations, they share a common environmental worldview that values reciprocal relationships and the protection of the natural world (Assessment, 2015, 53). In the specific case of TWN and their assessment, Coast Salish stories, teachings, and ancestral laws are the worldview foundation that extends into legal principles and protocols (52). The Assessment engages with three TWN legal principles. First, the sacred obligation of TWN to "protect, defend, and steward" the land (53). Second, the obligation to maintain and restore cultural, spiritual, and economic conditions for TWN to thrive (54). Third, there are consequences for individuals and the broader nation for failing to be "highly responsible" toward the land (55). It is thus clear that the conflict between the three parties in the TMEX case study comes from the fundamental differences in environmental

worldviews, and by extension, their impact assessments. While the NEB's IA aims to mitigate risk and compromise between corporate interests and environmental harms, TWN's approach aims to stop the project if it violates harm thresholds. The distinct IAs conducted by TWN and Canada's NEB are founded on different legal principles and policies, different relative aims, and different founding values.

These differences between the two environmental worldviews do not exist in a vacuum. Instead, the legal, economic, and social structures of capitalism and colonialism reinforce Western worldviews and minimize Indigenous worldviews. These factors create a power imbalance between TWN and the extractive industries allied with the Canadian government. In practice, colonial and capitalist social relationships develop through Western EA practices in Canada (Bernauer, 2020, 490). Scholars critique the EA process for focusing on risk mitigation rather than empowering the affected Indigenous nations with a veto to discard projects with unacceptable environmental risk (Bernauer, 2020, 499). In that sense, EA is intimately connected to and biased toward extractive industries (490). Resource extraction projects increasingly use impact and benefit agreements that formalize relationships between Indigenous communities and corporations and award certain benefits to Indigenous communities (Dylan et al., 2013, 62). While this fulfills the duty to consult and accommodate, the EA process is embedded within unequal power relations and legitimizes capitalist extraction through compromising environmental well-being for community benefits (Bernauer, 2020, 491). However, TWN's sacred legal obligations, ancestral teaching, and wealth of land-based knowledge from generations of knowledge transmission reinforce the Indigenous environmental worldview and delegitimizes the Western extractivist worldview. The TWN's Assessment allows for a holistic assessment of the project, including biophysical impacts, such as oil spill risk and management, but also the cultural, spiritual, and economic impacts of the project (Clogg et al., 2016, 13). In that sense, the scope of TWN's IA goes beyond the scope of a Western IA model. Moreover, the TWN's Assessment as a collection of this body of knowledge has broader significance concerning environmental justice, sustainable self-determination, and legal plurality.

Environmental justice is a social movement to address the inequitable distribution of environmental burdens and benefits due to systemic structures such as racism and colonialism. The TWN's Assessment conclusion and process maintain environmental justice by advocating for the people and land the TMEX will disproportionately impact. They also allow the TWN community to speak for themselves rather than have the Canadian government speak and draw conclusions for them. Sustainable self-determination is an Indigenous movement that seeks to enact rights through a combination of individual and community-based responsibility, rather than seeking recognition and rights from the state (Corntassel & Bryce, 2012, 160). The sustainability aspect of the movement comes from its goals to transmit knowledge and cultural practices to future generations and aims to honour longstanding reciprocal relationships with the natural world (156). The TWN's Assessment is a body of knowledge that is founded on and includes traditional knowledge and land-based teachings from TWN. The process of conducting the Assessment and the withholding of consent is an exercise of the sacred obligation and jurisdiction of the TWN, as expressed through the Stewardship Policy. In other words, the TWN's Assessment enacts self-determined and responsibility-based rights independent from the sovereignty of the Canadian state. The TWN's Assessment is thus also an example of how a plurality of legal orders can co-exist and equally inform development decisions in a partnership between Canada and Indigenous nations. Yet the current power imbalance in EA processes undermines this potential legal plurality and partnership. In the TMEX case, the NEB subsumed the TWN Assessment under the NEB evidence (Baptiste, 2022). By doing so, they did not recognize TWN's governance authority over the matter and did not weigh it into their own decision (Baptiste, 2022). While the TWN's Assessment is groundbreaking in itself as a process and exercise of sovereignty, the Canadian government still must be held responsible for putting its laws and policies that recognise Indigenous sovereign rights into practice.

In summary, the case study of the TMEX proposal showcases two contrasting environmental worldviews. Indigenous and Western worldviews and approaches to EA clash because of fundamental differences but also systemic power structures that reinforce colonial and capitalist legacies. Although the TWN's Assessment is a beacon of hope for environmental justice, sustainable self-determination, and the possibility of legal plurality, there is more progress needed for the Canadian government to uphold Indigenous sovereign rights in EA contexts and in general.

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Under an Illusion: Argentinian Presidents and their Justifications for Extraction

Abril Masola

Regardless of increasing scientific evidence that depicts the environmental harms of extracting fossil fuels, Argentinian Presidents continue to allow fracking no matter where in the political spectrum they stand. Argentinian Presidents have continuously defended fracking under the baseless view that it will lead to economic prosperity. In this essay, I argue that Argentinian Presidents employ the "development illusion" to pose fracking projects, such as Vaca Muerta, as beneficial to all, despite the fact that local communities have been hindered socio-economically by fracking. Governments do not encourage extraction for the sake of the country, but to continue generating profits for the elite and foreign companies. Although the Argentinian government promotes fracking, local communities (the people of Añelo, the indigenous Mapuche, and Mar del Plata citizens) do not fall for the "development illusion." To study the response against extraction, this essay will end with an analysis on why, and how, the people of Mar del Plata oppose an offshore drilling project that is currently being planned.

Argentina: The Next Oil Superpower?

For the sake of clarity, a brief view into Argentina's political parties is necessary. The last two decades of Argentina have been mainly characterized by left-wing Presidents of the Justicialist Party, also known as Peronistas, such as both Kirchner Presidents from 2003-2015. Argentina had a short-lived political shift to the right when President Macri (2015-2019) came into power with the Republican Proposal party. After Macri, Argentina was once again swept under the power of the Peronistas, with current President Fernández. Despite these shifts, extractivism is the one topic that can unite the seemingly politically opposite parties.

Argentina's Presidents of the last twenty years contend that Argentina is simply not making as much money as it could from its natural resources. The country is seen as such a natural resource landmine that ex-President Cristina Kirchner once stated that the country is not making enough profits through extraction with the natural resources at its disposal (Delgado 2018, 104). This view of Argentina's land is extremely harmful, and seems to completely disregard the importance of maintaining the existence and quality of lands for the subsistence of those who depend on it, as well as extractivism's effects on the environment.

This essay asserts that Cristina, along with the other Argentinian Presidents of the last twenty years, justify extractivism under the "illusion desarrollista" (the development illusion). This illusion leads them to correlate extractivist practices like fracking with socioeconomic gains that will push the development of the country forward. The development illusion is a commonly-employed fallacy by Latin American governments to argue in favor of extractivism as a measure to "close the gaps" between the economic development of the Global North with the South (Svampa 2019, 29). State agents, specifically Presidents in power, promote both the consumption and extraction of oil as a necessary resource "for social and economic development" (Huizar 2019, 7). Presidents seemingly convinced themselves that extractivism will eventually lead to energy sovereignty, despite the fact that the nationally owned Yacimientos Petrolíferos Fiscales (YPF) has not been able to "supply the country with oil and natural gas on its own" (Bravo and Sbroviacca 2021, 61). Moreover, government's protection and pushing of oil extraction leads to the resource being understood as an "inalienable national treasure" that must be appreciated not only for its ability to generate profits but also

create jobs (Huizar 2019, 7).

Although extraction is viewed as highly efficient for developing economies, it may not be as effective at creating jobs and allowing profits to "trickle down" as governments may claim. The extractive sector's main winners, the elites who gain the profits and the governments who sell the land and resources, tend to use the creation of jobs as extraction's main justification (Farthing and Fabricant 2018, 9). However, the extractive sector is too capital-intensive and continuously searches for "cheaper labor and cheaper nature" in order to keep increasing profits (Riofrancos 2019). Due to this, extractive-heavy sectors like fracking and mining do not have sufficient "forward and backward linkages to other sectors" allowing it to generate employment consistently and with stability (Farthing and Fabricant 2018, 9.). Instead of providing jobs and benefiting the economy of the country whose land is being exploited, extractivist projects have been found to disrupt "local economies, destroy environments, and undermine local decision making" (ibid., 10). Nonetheless, Argentinian Presidents have been defending continuous fracking on the country's Neuquén Basin, specifically the Vaca Muerta project for decades.

Beating the Dead Cow: Fracking in Vaca Muerta

Since its discovery in 2010, Argentinian Presidents have been explicitly encouraging further extraction and foreign investment for oil drilling in the Vaca Muerta ("Dead Cow") Formation located in the Neuquén Basin. Around 38% of the gas and 60% of the oil reserves of Argentina are in Vaca Muerta (Gutman 2017). At the hands of the state-owned YPF and the help of U.S. company Chevron, commercial extraction began in 2013 (ibid.). Vaca Muerta was one of President Cristina Kirchner's strategies for "establishing new policies for the domestic hydrocarbon market" along with the nationalization of the YPF (Delgado 2018, 103). President Kirchener justified these changes in extractivist policy as the strategies that will transform Argentina economically (Gutman 2017). Ironically, President Kirchner once stated that Vaca Muerta will make everyone so rich from oil, that it should be renamed to "Vaca Viva" (living cow) (ibid.).

The Presidential justification of Vaca Muerta as positive for development continues after President Cristina, and with a political shift to the right, as her successor President Macri followed the same logic of the development illusion. When President Macri pushed for investment from foreign oil companies in the U.S. in 2017, he stated that Vaca Muerta itself will change "the country's energy future" with its "abundant, cheap, and exportable resources" (Gutman 2017). Politicians are capable of explaining fracking as absolutely necessary for economic development, with no say on how it will impact, or has impacted, the local and Indigenous populations. Macri failed to mention throughout his Presidency the environmental and social costs of extraction in Vaca Muerta. Essentially, Argentinian Presidents prioritize the profit of large corporations (and of the country's elite) over the safety and livelihoods of the people of Añelo and the Indigenous Mapuche.

The locals of Añelo, a town in the Neuquén Province where the infrastructure for the project is being developed, have been enduring the negative socioeconomic impacts of fracking in Vaca Muerta (Delgado 2018, 102). The livelihoods of the people of Añelo have been negatively affected as "they do not receive an equal share of the rents for this extraction" (ibid., 114). This results in an uneven distribution of the socioeconomic impacts of fracking, as Añelo's people deal with a population explosion from oil company employees that leads to an increase in prices, a flooding of large vehicles and machinery, and a higher chance of conflicts and insecurity (ibid., 116). The Argentinian government plays an active role in the fracking of Vaca Muerta through the state-owned YPF, by its joint venture agreements with foreign companies, and by justifying such extraction as beneficial to the community in which it takes place (ibid., 113-115). The experiences of the people of Añelo serve as proof that the development illusion is in fact a fallacy. If such an illusion were true, then the people of Añelo would have seen themselves and their community benefitting from the nearby fracking project, and not feel completely disregarded by their provincial and federal government. Añelo's experiences are not unique, as Delgado (2018) argues, instead it is just one of the many examples of rural communities that are deeply affected by fracking (111).

The experiences of the Indigenous Mapuche, who call Neuquén home, are yet another group that has not fallen for the development illusion pushed by the Argentinian government. As President Macri fell deeper into the development illusion, he proudly stated, to the people of the Neuquén Province no less, that Vaca Muerta will essentially make Argentina into a "world power" (Goñi 2019). Instead of making the community richer, and increasing economic development, members of the Mapuche community in Neuquén claim that Vaca Muerta has only brought "discrimination, dispossession, and health problems" (ibid.). With the mishandling of waste, and the constant pollution of the air and water, local communities like the Mapuche have been put in harm's way for the sake of (possible) profit. The Vaca Muerta project has "yet to prove its economic viability" as profits are drowned by transport and infrastructure issues (ibid.). Instead of investing in improving the conditions for the health of the Mapuche, or the economic factors that weaken the profitability of the project for the province, the Argentinian government chooses to keep encouraging foreign investment through "direct handouts to lure investors" (ibid.). For example, the government gave $6 billion (USD) in subsidies to foreign oil companies in 2018 (Keesler et.al. 2019, 30). The Argentinian government knows that oil is a resource of limited supply (Huizar 2019, 7), but it views short-term profit as more worthy of its time and resources than the lives of its people.

Mar del Plata, Mar del Petroleo

Currently in the coastal city of Mar del Plata, an offshore drilling project is being planned. I strongly contend that this extractive project is yet another example of the "progressive" Argentinian government falling for the development illusion, while the people do not. The main beneficiary of this extraction is Norwegian petroleum company Equinor and the state-owned YPF, as they partnered to drill in the CAN100 block in the North Argentinian Basin (Lago 2021). This block, off the coast of Mar del Plata, Bahzía Blanca, and Viedma, is around seventy-five times the size of Buenos Aires, the country's capital (ibid.). In 2019, the YPF was given exclusive access to CAN100, which is now open to a partnership with Equinor and likely Shell in the near future (ibid.). Ironically, these three companies worked together in Vaca Muerta, where Greenpeace Argentina announced an oil spill of about eighty-five thousand meters occurred (ibid.). In order to continue generating profits for themselves and for foreign companies, the Argentinian government justifies this project by personally guaranteeing its safety and by stating that it could potentially make Argentina the "next Brazil;" (Newberry Feb. 2022). This notion emphasizes the importance of economic development over social wellness, as Brazil may be economically rich, but abundant in socio-environmental issues. Nonetheless, the people of Mar del Plata have organized to amplify the project's potential safety hazards (Newberry Feb. 2022).

Greenpeace Argentina, along with local organizations like Surfrider Argentina and Fundación Patagonia Natural, have been representing the voice of Mar del Plata's

people, and mobilizing action against this drilling project. Mar del Plata citizens have rallied on the streets, with protests occurring on various weekends of January 2022. While the people marched, Greenpeace and the aforementioned corporations filed a class action environmental lawsuit for the approval of seismic exploration to be declared "unconstitutional, and null and void" (Colombo 2022). Mainly, the people of Mar del Plata found that the drilling project was not transparent enough about its potential dangers and safety hazards for marine life (ibid.). Since it is a coastal town, much of the people of Mar del Plata rely on maritime and tourism industries; thus, the potential of an oil spill is dangerous for more than its potential environmental impacts. The public demonstrations and protests in Mar del Plata and in many cities throughout the country did not happen in vain, as in February 2022, the Federal Court N2 in Mar del Plata ruled against the continuation of the oil exploration, until there is "an exhaustive review" of all its potential effects on the health of the Argentine Sea (ibid.). The example of Mar del Plata provides not only an example of the development illusion, as the government seems to convince itself that this project will lead to prosperity for all, but also as a positive instance where the voices of the local community were heard.

Conclusion

If the environmental or social impacts of fracking projects have been admitted by one of these Presidents, then it has been swiftly swept under the rug. The closest to an admission the Argentinian people have been given has been by current President Alberto Fernandez' presidential spokeswomen, Gabriel Cerruti, who has stated that "until we [Argentina] reach that moment when the world has renewable energies or more sustainable energies [...] gas will be the main source of energy" (Newberry Jan. 2022). Therefore, the government is conscious of the importance of transitioning into a less extractive economy, but has no likelihood to do so until the technology catches up, or in other words, until the sustainable technology is as profitable as oil is. Being in "a moment of transition" as Cerruti says, is simply not enough. Governments have extraction and economic development entangled to a degree that impedes such a transition from occurring. Essentially, the Argentinian government sees extraction "so central to development that it overrides any other concern; in other words, extractive activities seem to enjoy teleological primacy" (Arsel 2016, 881). Thus, like governments around the world, the Argentinian political left and right will continue to allow extraction under the illusion that it will eventually lead to development stable enough to eliminate pending economic crises.

The mutual agreement between the parties of the left and the right on extraction occurs all throughout the continent. As Svampa (2015) says, the Latin American Left and progressive populist governments justify extraction in the same way conservatives do, under the guise that social-environmental problems are "secondary or expendable in the light of the severe problems of poverty and exclusion" (70). Progressive governments try to justify extractive projects by pointing towards the ever-elusive notion of development. Governments cling to the justification that the state's accumulation of wealth will result in redistributions that benefit the whole country (ibid. 2015, 71). This does not mean that progress in anti-extractive policy is impossible as Buenos Aires and Entre Rios (Argentinian provinces) have passed local laws to prohibit further exploitation of natural resources (Alvarez 2016). Ultimately, Argentinian governments of the left and the right are guilty of continuing, and maintaining, the development illusion.

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Cultivating Conversation Through Climate Crisis Café

Mallory Furlong

On November 3rd, we watched a video in lecture that helped me to make sense of how I'm feeling. The video was titled We Are All at Sea featuring Astrida Neimanis. In the video, Astrida spoke about water, empathy, life, care, and the connection between humans and non-humans. There is a quote from that video that has stayed with me since I first watched it. She shared, "We are all bodies of water, with pumped-up vulnerabilities, leaking, sponging, sloshing, dripping, sipping. But these days, my body of water is mostly feeling like a liquid hot mess."1 This is what eco-anxiety feels like.

Eco-anxiety is a combination of eco, meaning "environment or habitat", and anxiety, meaning "a feeling of worry, nervousness, or unease". Together, they refer to the emotional response or powerlessness that one may feel when considering the current state or future of our world2. Eco-anxiety is not a mental disorder in the same way that Generalized Anxiety Disorder or Depression are, it is something that anyone can experience2. It can present itself as denial, burn out, grief, frustration, depression, hopelessness, and many other ways2. Over the summer, I conducted research on eco-anxiety alongside Professor Simon Appolloni and fellow student, Nolan Scharper. This research led us to one conclusion; while many students may experience eco-anxiety, they don't have a place to talk about it. For this reason, I created Climate Crisis Café.

Climate Crisis Café is a workshop that engages students in arts-therapy based exercises to discuss and manage their eco-anxiety. On Tuesday November 1st, I hosted a Climate Crisis Café for a handful of University of Toronto students, mostly from WGS273: Gender and Environmental (In)Justice. Seven people attended and we talked for over an hour while eating chocolate chip cookies and drinking tea. This workshop was the best one I have hosted so far.

Going into this workshop, I had prepared multiple exercises for us to do; however, we spent the whole time focussed on the first exercise, engaging in lively discussions from there. The first activity was inspired by a teacher on TikTok, known as Real Ms. P. She frequently asks her students to anonymously write down something that they are struggling with so that she can read it aloud to the class. The purpose of this exercise is to develop connections between participants, show support for one another, and remind participants that they are not alone in their feelings. I adopted this exercise and asked each participant to write down a few major eco-anxieties that they were experiencing so that I could share them with the group.

This exercise inspired a fruitful conversation that covered natural disasters, religion, environmental racism, ageism, reproduction, and politics. Our conversation flowed naturally, with each participant bringing up topics that they were struggling with. We were able to bring together ideas from class to talk about what is wrong with the world and how we feel about it. I could tell through the waves of conversation that these students had bottled up their feelings for a long time and only now had someone unscrewed their cap.

After talking at length about the prompts from the first exercise, I quickly realized that we had reached the end of our time together. I didn't want to leave them with these big emotions, which is something that I struggle with every time I host a Café. In past workshops I have taught students how to critically engage with negative climate change news, but this time I wanted to illustrate how our experience with eco-anxiety is reflected in The Fifth Season. I shared the following speech to wrap up our time together:

In The Fifth Season, there are three main groupings of people; stills, orogenes, and guardians. Stills, or humans, are people with

no orogenic abilities. Orogenes are like humans, but they have the gift of orogeny which allows them to manipulate both kinetic and thermal energy to create or negate seismic events4. And finally, the Guardians are those that track, protect, train, and watch over the orogenes4. They are also slightly evil, because they can kill orogenes if they so wish, but we will get into that in a second. In our world, the stills are your average person; they just go about life. Maybe they believe in climate change, maybe they don't, but they are scared of it and often live in ignorant bliss. The guardians are those non-believers of climate change that are in positions of power; maybe they're politicians, or big oil companies, or businessmen, or in the logging or energy sector. Regardless of their specific field, they have a lot of power over the stills, the orogenes, and the world. And finally, there are orogenes. We are orogenes. We are environmental actors, thinkers, protestors, and lovers. Our ability to empathize with the earth, feel it, listen to it, and speak on behalf of it is our super-power. Your super-power makes you a lot more dangerous than you give yourself credit for. So, while you may be feeling anxious, angry, overwhelmed, burnt out, sad, or hopeless, there are people out there that know that you have the power to change the world if you really wanted to. You are a threat to this society's very existence, and you should be proud of that.

This speech resulted in silence. This was not the response that I was anticipating, and it made me question whether people could relate to what I was saying. This speech explores many similarities between orogeny and eco-anxiety. First, it emphasizes that both orogeny and eco-anxiety are special gifts that only some members of the population have. Second, it explores the ways that both orogeny and eco-anxiety are shamed, burdened, and feared in both societies. Taking this idea one step further, this speech recognizes that both eco-anxiety and orogeny are a threat to our respective societies' existence. After taking the time to dissect these main themes, I realized why everybody was so silent – they hadn't thought of their eco-anxiety in this way before. They believed that their eco-anxiety was a bad thing. Even I thought that my eco-anxiety was a bad thing; hence why I described the experience as "a liquid hot mess" at the beginning of this essay.

We live in a society that paints emotions as a weakness. We hear messaging such as, "Women can't be leaders because they're too emotional," or "Real men don't cry," or "Save your tears for your pillow." This rhetoric is emphasized in our society, so of course we don't want to talk about our eco-anxiety. Even though eco-anxiety is a warranted response to the magnitude of anthropogenic climate change – it's still taboo. But what this archaic, patriarchal framework doesn't understand is that environmental justice work is fueled by emotion. This environmental field wouldn't even exist if people didn't empathize or care for the Earth.

I am reminded of a scene from chapter 22 of The Fifth Season where Alabaster and Syenite are reflecting on the history of orogenes. Throughout this conversation, Syenite is struggling to accept her orogeny as a positive thing. In response Alabaster says, "It's a gift if it makes us better. It's a curse if we let it destroy us. You decide that – not the instructors, or the Guardians, or anyone else." This is the main idea behind Climate Crisis Café; to challenge societal norms, process our eco-anxiety, and understand why it is so important. I hope that this workshop is a reminder for students to be kinder to themselves and recognize that – at the end of the day – their eco-anxiety is another representation of their empathy, care, frustration, and grief. It is an ethic of care.

Thinking back to the beginning of the semester, I was concerned that Climate Crisis Café wouldn't meet the requirements of an environmental justice event. After much reflection, I have realized that this type of workshop is exactly what environmental actors, thinkers, protestors, and lovers need.

We need a safe space to talk about our emotions, relate to one another, and remind each other that we are doing the right thing. How we take care of ourselves matters, and I hope that through this Climate Crisis Café I made even the smallest impact on how my colleagues manage and understand their eco-anxiety. Without such spaces, we are left to feel like a liquid hot mess, and we deserve better than that.

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The Sun Through The Window

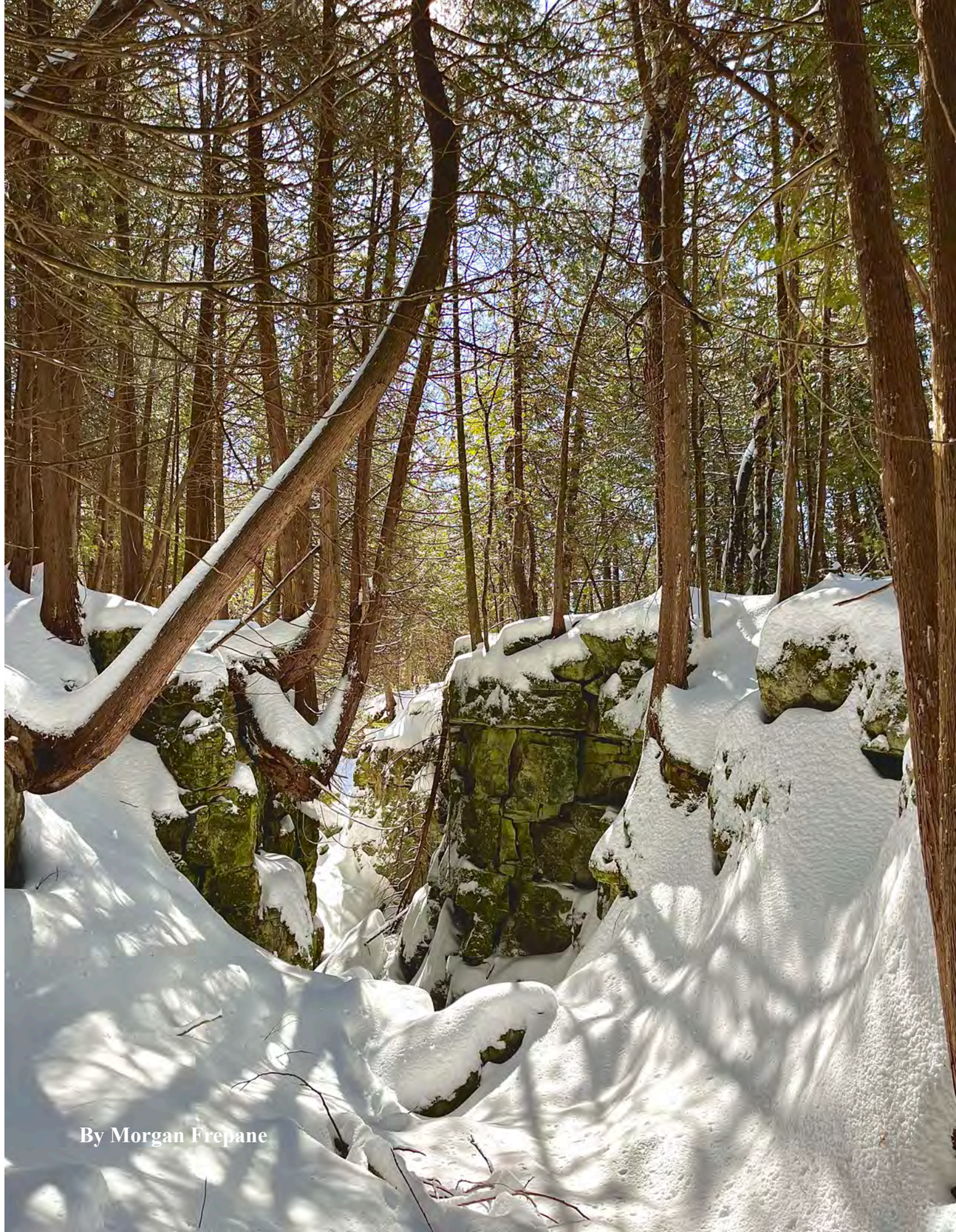
Morgan Frepane

In March of 2023 I was very lucky to have the opportunity to go on a remote camping trip in Northern Ontario with the University of Toronto Outdoors Club (UTOC). Myself along with twenty other University of Toronto Students went to the UTOC cabin in Southern Collingwood. This Cabin has no running water, electricity, heat, and cell reception can be difficult to obtain. We did not have the ability to study or to be online; this led to the twenty of us having to find ways to pass time. We went on many hikes and walks in the snow during the three days we were there. The sun decided to make an amazing appearance on Saturday while on a hike in the escarpments near the cabin. I have not felt a sun so bright since moving to Toronto. It was as if standing on the edge of the lookout point was something predetermined for me to do, to remind myself that nature is the strongest light in my life. The sun lasted for many hours after the hike; we decided that we were not done having fun in nature. We found sleds in the cabin's shed and decided to climb the tallest and steepest hill we could find. For the hour we were sledding, all of my worries were carried away, as if they too sped down the hill and got lost in the mounds of snow. Being in nature allowed me to experience joy that I thought I could only feel during childhood. The pure excitement over something so insignificant yet so extraordinary.

Once the sun began to set each night we would find our way indoors. Wondering what to do now, we simply began to talk to each other, sharing our beliefs, our cultures, our stories. It was a very inspiring thing, hearing about others' lives. By not having access to our phones, it forced us to interact as if the internet were never created in the first place. Some bonding over board games, some talks about hypothetical situations that led to philosophical debates, and finally the storytelling around a campfire while making smores. We all found ways to fit and work together to pass the time, as if we were the pieces of the puzzle that was being assembled on the floor of the living room.

On the third day I woke up quite early. The few of us that were awake watched the sunrise over the trees and simply sat in silence. We all were so deeply connected through this beautiful image in front of our eyes. The simplicity that the sun brought once again reinforced the reflection that was started the day before at the lookout point. I have never felt such clarity or heard such silence - even the birds knew not to make a sound.

This trip not only prompted the formation of connections between myself and those who were on the trip, but it also allowed for a reflective space. With much down time, I spent most of it sitting by the window looking out trying to figure out more about myself and where I want my life to go in respect to experiences like this one. How can I find myself in spaces like this more often? My reflection did not end with the trip. I have found that I have been more motivated to do work since arriving back in Toronto. I seem to reach for a novel that I've been meaning to read rather than my phone, or I am able to write for hours on end and still be able to focus. Maybe this is the work of deconstructing my own nature deficit disorder.



Endnotes

The following submissions come from a handful of students from the ENV411: Sustainability Thinking class taught by Professor Michael Classens. In their first assignment, students were asked to reflect on their academic career and write a one-page letter to someone who has significantly contributed to how they understand the world. These are some of those letters:

Dear Professor Chen,

After embarking on my first year at UofT in monotonous online courses, I entered my second year questioning my passion for learning about Earth's physical processes. Skeptically, I walked into your classroom for Introduction to Hydrology (GGR206), took out my paper and pencil, and, to my joyful surprise, began absorbing your knowledge-filled lectures like a sponge.

In GGR206, I began to see water as a source of a spiritual-like connection, flowing through just about all of Earth's components. By the end of this course, water, which I once saw only for drinking, swimming, and showering, had become an expansive and intricate compound, making Earth unique and multidimensional. Following this enlightening experience, I enrolled in your other Field Methods in Physical Geography (GGR390) course.

Through GGR390, which was my first in-person field course, you helped me understand climatology and hydrology at deeper depths. Your welcoming smile and passion for teaching in this course translated the 2D class structure of GGR206 into an integrated 3D learning experience.

Over a short time, you became a kind and wise mentor for me and posed as a beacon of light through turbulent times. Recently, I received the Robert Hunter Scholarship for academic achievement and co-curricular involvement in climatology. I cannot help but attribute part of my success to your passion for climatology and innovative course structure. I wish you the best in your future endeavors and will keep in touch as I apply to graduate school. Talk soon!

Sincerely,

Emmeline

Professor Scharper,

I perform the Loon call you taught our TrinOne cohort on Joker's Hill to make my little cousin laugh. This past October, I took a friend to watch the salmon run at the Humber River and chatted about salmon restoration efforts around the same place you brought us. And when I walk home from work, I am less afraid of navigating through the darkness because the Mourning Doves along the telephone lines accompany me. I try to observe my surroundings. I appreciate Toronto a bit more each day.

As I enter my final semester of undergrad, I reflect on David Orr's "What is Education For?" speech we read on the first day of class. In a society where many cannot look each other in the eye, that equates making a living to getting paid, and asserts that humans are simultaneously mightier than God and dirtier than scum; I have concluded that an environmental education must inspire hope. It demonstrates how to live well and that ultimately, we have never been, nor will we ever be alone. In TRN140Y, you challenged us to see with an open heart as we sauntered across Toronto in the spirit of Thoreau. We learned the legacy of the White Pine, made friends with the folks at Black Creek Community Farm, and became closer to our neighbours through the community service assignment, to name a few. TRN140Y taught me that learning extends beyond four walls, and that I am capable of being a kinder friend not only to my inner circle, but to the entire Earth community. We are all living stories, and we are responsible for sharing with, and learning from each other so that through our collective imagination our descendants will have a future.

All of this is to say, thank you. Thank you for providing me a glimpse of what education can, and must be.

Sincerely,

Olivia Rodrigo

Dear Professor Scharper,

In my ENV411 class we were asked to write a letter to someone who has made a significant contribution to our academic career. I immediately thought of you. It is hard to explain all the ways that you have impacted my life in less than 250 words. So, I'm going to tell the story of the first – and arguably the most significant – way that you impacted my academic career.

When I first started at UofT, I had no plans to study environmental science. After much deliberation, my friends convinced me to take ENV100 to fulfill one of our breadth requirements. I really didn't want to take that course, but I found myself in the bookstore buying your book, For Earth's Sake, as our class textbook. That book changed the trajectory of my academic career. There is one quote that called me to this field, and it states, "We are not asked whether we wish to live at this particular time – we are here. The inescapable is before us." That quote put everything into perspective for me. I just knew that this was my calling, and here I am. In a few months I will be graduating with my BSc in environmental science, and I am going on to pursue a MSc in Sustainability Management.

In reflecting on my time at UofT, I quite literally would not be here without you. So, thank you. I am forever grateful for you, your book, and your mentorship over the years.

Yours in gratitude, Mallory

Dear Professor Shelby Riskin,

Before I took your EEB255 class on conservation, I was lost on what I wanted to pursue and was experiencing severe imposter syndrome. However, you helped me find the drive and passion I needed to be in university. For example, when during your office hours you taught me about how conservation research has helped bring species back from the brink of extinction which in turn ignited a fiery passion within me. It made me understand the world not as a collection of resources for human use but a global community which is home to the most diverse ecosystems and species. It changed how I learn as whether I'm learning philosophy or economics; I learn with an ecological/sustainable worldview in mind. Regardless, I still battled with imposter syndrome as I was struggling to adapt to the fast-paced content and writing multiple assignments. However, when you noticed this and reached out one day by staying after class with me by providing me with writing resources, going over content again, and reminding me that I belong, it changed how I learn forever. I no longer feel ashamed asking for help and realize that university is what you make of it as there's no strict guideline of what you can be. Without your encouragement I would have never made it this far in university and would have never found my passion to continue on learning as so that one day I can give back to our earth.

Thank you,

Fizza.

A Labour of Love by Emily Hospedales