Getting to the Core of the Matter: A historical materialist study of the apple industry in Nova Scotia, 1605-1980

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Table of Contents

Abstract

The story of the apple in Nova Scotia between 1605 and 1980 shows how agriculture shapes our world, and our relationship to that world. This paper reviews the failure of the apple industry, and provides insights on how to go forward. Agricultural failure, defined as a large contraction in production, is as traumatic for a rural area as a major plant shutdown is for an urban area. Although agricultural failure may coincide with unexpected weather or environmental conditions, careful examination usually reveals broader structural problems at its root. This is certainly the case with the collapse of the Nova Scotia apple industry after World War II. Therefore, this paper asks the question: Why did the industry fail, despite significant geographic advantages and a promising early history? The apple was a formative and integral part of this province's development. As such, when guided by a historical materialist methodology, the apple opens a broader discussion of historical developments, structures of power, and the human-nature relationship in Nova Scotia. This paper concludes with a discussion about positive options for the Nova Scotia apple industry based on a different set of values, a new approach to world markets, and a more sustainable relationship with nature.

Key words: agricultural failure, apple industry, Nova Scotia, food regime theory, historical materialism

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Introduction

In November 2013, Heinz announced that in spring 2014 it would be closing its Ketchup factory in Leamington, Ontario. At once, people thought the closure would spell the failure of the tomato industry in Leamington (Ligaya, 2013). The trauma of this recent crop failure can be used to illustrate many of the points that will be made about the failure of the apple industry in Nova Scotia.

In some ways the Heinz closure seemed sudden, but in retrospect it was not unprecedented. There had been threats of a factory closure in the 1980s. The North American Free Trade Agreement forced Heinz to compete in the global market. Heinz told farmers in Leamington that they needed to get their costs down or the factory would have to move (Marlow, 2013). In order to cut costs and increase yields, Leamington farmers invested lots of money in tomato-specific machinery and irrigation technology. They did this under the belief that they would have Heinz as a long-term purchaser that would make the capital investments for the new technologies worthwhile (Marlow, 2013). Now that the Heinz factory is shutting down, many farmers will no longer be able to make a living from tomato farming, and the expensive tomato-specific machinery will be rendered useless.

The Heinz closure not only affects the economy. According to many citizens of Leamington, tomatoes were in their soil, but also in their blood (Marlow, 2013). Leamington calls itself the tomato capital of the country, has a giant welcome tomato in its downtown, and the people gather together every year for a community tomato festival (Leamington Tomato Festival, 2013). The tomato is ingrained in the culture in Leamington. Even though the town has other successful agricultural products and will most likely survive the Heinz closure, the Mayor of Leamington, John Patterson, said everyone is “heartbroken” over the closure (Marlow, 2013). This illustrates just how integral one crop can be to a town’s culture and self-identity.

The Heinz factory was established in 1909 and currently employs about 740 people who will be out of work when the plant shuts down in the spring of 2014 (Ligaya, 2013). Because of the enormity of the plant, Leamington has become a classic one-industry town where a large portion of the region has oriented itself to tomato production. The plant not only created jobs

for its workers, but also for farmers growing tomatoes, and local trucking companies that transport the tomatoes and the ketchup (Marlow, 2013).

Unfortunately, this situation is not unique.[1] There are many examples of agricultural failure in important commodity crops in Canada. The case of Leamington tomatoes presents a situation where agricultural failure is caused not by a biological disease, but solely because of market pressures and an over-reliance on one consumer. For this study, agricultural failure will be defined as a large contraction in the production of a crop, whether it is because of environmental causes or a decrease in market, or a combination of both, that lead to persistent and significant economic damage in a region.

Sometimes it is only when something disappears that we realize how important it is. Farming can appear to be a rather banal, albeit necessary, part of human existence. However, farming is an activity that is deeply connected with human labour, the environment, and economic realities. Agricultural failures, the subject of this study, are traumatic, but also revealing. They force people to reconsider the path they were on and can provide insight into relationships of power, and the connections between culture, economics, and the environment. This study will examine the development and failure of the Nova Scotia apple industry in order to elucidate the relationship between culture, economics, the environment, and agricultural failure.

Like in Leamington, farming has always been one of Nova Scotia's backbone industries and has made vital contributions to the province's economy, society, and culture (Sooksom, 2010). The apple is a formative and integral part of this province, specifically in the region of the Annapolis Valley. Therefore, this study examines the question: Why did the once-promising Nova Scotia apple industry eventually fail, despite significant geographic advantages and a promising early history?

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[1] There are many famous examples of agricultural failure caused by internal and external influences, or a combination of the two. Please see:
Hogendom, J. & Scott, K. (1981). The East African groundnut scheme: Lessons of large-scale agricultural failure. *African Economic History*, *10*, 81-115.
Donnelly, James. (2008). *The great Irish potato famine.* England: The History Press.
Worster, Donald. (2004). *Dust bowl: The southern plains in the 1930s* (2nd ed.). England: Oxford University Press.

To answer this question, this study surveys the literature on agricultural failure, single-crop histories, and food regime theory in order to contextualize the particular situation of the apple in Nova Scotia. It then examines three important moments in the history of the apple in Nova Scotia: the displacement of the Mi'kmaq people and the use of the apple as a settlement tool by the French and the English (1605-1770), the apple boom and how it brought Nova Scotia to the world (1849-1933), and the collapse of the apple market and attempts to hold on (1939-1980). The conclusion briefly discusses recent innovations in the Nova Scotia apple industry and how it has responded to the failure. The environmental, economic, political, and social factors are integrated into an explanation of each historic period.

This history is evaluated within the broadly defined theoretical framework of historical materialism. Historical materialism is a theory of historical development articulated by Karl Marx. Scholars debate what constitutes true historical materialism. In this study it is defined as the understanding that material realities and the way humans transform material realities (i.e. modes of production) are functionally connected to how history, culture, ideology, politics, and social norms play out in the human sphere (Habermas, 1975; Levine & Sober, 1985). It is crucial to emphasize the dialectical relationship between the environmental and social variables that is a tenet of historical materialism. Arguably, the human-nature dichotomy is the biggest barrier we face in achieving sustainability as a human species. Most people struggle to understand just how intertwined humanity is with our material reality. Through the use of a historical materialist approach, this study hopes to reduce this dangerous and fallacious dichotomy and give importance to environmental factors often forgotten in historical narratives.

Due to the apple's prominence in Nova Scotia, there have been a number of other studies of the apple in Nova Scotia.[2] However, none of them use a historical materialist lens, which politicizes instead of describes history, and specifically highlights the relationship between humans and the environment.[3] On a broader level, this study contributes to the

[2] For more publications about the apple in Nova Scotia please see:
Conrad, Margaret. (1980). Apple blossom time in the Annapolis Valley 1880-1957. *Acadiensis, 9,* (2), 14-39.
Hutten, Anne. (1981). *Valley gold: The story of the apple industry in Nova Scotia*. Halifax: Petheric Press.
Hatchard, Keith. (1980). *Apples in the Barrel*. Hantsport: Lancelot Press.

[3] This study is only a cursory overview of the apple in Nova Scotia. Owing to the scope of this study, aspects have been left out and therefore the topic remains open for future in-depth study.

literature on agricultural failure, and the potential dangers of adopting high-input, high-yield, monoculture agriculture. It is widely held among academics in the field of sustainability, and a growing number of concerned citizens, that our current food system is problematic from both an environmental and equity standpoint.[4] From a farmer's perspective, a reliance on one crop in the contemporary volatile and globalized food market means the farmer is in a precarious position. Although agriculture is seen as a mundane activity, it can reveal a lot about the world we live in; in fact, its association with everyday life is what allows it to be so revealing. This is especially true of agricultural failure.

[4] It is beyond the scope of this study to discuss these claims in detail. Please see the following sources for more:
Sage, Colin. (2011). *Environment and food*. United States: Routledge.
Roberts. Wayne. (2013). The no-nonsense guide to world food (2nd ed.). Toronto: Between the Lines.

Literature Review

This literature review begins by analyzing two influential one-crop histories to demonstrate the ways in which the study of a single crop can be revealing of broader phenomena. Two agricultural failures are described in order to identify important themes to address when looking at the apple in Nova Scotia. Lastly, the literature review will introduce historical materialism and describe how it will be applied to the situation of the apple in Nova Scotia.

One crop histories

Kurlansky's *Cod: A biography of the fish that changed the world* (1997) and Sidney Mintz's *Sweetness and Power* (1986) are two seminal one crop books that examine the relationship between an important crop and historical development. These two books provide examples of specific variables and themes to focus on in the study of the apple in Nova Scotia. They inform the multi-faceted approach of this study by combining history with an inquiry into the relationship between modes of production, markets, technology, society, political phenomenon, and environmental realities.

Kurlansky's *Cod* is stylistically interesting because it focuses on narrative, rather than following a strict analytical framework. Despite the narrative style, Kurlansky discusses many important issues. He focuses on both the contingency of history and how history can be shaped by one species of fish. He explains the biological factors that made cod the perfect commercial fish—easy to catch and stores well. His narrative follows cod as its availability allows regions to gain commercial power, and how changing technologies and policies effected the way cod was caught and traded. Efficient fishing technologies led to over-consumption of cod which then caused the collapse of the cod fisheries in Newfoundland. At the end of the book, Kurlansky explicitly states a view that had been tacitly presented throughout the history of cod. Humans want to see themselves as separate from nature and evolution, but we are not. Kurlansky warns us to remain humble, recognize that evolution works on the human species too, and that "what works best in nature does not always appeal to us" (Kurlansky, 1997, p.204). He argues that we

influence nature, but that we also rely on nature to live and sometimes nature, whether because of us or in spite of us, acts in a way that does not benefit humanity.

Kurlansky emphasizes how both biological and technical factors can have wide-reaching effects. The biological characteristic of the fish as well as its natural environment have a role in determining which fish are caught and which regions of the globe gain wealth and power. Boat refrigeration technology allowed people to spend more time on the ocean which meant that fisherpeople spent less time on shore with their family and friends. Improved fishing technologies which allowed mass amounts of fish to be caught were both a part of the success of the fish, but also led to its collapse. Usually technology is associated with success in human evolution, but as the case of cod shows, technological advance can be a double-edged sword.

Kurlansky's book provides important themes to look for in the case of the apple industry in Nova Scotia. It reveals the potential role of technology in agricultural failure. Therefore this study of the apple in Nova Scotia asks how technological advancements in the apple industry may have dashed long-term sustainability for short term gains. This study also examines the role of over-production in the apple industry. Apples, unlike fish, are cultivated and do not have a natural limit, other than the amount of available space for orchards. Even though apples cannot be over-harvested, they can be over-produced past market saturation, which can also be negative.

Ultimately, Kurlansky forces the reader to rethink how humans see ourselves in the world and how we relate to the environment. We have to remember that we are animals too and just as much a part of nature and vulnerable to the whims of evolution as any other species. This study will further the discussion about the relationship between humans and the environment through the application of a historical materialist lens on the case of the apple in Nova Scotia.

Mintz's *Sweetness and Power* focuses on the relationship between the production and consumption of sugar. He asks questions such as how do people become consumers, what is the relationship between colonies and the power they provide for, how do new technologies and processing techniques create change, and what drives the market pressures of supply and demand? For Mintz, the social history of food is seen as an important part of understanding the

anthropology of modern life. Humans create social structures and endow things with meaning, but these "social phenomena are by their nature historical" (Mintz, 1986, p.xxx).

Mintz uses sugar to investigate colonialism and relations of power between Europe and Africa. He also examines how labour is affected by changes in technology. Modes of production and the availability of a food commodity impact which classes have access to sugar. In the 17th century, sugar was an elite product for the nobility and a symbol of high social and economic standing. By the 20th century, it had become a staple of the working class diet. Sugar was an economic driver: it contributed to the economy through taxes, slave grown sugar created surplus capital and allowed for industrial developments in Britain, and it served as a cheap fuel for the factory workers in Britain. Through his anthropological and historical survey of sugar, Mintz reveals its connections to economics, politics, culture, and society.

Mintz is a classical historical materialist author, yet he places a large emphasis on culture. This shows the intimate connection between the socio-economic realm and that of culture. It is interesting to see how, in the context of food, money and power often seem to drive policy, rather than a desire to nourish eaters and produce healthy citizens. In the case of sugar, economic imperatives led to the horror of the slave trade. Although the apple economy of Nova Scotia was not powered by slaves, Mintz's book brings out the importance of examining how the primacy of money can lead to unwise state and policy decisions.

Both sugar and the apple are sweet and thus alluring products. The sweet taste of sugar hides disturbing power and social relations embedded in colonial exploitation. The history of the apple is also one of colonial expansion for a delicious commodity crop. European settlers in Nova Scotia grew apples on land they stole from the Mi'kmaq people. Both the slave trade and disenfranchisement of aboriginal people have led to cultural wounds and entrenched oppression.

Agricultural Failure

Before examining the failure of the apple industry in Nova Scotia, it is necessary to establish that looking at agricultural failure is a legitimate way to gain access to an intersectional understanding of history. As Matthew Schnurr argues, studies of agricultural

failure can reveal as many things about the intersections of nature, power, and politics as can studies of agricultural success. Despite this, the topic of agricultural failure gets much less attention (Schnurr, 2013). For the purposes of this study, agricultural failure is defined as a large contraction in the production of a crop. Two case studies of agricultural failure are examined below to elucidate this concept.

Schnurr's (2013) "Cotton as calamitous commodity" is the story of repeated cotton failure in Natal and Zululand, Africa. It shows how colonial agriculture fails because colonizers do not understand the specific growing conditions. However, even agricultural failure has power to structurally change both the political and environmental landscape and can be used as a vehicle for colonialism.

Schnurr's paper is one of "historical amnesia" (Schnurr, 2013, p.1). It chronicles three failed attempts of cotton production in Africa, encouraged by British colonizers. In 1847, Joseph Charles Byrne started to promote British emigration to Natal, Africa, for the purpose of cotton cultivation. In the 1860s, Theophilus Shepstone encouraged cotton cultivation among Africans in Natal. He used this as a way to increase administrative policy and further his vision of native-settler relations. He wanted to separate Africans from settlers and reaffirm tribal hierarchies except with his magistrates in charge. In the early 1900s, on the suggestion of William Scherffius, cotton cultivation shifted to Zululand, which was thought to have a better climate for cotton. This provided an opportunity for Europeans to dispossess Zulu farmers of their land under the guise of agricultural expansion[5].

Schnurr's paper highlights the ways in which colonial agriculture, even when it fails, can have large impacts on colonized lands. Despite repeated failure, the cultivation of cotton brought about many structural changes. Byrne encouraged British people to move to Natal. They started complaining right away and realized that the growing conditions were not adequate for cotton farming. Bryne's plan of settlement failed because of the difference between his dream and the environmental realities. However, despite the failure of cotton,

[5] For a full account of the history of cotton in Natal and Zululand please see:
Schnurr, Matthew. (2008). *Lowveld cotton: A political ecology of agricultural failure in Natal and Zululand, 1844-1948*. (Ph.D. Thesis.) University of British Columbia.

many of these settlers remained in Natal, increasing settler presence and solidifying Natal's position as a white outpost.

Shepstone was the creator of Natal's native administration policy. While he held this job, Natal received many refugees from other areas in Africa. To deal with this influx of people, Shepstone developed a method of centralized control, which separated Africans from settlers and put British magistrates in charge of tribal hierarchies. He thought that if Africans grew cotton their situation would improve. Farming also forced Africans to become stationary people and affirmed his goal of settler-African spatial segregation. At first, the cotton plantations had relative success, but then a cycle of drought combined with locusts crippled agricultural production. Again, the environmental realities are an important force behind the failure of cotton.

Following the second environmental demise of cotton, Scherffius advised that the warmer climate of Zululand would be more suitable for the crop. This project was met with a few years of success, but it too ended in failure. People searched around for things to blame such as a shortage in skilled labour, inadequate transportation, and unfavourable markets. However, Schnurr argues that erratic precipitation and insect damage contributed most to this third failure.

During this brief period of cotton farming in Zululand, the British expropriated Zulu land and then forced the farmers to become labourers on land that was once theirs. Increased settler presence also legitimized further British administrative activity in what had once been an isolated area; increased agricultural production was a way to depoliticize the action of taking land and increasing administration.

There are three key learnings that can be drawn from Schnurr's piece that are instructive for the case of the apple industry in Nova Scotia. First, the study of agricultural failure is important and can be very revealing. Second, Schnurr highlights the role played by the environment in human history because "this series of agricultural failures was rooted in the environment and in human interactions with it" (Schnurr, 2013, p.28). Third, it highlights how agriculture can be used as a tool for settlement and colonization. Even though the repeated cotton attempts failed, they led to "increased settler presence, stronger delineation between

settler and African space, expanded state control into rural areas" (Schnurr, 2013, p.4). What is most generative in Schnurr's work is this parallel between colonial structure in Africa and Nova Scotia. Despite the difference in crop, they both follow the classic colonial narrative of establishing a crop in a colony to be sent to the homeland. They also both allow settlers to lay claim to land through the power of cultivation.

The story of tobacco in the South-Eastern United States weaves a different narrative, but one which arguably epitomizes failure — the crop had qualities that literally killed its customers, and eventually brought the industry and the farmers who had prospered from the industry down with it.[6] The story of tobacco in the South-Eastern United States is one of politics making a product less desirable. However, it is also a story about a product re-making itself and finding a new niche in the market.

In 1612, the first tobacco crop was grown in Virginia, and in 1613 the first sample was delivered to England (Salmon & Salmon, 2013). 1619 marked the first year that tobacco was used as currency, a custom that continued on for another 200 years. In the same year, the first sitting of the legislative assembly passed a law that forbid the sale of tobacco for less than three schillings per pound (Borio, 2011).

Inspection laws were passed by the government to maintain a high quality of tobacco. The government was aware that their export to England was dependent on a quality product (Salmon & Salmon, 2013). Even with government controls, the popularity of tobacco eventually led to over-production. In 1705, tobacco prices hit a low of a quarter of a penny per pound. This did not decrease production. In fact, tobacco production reached an all-time high in 1709 at 29 million pounds. New inspection laws were passed, and prices increased and stabilized between the 1730s and 1760s. However, in 1775, because of the American Revolution, the legislative assembly voted to stop shipments of tobacco to Britain. Instead, farmers were encouraged to grow food crops, such as wheat, to support the American troops. This disappearance of the main market for tobacco caused to a steep decline in its cultivation (Salmon & Salmon, 2013).

[6] For a detailed and global understanding of the history of tobacco please see:
Borio, Gene. (2011). *Tobacco Timeline*. Retrieved from
http://archive.tobacco.org/resources/history/Tobacco_History.html.

Tales of tobacco remain quiet until the late 1800s, when cigarettes started to catch on world-wide. In 1901, 3.5 billion cigarettes and 6 billion cigars were sold around the world (Borio, 2011). The early history of tobacco farming in America focused on export to England; this more modern industry focused on national consumption.

When the Americans joined WWI in 1917, cigarettes became increasingly popular on the American market. Cigarettes were deemed an important part of winning the war, as they relaxed soldiers and built moral. In fact, when American General Officer John Pershing was asked what was needed to win the war, he said "I answer tobacco as much as bullets" (Borio, 2011). Because of this, basically an entire generation of men returned from the war addicted to smoking. WWII gave another boost to the tobacco industry. Cigarettes were included in soldier's rations and cigarette use skyrocketed back home as well. Between 1920 and 1940, the number of smokers in America more than doubled (Borio, 2011).

International tobacco competition began in the 1940s. For example, Virginia flue-cured tobacco was Zimbabwe's leading export in 1945. This was the start of a continuing trend in the tobacco industry (Hahn, 2008). At the same time, the 1940s saw the beginning of the public debate about the effects of smoking on health. As information about tobacco's contribution to cancer and heart disease became well known, the percentage of Americans who smoked dropped rapidly. In 1949, a little under 50% of the population smoked. This went down to 42% in 1965, and 33% in 1980 (Borio, 2011). Smoking rates have declined over 50% since 1949, with only 19% of the American population smoking in 2011 (Center for Disease Control and Prevention, 2013). The impact of this sharp drop in sales fell on the farmers (Scheer & Moss, 2011).

Not only was there a drop in demand for the crop, but the tobacco industry aggressively sought cheaper areas in the world to grow tobacco, and tolerated substantial declines in the quality (Hahn, 2008). They had a captive and addicted customer base and had no reason to look for quality when all they had to provide was a delivery system for nicotine. The big tobacco companies did not gear their cigarettes to those who enjoy the taste of fine tobacco (Hahn, 2008).

Recently, a new tobacco niche has emerged. Some American tobacco farmers have begun transitioning away from tobacco as a high quantity cash crop, towards tobacco as a quality, value-added crop. Many American tobacco farmers are transitioning to organic. These methods are more labour intensive and yield less, but the costs can be recuperated because organic tobacco sells for over double the price of conventional tobacco. Santa Fe Natural Tobacco has seen their sales increase 10% every year since 2001 (Scheer & Moss, 2011). Selling organic tobacco allows farmers to make money without having to grow vast quantities (Bickers, 2008). Rick Smith, owner of Independent Leaf Tobacco Company is trying to encourage organic production because "that's where there is potential for more growth"—in fact, it is even difficult to keep up with demand (Bickers, 2008). Other than these few examples, most modern day American tobacco farmers are producing for a market that creates no differentiation in quality or other distinguishing characteristic that can prevent the collapse of prices.

There are four key learnings that can be taken from the history of tobacco to inform the discussion of the apple industry in Nova Scotia. First, government policy is an important tool for controlling the price of a commodity crop. Second, quality control is very important for sustaining the price of an agricultural product. Third, wars, depending on the context, can either inhibit or encourage the same crop. Lastly, the tobacco example highlights the importance of differentiating a product and making it place specific. When high quantity production fails, sometimes the product can succeed with lower levels of sales at value-added prices.

Historical Materialism

Historical materialism will function as a conceptual lens for examining the history of the apple in Nova Scotia. Historical materialism is a theory of historical change articulated by Karl Marx. The core tenet is that material realities and the way we transform material realties are connected to history, culture, and social norms (Habermas, 1975; Levine & Sober, 1985).

Historical materialism is deeply controversial. Many disagree with the theory entirely, while even those who use it are divided over what exactly it is. This is because there is a wide spectrum of interpretations of Marx's historical materialism (Duncan & Ley, 1982; Bell, 1979). In

fact, even in Marx's time there were so many ideas of the definition of historical materialism that Marx himself said "if anything is certain, it is that I myself am not a Marxist"[7] (Marx in Marxists, 1882). This study will put the debate about what true historical materialism is aside. As well, this study does not use historical materialism for any political motivations. Simply, it is a sensible way to examine history, especially that of agriculture.

Since historical materialism holds that the sequence of economic structures corresponds to the development of human history it means that modes of production and relations of production are intimately connected with the trajectory of human culture and history (Levine & Sober, 1985). The mode of production, or productive force, is the labour, technical knowledge used in production, and the organization needed to mobilize people to work (Habermas, 1975). The productive force is the actual doing of stuff. The relations of production are the institutions and social mechanisms that decide what labour will do, regulate access to the means of production, and determine the distribution of wealth (Habermas, 1975). For example, the mode of production in the medieval era was the hand mill, which was not coincidentally related to the relation of production at the time—feudalism. The mode of production led to a relation of production based on feudal lords and peasants (Habermas, 1975).

For Marx, the first historical act that distinguished humans from other animals is that we produced our means of subsistence; "by producing food, man indirectly produces his material life itself" (Marx, 1994, p.107). Agriculture is not some mundane act of continuing a physical existence on the planet, "rather it is a definite form of human activity" (Marx, 1994, p.107). For Marx, how we produce our food and material needs is how we express our life; our relationship with food, and thus nature, is fundamental to who we are. Although historical materialism recognizes the primacy of material conditions and their role in making history, it also has a dialectical understanding of the relationship between material reality and the role humans have in making their history. Material reality is both the material reality humans find existing and the material reality that humans produce through their actions (Marx, 1994).

Without nature, the worker cannot make anything. It is in the materiality of nature that a worker can express their life. Marx went so far as to call nature the "inorganic body of man"

[7] ce qu'il y a de certain c'est que moi, je ne suis pas Marxiste.

(Marx, 1994, p.63). This shows his deep commitment to the dialectical relationship between environmental realities and the sphere of human history. Agriculture is the perfect example of this dialectical relationship between humans and nature. Food is something that we create from the materiality of nature, with our labour, and then put into our bodies to keep us alive so that we can keep making history.

Historical materialism can be used as a theoretical framework to gain insights into reality and problematize history. Michael Burawoy, a celebrated anthropologist and historical materialist, focuses on labour and its connection to institutional forces. In "The functions and reproduction of migrant labour" (1976), he looks beyond the individual influences that affect migrant workers and instead focuses on political mechanisms that prevent the worker from being able to have complete control over her future. He wants to show how an understanding of the interplay between the underlying structure of migrant labour and the particular political and economic context inform individual action and experience. Further, he argues that the structure of migrant labour—a separation between the retaining and renewal of labour—combined with other political factors, and the particular situation in the industry, form a pattern in the relations between race, class, and different factions of society.

Harriet Friedmann's classic work, "The political economy of food" (1982), examines the rise in grain prices in the 1970s. She does this by employing the concept of food regimes, developed by herself and McMichael (1989), to operationalize a historical materialist lens on the food system. She argues that historical events, such as sudden rises in food commodity prices, are not truly sudden. Rather, they represent a structural turning point in the reorganization of production. She examines the rise of grain prices in the 1970s by looking at the stocks of grain, government policies, political tensions, the opening of new markets, and the transition of people from self-sufficient agrarian societies to capital-intensive farming. Friedmann situates "the rise and fall of the international food order within a theoretical project to understand the recent history (and possible future directions) of [capital] accumulation on a world scale" (Friedmann, 1982). She sees food as holding a special conceptual status and believes the commodification of food is a crucial aspect of the proletarianization of farmers, or

the process of extending capitalist markets to populations that were engaged in subsistence and barter economic relations.

John Bellamy Foster is a prolific writer in the field of historical materialism and the environment. Foster (2007) describes the depth of Marx's understanding of the dialectical relationship between humanity and nature, especially in the context of agriculture. Marx was influenced by the German chemist Justus von Liebig. For Liebig, a system of production that took more from nature than it returned was a robbery system. He described how a metabolic rift was created when food waste in the city caused true waste, while in rural areas it could have been reincorporated into the impoverished soil to improve soil nutrients. Marx believed that to fix this rift we needed to systematically shift social organization and production in order to live with the needs of the future in mind. He believed the only environmentally and socially sustainable solution was one where production was governed with the human and natural metabolism in mind. Rational governance, as opposed to blind capitalist growth, could only be possible in the context of socialism. Foster shows that Marx was an environmentalist who intimately understood the interconnectedness between nature and human activities (Foster, 2007).

Based on the writings of Burawoy, Friedmann, and Foster, this study will use historical materialism in three main ways. First, as exemplified by Burawoy, historical materialism allows one to examine the underlying forces that condition behaviour and how individuals are slaved to broader political, economic, and social structures. Second, Friedmann uses the historical materialist lens to reveal connections between agriculture, politics, the state, and capital accumulation. This study will also apply the insights gained from Friedmann's and McMichael's concept of food regime theory directly in the analysis of the apple in Nova Scotia. Thirdly, as brought out by Foster, this study will use historical materialism to emphasize the interrelationship between humanity and the environment.

Methodology

As described in the literature review, this study will use a historical materialist lens to analyze the history of the apple in Nova Scotia. First, this study will strive to understand how individual people and organizations are slaved to broader social realities. Second, this study will illuminate the connections between agriculture, politics, the state and capital accumulation. Thirdly, historical materialism emphasizes the dialectical relationship between humanity and the environment. Therefore, this study will be able to focus attention on abiotic factors of history that are often seen as unimportant, such as soil nutrients, and climate.

Three main sources will reconstruct the history of the apple and inform the conclusions. They are: secondary histories of the apple in Nova Scotia, annual reports from the Nova Scotia Department of Agriculture (NSDA),[8] and a variety of archival information going back to the 17th century.

This study will also use Friedmann's and McMichael's concept of food regime theory (1989) where applicable. Food regime theory is a way to historicize and problematize food that "links international relations of food production and consumption to forms of accumulation broadly distinguishing periods of capitalist transformation" (Friedmann & McMichael, 1989, p.96). Food regime theory will act as a framework and reference point for the development of the apple industry in Nova Scotia. It provides an understanding of the three major developments of food production and trade. The first regime starts in 1870, which approximately overlaps with the second stage of this study's analysis of the apple industry in Nova Scotia. Food regime theory aids the analysis of the apple in Nova Scotia because it illuminates how each transition reframes the politics, scope, and technologies of agricultural development (McMichael, 2009).

A combination of historical sources examined through a broadly defined historical materialist lens, and the specific framework of regime theory informs the methodology of this study.

[8]The first annual NSDA report that was available is from 1929. A subsequent report for every decade was studied, as well as any other crucial years to inform the historical narrative. By the 1940s, the department was renamed the Department of Agriculture and Marketing, but it will referred to as the NSDA throughout this study.

Apple as Settlement Tool (1605-1770)

Agriculture played an important part in the battles over land in Nova Scotia in the 17th and 18th century. [9] In fact, some historians argue that settlement history incorrectly focuses too heavily on battles instead of agricultural developments (Hutten, 1981). This chapter starts in 1605 with the first Nova Scotia reference to the apple, and ends in 1770, which marked the slowing of immigration from New England. It argues that the apple was a settlement tool in Nova Scotia, and also uses the apple to represent broader trends in agriculture that relate to colonial expansion. It begins by investigating the connection between agriculture and the doctrine of discovery and narrates how agriculture was used by Europeans to appropriate Mi'kmaq territory. The French prospered in Grand Pré on fertile fields that featured apple orchards. The English conquered the French and then attracted settlers from New England to solidify their hold on the territory, importing apple culture with them. Apples were useful on the frontier as they could be used both to make alcohol and for sweetness. Apple orchards also represent the European battle with the frontier as they tried to tame the wilderness. The apple, and agriculture more generally, was a tool of settlement for Europeans as they expropriated Mi'kmaq land.

Justifying take over

When Europeans first 'discovered' North America, they declared it *terra nullius*, which is a term meaning land that belongs to no one (Kerr, 2005). The doctrine of discovery in the 16th century was the idea that "the first state to 'discover' an uninhabited region with no other land claims automatically acquires territorial sovereignty" (The Aboriginal Justice Implementation Commission, n.d.). However, the land was not empty. The Mi'kmaq people had been roaming the land for at least 3000 years before any Europeans arrived (Kerr, 2005).

[9] The action discussed in this section will be mostly centered on what is now Nova Scotia. However, land boundaries have changed over time. Much of the history of Nova Scotia is intertwined with the history of Acadia, which consists of what is now Nova Scotia, New Brunswick, as well as part of Quebec and Maine. This was an area inhabited by the Mi'kmaq people and fought over by the English and the French.

The Mi'kmaq did not use agriculture to get their food; they were semi-nomadic and cycled through different areas of the region with the seasons.[10] The Mi'kmaq moved between coastal areas in the warmer months and further inland in the winter (Wicken, 2004). The fact that they did not enclose land was one of the reasons that allowed Europeans to classify the land as being unoccupied and owned by no one (Wicken, 2004; Kerr, 2005). The lack of agriculture made it easier for the early Europeans to justify laying claim to Nova Scotia in the first place.[11]

A French fruit first

The French were the first to develop permanent settlements in Nova Scotia in the early 17th century. In 1605, Samuel de Champlain chose Port-Royal to be the first French settlement and stronghold because it was a strategic location for both defense and agricultural potential. The colonists wanted to be agriculturally self-sufficient, and they hoped the fertile soil and fresh water from the nearby Annapolis River would allow them to achieve this (Kerr, 2005). In the same year, de Champlain made the first Canadian literary reference to the apple in Nova Scotia in his diary. While describing the winter of 1605 he said that "the cold was so intense that cider was divided by an axe to measure it out by the pound" (de Champlain in Hutten, 1981, p.1). By the 1630s, the beginning of permanent European settlement, it is thought that there were already small apple orchards on Cape Breton island, the first place where De Champlain and his crew wintered (Kerr, 2005; Dunn, 1990; Gwyn, 2014). This source of alcohol on the frontier was crucial to the settlers, especially to get through harsh winters (Kerr, 2005). As well, the French preferred cider to wine or beer until the 18th century, so it is fair to assume that they would want to provision it for themselves in a new land (Hatchard, 1980). Apples were an important part of early French settlement because they provided the French with cider.

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[10] According to a 1616 report on Mi'kmaq subsistence patterns by a French abbé, Pierre Biard, in the winter the Mi'kmaq hunted beaver, otter, bear, moose, caribou, and seals, and also did some ice fishing. In early spring they fished for smelt, herring, salmon, sturgeon, and looked for the eggs of waterfowl. In the summer they fished in the open water for cod and shellfish. In the fall they fished for eel, and also hunted elk and beavers (Barsh, 2002).

[11] The 17th century writer John Locke believed that land was given to humans communally, and that it was through labour that humans could make the land valuable and gain ownership of the land. Non-agriculture was considered "waste" (Lock, 2002, p.19). The colonial implications of this belief are made quite clear by Locke.

The French had three key settlements in Nova Scotia – Port Royal, Chignecto, and the Minas Basin (Dunn, 1990). Port Royal was the first settlement, but starting in the 1670s, French settlers started moving away from Port Royal and re-installing in the Minas Basin (Hutten, 1981). The name Minas Basin is often used interchangeably with the name Grand Pré, however they do not refer to exactly the same area. Grand Pré was the main village with the highest concentration of people. Minas Basin includes Grand Pré as well as two other districts, Pisquid and Cobequid (Dunn, 1990). The move to Minas Basin was partially to escape the battles between the British and the French at Port Royal, but also because of the productive soil (Dunn, 1990).

Today, Grand Pré conjures up iconic images of scenic meadows and flourishing apple orchards. The records from 17th and 18th century Nova Scotia and Grand Pré are sparse, but they do imply a successful, if not entirely idyllic, agricultural community. Reverend Andrew Brown, a Presbyterian clerk in Halifax in the 18th century wrote about 17th century Grand Pré, using manuscripts no longer available today. He described the careful construction of fruit tree orchards with willows planted around them to ward away frost and high winds. The intelligence of the farmers meant that they "seldom failed to gather a heavy crop and make a great deal of excellent cider" (Brown in Gwyn, 2014, p.23-24).[12] By the early 18th century the Minas region was the most populated in Acadia with about 500 people (Dunn, 1990).[13] In 1720, a British official jotted down a quick sentence identifying the agricultural productivity of Grand Pré: "land at Minas very productive" (Macmechan, 1900, p.60). The productivity of the Minas region was recognized by both the English and the French. Minas became the main agricultural center for all of Acadia and was referred to as the granary of Acadia (Dunn, 1990). Food is a necessary prerequisite for a sustainable settlement. Therefore, the success of agriculture in the Minas Basin region allowed the French to settle permanently in Nova Scotia, without relying entirely on imported goods. The apple orchards provided cider, which would have helped make the frontier merrier, and reminded the settlers of home.

[12] Brown notes that caring for the apple orchards mostly fell to the daughters of the family. The role of women changes throughout the history of the apple and would be an interesting topic to focus on in further study.
[13] At the time, Port Royal had 456 people and Chignecto had 188 people (Dunn, 1990).

The success of agriculture in Grand Pré was part technological prowess and part product of biology. The tides of the Bay of Fundy are relatively high and move quickly. They effect both the area of Grand Pré, and to a lesser extent, the area of the Annapolis Valley (Butzer, 2002). The soils in the Minas Basin continually gain nutrients as the sea water washes over them. Eroded particles from rocks and sea cliffs fall into the currents of the Bay of Fundy and the Minas Basin tides. They attract ions of minerals such as calcium, magnesium, potassium, and sodium to their surfaces. These are all minerals crucial to plant growth. As the tide moves into the marsh, it brings these nutrient-rich particles with it, along with decaying organic material that also adds to soil quality. Since these materials are mixed up in the tidal water, the nutrient level of the marsh soil is quite evenly distributed (Bleakney, 2004). The Acadians then developed a specific way to build dykes and take advantage of this nutrient rich soil.[14] These biological realities created the fertile soil that allowed the French farmers to sustain a successful agricultural community. Although it seems that wheat and oats were the main crops grown on this fertile soil, the apple was sufficiently prominent to make it into enough historic documents that records of its existence still survive today (Gwyn, 2014).

British take-over

After the storming of Port Royal in 1710, the British named the Minas Basin area the Annapolis Valley, and named Acadia Nova Scotia (Wicken, 2004). The region of the Minas Basin, inhabited by the Mi'kmaq and the Acadians, was strategically important for the English. It was near valuable fishing areas and close to the St. Lawrence River, which gave access to Quebec and Montreal (Wicken, 2004). Most residents of Minas chose to stay under British rule, rather than move to PEI or Cape Breton, which were still French. The Mi'kmaq too continued to live unencumbered by British rule just as they had under French rule.

Soon the English began attempting to extend and secure political control over Nova Scotia (Wicken, 2004). The Treaty of Utrecht in 1713 signified the beginning of these changes,

[14] To learn more about this incredible feat of engineering, please see:
Bleakney, Sherman. (2004). *Sods, soil, and spades: The Acadians at Grand Pré and their dykeland legacy. Canada:* McGill-Queen's University Press.

which were furthered by the Treaty of 1726. The establishment of Halifax in 1749 marked the start of a strong British presence in Nova Scotia.

In an attempt to exert their control over the French, the English demanded that the French Acadians who remained in Grand Pré take an oath of allegiance to the English Crown. The Acadians refused and thus on July 28th, 1755 the British Nova Scotia Council ordered the deportation of the Acadians (Akins, 1869).

However, it seems the expulsion may have had agricultural as well as patriotic roots. In the minutes from a previous council meeting in 1738, the council discussed how the French "possessing the best lands has been a discouragement to possible English settlers" (MacMechan, 1900, p.120). The minutes from the July 28th council specified that the Acadians should be dispersed among the colonies of North America to "prevent as much as possible their Attempting to return and molest the Settlers that may be set down on their Lands" (Akins, 1869, p.227). To ensure the Acadians had nothing to return home to, British soldiers destroyed their communities, and burned down their barns. In all, the Expulsion displaced between 10,000-18,000 people, and killed thousands more (CBC, 2014). The English were beginning to dominate Nova Scotian soil.

As the English dominated the French, they noted how the French had 'dominated' the earth to create well cultivated orchards and a fertile dykeland. Since the Acadians were forced away so quickly, they left their fields, and of course, apple orchards. All over Nova Scotia after the expulsion, "small orchards beside the ruins of French homes went on bearing fruit as though nothing had happened" (Hutten, 1981, p.3). Captain John Knox, who examined the Acadian territory a few years after the Expulsion, wrote in his journal that "the French have been at great pains here in clearing and planting these orchards, and indeed, finer flavoured apples, and greater varieties, cannot in any other country be produced" (Knox in Hutten, 1981, p.4). The French were the first to introduce apples to North America, "and it was a permanent legacy" (Hutten, 1981, p.3).

An apple a day keeps the French away

To solidify their hold on the land, the English then used the promise of fertile fields as a way to attract New England farmers from more highly populated areas in New England. The use of agricultural land to attract people started in the 1730s before the expulsion of the Acadians. In 1732, council approved putting advertisements in New England newspapers "in Order to Draw some Protestant Subjects from thence or Elsewhere to settle" (MacMechan, 1908, p.251). In council minutes from 1738, they discuss the desire to settle the province with Protestants from New England and that they will give land away for free (MacMechan, 1900). From 1760 to the 1770s about 7000 New England settlers moved to Nova Scotia (Hutten, 1981).

Many of these New England Planters, as they were called, brought new apple varieties, apple growing knowledge, and a deep connection to the apple. For example, Colonel John Burbidge came to the Annapolis Valley in 1762 on a land grant of 750 acres. He brought the Nonpareil and Golden Russet to the province which later became popular commercial varieties. Most importantly, Burbidge was the first person in Nova Scotia to use the grafting technique on apples rather than growing them from the seed (Hutten, 1981). The New England Planters kept the orchards left over from the Acadians and actually grafted their new varieties onto the old French trunks (Gwyn, 2014).

When an apple tree is planted by seed, since every seed contains its own unique genetic instructions, each seed will produce a unique apple tree (Pollan, 2002). That is, apples do not breed true. Apples acquire this genetic diversity through the way the apple flower is fertilized (please see figure 1). When a grain of pollen, usually brought by the wind or bees, sticks to the stigma, it acts as a tiny seed and sends a mini root through the tissue of the stigma and all the way down to one of ten

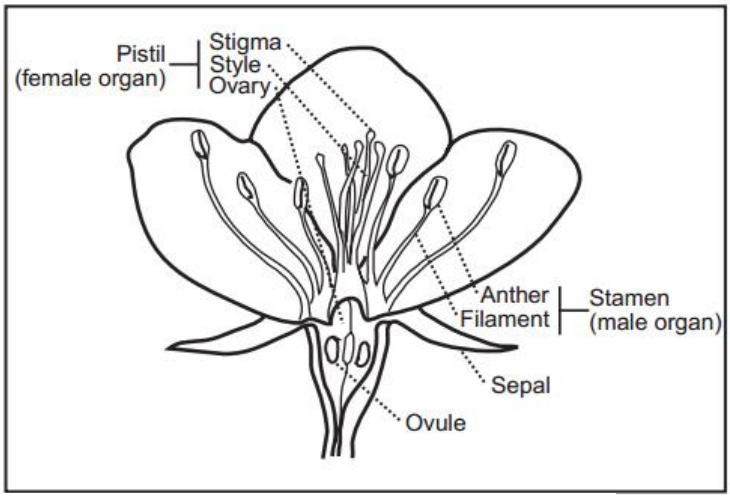

Fig.1 Diagram of an apple blossom (Warmund, 2002)

ovules. In the center of each ovule is an egg nucleus. The egg nucleus and the tiny root both contain half of the genetic information that will form the new apple seed. In order for the apple blossom to turn into an apple, all ten egg nuclei in all ten ova must be fertilized by a grain of pollen. If this does not happen, the blossom falls from the tree and does not turn into an apple (Wynne, 1975). Since the apples vary so much, they could quickly develop into varieties that could survive in the distinct soil and climate of North America (Pollan, 2002). Even though the diversity and often sourness of flavour was not suitable for eating, it actually led to a better and well-balanced apple cider (Wynne, 1975). The variability of the apple was a benefit while it acted as a settlement tool, but as the apple began to be marketed as a commercial crop, the unreliability of growing apples from seed became a hindrance.

Grafting was invented by the Chinese in the second millennium BCE. If you cut a piece of wood, or an apple scion, from one tree and notch it into the trunk of another tree, the fruit produced on the second tree will be the same as that of the first tree (Pollan, 2002). By the 16th century, this technique of grafting was known to Europeans (Wynn, 1975). When Burbidge introduced grafting he allowed for specific apple varieties to be cultivated, paving the way for a commercial apple industry.

Although apple cider was important to French settlers and a reason for the establishment of the apple in Nova Scotia, it was the English for whom the apple, and agriculture more generally, was a crucial settlement tool in North America. This can be seen most explicitly in the settlement of New England, as passed on to Nova Scotia through the New England Planters. For New Englanders, “planting apple orchards was among the first tasks early settlers undertook” (Wynn, 1975, p.18). The importance of apples to the development of what is now the United States has been mythicized in the figure of Jonny Appleseed, or John Chapman. Chapman would plant seeds in places where he thought the frontier would move next so that he could have developed trees to sell to new settlers. It was a wise business model, since in some states everyone who got a land grant had to plant 50 apple or pear trees. This was to show that the people were actually cultivating the area, not just receiving it for real-estate speculation (Pollan, 2002).

Apples provided sweetness when sugar was still a luxury. Apples can be found in many recipes of the New England frontier,[15] and were also fed to livestock. Perhaps most importantly, apples were used to make cider and applejack, a strong alcoholic apple beverage made by concentrating cider. Water in Europe was dangerous and full of disease, so when settlers came to America they still had fear of water and drank mostly cider. Many settlers in New England were strict Protestants who did not drink wine because the bible forbade it, but could drink cider because the bible said nothing about the alcohol from apples (Pollan, 2002). The apple was so important to the settlement of the American frontier that Henry David Thoreau said "it is remarkable how closely the history of the apple tree is connected with that of man" (Thoreau in Pollan, 2002, p.4-5). When New Englanders were invited en masse to Nova Scotia in the mid-18th century, they came with apple seeds in hand.

Domesticating the wilderness through apples

The apple also offered peace of mind to settlers battling the wildness of the frontiers. An apple orchard is "an idealized or domesticated version of the forest" and geometrically aligned apple trees offered "visible, even stirring proof that a pioneer had mastered the primordial forest" (Pollan, 2002, p.16). Here, one can see how the apple orchard represents the battle humans fought with nature in order to tame the wilderness and create productivity out of harsh and barren land.

During the Scientific Revolution, traditionally seen as spanning approximately 1500 to 1700, a mechanistic worldview emerged and led to a view that nature is something other and without life. The very notion of a Scientific Revolution is part of the narrative of Western culture's ability to master nature with science and technology. It can be seen as humanity's coming of age, where we could finally understand and dominate nature with our technological prowess. The 16th and 17th century language around knowing nature is often phrased in quite violent and misogynistic terms (Merchant, 2002).

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[15] Baked apples, apple butter, apple cider, meat dishes with apple sauce, apple pumpkin pie, and puddings with apples were all popular in Colonial New England. For more information please see:
Stavely, Keith & Fitzgerald, Kathleen. (2003). *America's founding food: The story of New England cooking*. USA: The University of North Carolina Press.

The semi-nomadic Mi'kmaq lived more within the natural patterns of nature, while the European settlers conceived of survival as something they did in spite of nature. Agricultural domination as a settlement strategy represented a different mode of development from that of the Mi'kmaq, and served to entrench the divide between Europeans and the Mi'kmaq way of life. Before the treaties of 1713 and 1726, the Mi'kmaq could live alongside the settlers. However, as the English settler presence grew, it increasingly got in the way of traditional Mi'kmaq hunting grounds, fishing areas, and the general way of life. The apple was a visible way to show that one's labour had turned sterile wilderness into productive orchards and pasture.

The apple was an important part of settlement in Nova Scotia between 1605 and 1770. The Mi'kmaq people's lack of agriculture made it easier for Europeans to see the land as unoccupied. Agricultural labour was used to justify claims to land ownership. It was used to feed settlers and soldiers that helped protect new lands. It was used to represent an idyllic transformed frontier where human labour and ingenuity transformed barren wilderness into the refined product of alcohol. The British then used agriculture as a tool to attract fellow Englishmen and protect land from the French. Both the English and the French used agriculture and the quintessential geometric apple orchard to make the wilderness fruitful and prove their dominion over nature. The settlement ethos is founded on agriculture as a tool to win against other nations and nature itself.

Apple as Booming Cross-Atlantic Business (1849-1933)

The apple brought Nova Scotia onto the world stage in the 19th and early 20th century. This chapter will examine history from the first apple shipment to Britain in 1849 until the peak year of apple production in 1933. This time period shows how the Nova Scotia apple market exploded and became an important agricultural export for the province. Before examining the specific history in Nova Scotia, it is beneficial to put this history within the understanding of food regime theory. Food regime theory does not go back far enough to be relevant for the first part of the apple's history in Nova Scotia, but the first food regime, from 1870 to the 1930s, roughly overlaps with the second stage of the apple's history in Nova Scotia.

According to Friedman and McMichael, the first food regime is characterized by European powers outsourcing staple food production to colonies of settlement in the New World which provided 'wage food' for the emerging industrial class back in England. Wage food is food that can sustain industrial workers and be affordable enough that they can be paid low salaries in factories (McMichael, 2009; Friedmann & McMichael, 1989). Unlike the purely colonial trade of tropical products, trade in the first food regime was between "independent national economies with ecological and social characteristics favouring similar ranges of products" (Friedmann & McMichael, 1989, p.94).[16] Over this period, the world changed from being divided into agricultural colonies and European industry, towards states becoming independent and increasingly developing both industry and agriculture within their boundaries (Friedmann & McMichael, 1989). As well, to fight protectionist economic policies, settler states introduced agricultural regulations to help farmers cope with the collapse of international trade in the 1920s. The nation state, policies to support farmers, international trade, and the introduction of new technologies characterize this part of the apple's successful history in Nova Scotia.

Prescott as father, Valley as womb

It would be impossible to examine the success of the apple industry in Nova Scotia without discussing its father, Charles Ramage Prescott who lived 1722-1859. He arrived to Nova

[16] However, imports from tropical regions to Europe continued into this time.

Scotia with the wave of New England Planters in the late 18th century and established Acacia Grove, which would become a hub of horticultural activity. Prescott was a gentleman farmer who used his wealth and privilege to help improve fruit cultivation in Nova Scotia (Hutten, 1981; Hatchard, 1980). He was a member of the Nova Scotia legislature, and horticultural societies in New York, Boston, and London. This allowed him to learn about agriculture, spread the word about Nova Scotia, and advocate for farmers in government. As a wealthy man, he gave advice and new apple grafts to other farmers, and used his orchards as a place for education and as an early experimental ground. He imported and developed multiple varieties of apples. Most famously, he brought the Gravenstein to Nova Scotia, which would become a popular variety for over a century and is still sold today (Hatchard, 1980).

According to some apple devotees, there are only a few places in the world that are able to grow the Gravenstein, and only in Nova Scotia can the apples reach their ultimate quality (Hutten, 1981). It is unlikely that Nova Scotia is the only place on earth that can support the Gravenstein; however, it is true that Nova Scotia, and specifically the Annapolis Valley, have prime apple-growing conditions that have likely given them an advantage in global trade. For apple trees to grow, their roots needs to be kept relatively dry, they need access to sun to bear fruit, and they need cold winters to let the trees rest (Wynn, 1975). Nova Scotia has a temperate climate with average temperatures ranging from 5.5°C in the spring, to 20°C in the summer, 18°C in the fall, and -3°C in the winter (Province of Nova Scotia, 2006). The Annapolis Valley was then, and remains today, the heart of apple production in Nova Scotia (Growing Nova Scotia, 2014). The Annapolis Valley has especially good climatic conditions that give growers a competitive advantage in regards to input costs and apple quality (Growing Nova Scotia, 2014). The growing season is short, cool, and moist, which means that most farmers do not need to use artificial irrigation. The cool temperatures allow the region to produce highly coloured apples, which are appreciated by consumers (Growing Nova Scotia, 2014).

The climatic advantage led to production rates that were quite astounding. In the 1930s, the peak of apple production, it is estimated that Nova Scotia produced 40% of all the apples produced in Canada. It is said that 75% of Nova Scotian apples were produced in a 40km radius surrounding Kentville, a key city in the Annapolis Valley region (Conrad, 1980). For the

inhabitants of Kings county, where Kentville is located, “it was a source of great pride” that they produced so many of the province’s, and indeed the country’s, apples (Conrad, 1989, p.19). The apple was not just something that was grown in the Annapolis Valley, but became an important part of the inhabitants’ identities and culture. To this day, “the apple is king” in the Annapolis Valley (Mason, 2010). The annual apple blossom festival continues since its start in 1933.

The birth of the apple industry

19th century inhabitants of Nova Scotia recognized it’s agricultural and apple potential. In 1854 Nova Scotia held a regional exhibition to show off the best of the province, with everything from furniture, to gems, to agricultural products. The fruit section of the contest received 65 entries and at the end, the judges thought “the Apples and Pears were truly splendid” (Executive Committee of the Nova Scotia Industrial Exhibition, 1854, p.23). In fact, the judges said that after inspecting the fruit division, “no one could fail to be convinced that the growth of Orchards ought to be greatly encouraged in this Province, and that fruit should form one of the chief articles of export” (Executive Committee of the Nova Scotia Industrial Exhibition, 1854, p.23).

It seems that Nova Scotians sang the praises of their region not simply because it had good agricultural land, but also because they felt England was prejudiced against Nova Scotia. At one time, when the French still threatened to take control of Nova Scotia, it was seen as a strategic place, but with the “extinction of the French Dominion” they worried that the British interest in Nova Scotia declined (Executive Committee of the Nova Scotia Industrial Exhibition, 1854, p.3). The winning essay about Nova Scotia in the exhibition said that there is “much misconception” on the “uncommon severity” of Nova Scotia’s climate “so as almost to deter the European emigrant from choosing it as a place of permanent settlement” (Knight, 1862, p.16). The prejudice towards Nova Scotia had to be overcome in order to take advantage of the mass population and market availability in England.

In 1862 London, England held an international Fruit Show in the Crystal Palace, the building made famous by the Great Exhibition of 1851. Nova Scotia had a prominent location in the exhibition in the 1862 Crystal Palace Fruit Show and it provided a way for Nova Scotia “to

indicate to the world the very varied, and hitherto almost unknown capabilities of the Province" (Nova Scotia Department, 1862, p.1). The apples were widely admired and it acted as a fantastic marketing opportunity.[17] This put Nova Scotia on the world stage, and positioned it as the premiere apple producer within the British Empire. British buyers immediately realized the benefits of buying fruit from Nova Scotia— Nova Scotia had good growing conditions and available space for agriculture, while Britain provided a large population center of consumers. It was a perfect partnership and "from then on, the Nova Scotia apple industry grew in direct relation to the British Market" (Hutten, 1981, p.26).

The next year, in 1863, Nova Scotian fruit farmers came together to form the Nova Scotia Fruit Growers' Association (NSFGA). That same year, the first apple barrel was made in Nova Scotia. Previously, apples had been stored and sold in leftover containers hanging around the house. Farmers did not have enough extra containers to provide for the growth of the industry (Meister, 1921).[18] In a two year period, the product, the container, and the consumer all came together—an industry was born.

The first apple shipment to Britain actually predates the Crystal Palace Fruit Show. It is thought to have been in 1849 from a port in Halifax (Hutten, 1981; Gwyn, 1980). However, European shipments did not become popular immediately because of the expensive cost of steam freight transport and the long trips with uncontrolled climates that caused apples to rot (Conrad, 1980). Rough land transport to ports also led to bruised fruit. Therefore the Annapolis Valley was lucky when a port at Annapolis Royal opened up in 1861, diminishing land travel (Hutten, 1981). As well as facilitating shipping through the new port, the province also set up rail road connections to these new ports as the interprovincial railway system proliferated in the 1860s and 1870s (Knight, 1862; Conrad, 1980; Hutten, 1981). Transport on the water also improved. In 1919, the shipping voyage was cut from about two weeks to 7-8 days, and in 1923 apples started to be shipped in boats with ice chambers to slow down spoiling (Hutten, 1981).

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[17] Without contemporary storage ability, since apples are harvested in the fall and the Exhibition was not until the summer, the apples had to be preserved. In order to "prevent them from perishing by decay during the time when the exhibition would be held in England...A variety of experiments were tried, and at last it was found that by using diluted alcohol in air-tight glass jars, the difficulty might be overcome" (Nova Scotia Commissioners for the International Exhibition, 1864, p.7).

[18] For a history of the apple barrel industry in Nova Scotia please see:
Meister, T. (1921). *The apple barrel industry in Nova Scotia*. The Nova Scotia Museum.

The ability to transport apples more easily to the highly populated British market led directly to increased apple production. The earliest records available of mass apple export start in 1880 and provide an average annual production of apples over a four year period.[19,20] Between 1880 and 1884, the average annual apple production was 9,333 barrels with 32% exported and 68% consumed fresh in Canada. Ten years later, between 1890-1894, 178,000 barrels were produced on average each year and were dispersed 62.9% through export and 37.1% in Canada. 371,000 barrels were produced on average between 1900-1904, followed by 936,667 barrels on average between 1910 and 1914. By 1900, almost 80% of Nova Scotian apples were consistently being exported to England. 1920 was the first year where some apples were processed. 1,167,333 barrels were produced; of these, 78.2% were exported, 5.8% were processed, and 16% were consumed fresh in Canada. The numbers kept growing and by 1924, 1,471,000 barrels of apples were produced in Nova Scotia (Longley, 1932).

Quality concerns

Prior to 1939, apples from the Annapolis Valley were liked in England because of their price, not their quality. As Starr, an early president of the NSFGA remarked in 1886 about the years previous, "prices were low…the fruit, itself carelessly harvested, badly packed and then transported…for two or perhaps four weeks, was apt to arrive [at] market in a condition better imagined than described" (Starr in Conrad, 1980, p.15). Sturdy, late-keeping, medium quality, cooking apples were planted and produced to cater to the desires for cheap apples, and the necessity of apples that could withstand transport. Therefore, varieties such as Ben Davis, Russet, Stark, Gano, Baldwin, "and the much favoured" Gravenstein were grown most heavily in Nova Scotia (Conrad, 1980, p.19). The demands from the domestic market to grow sweeter,

[19] All production levels will be reported in terms of barrels in this thesis for the sake of comparison and consistency. Apple production was mostly measured in barrels until the 1950s, when it then switched to bushels. In this report it is assumed that one barrel is the equivalent of 3.23 bushels. In 1899, the Federal government passed a law stipulating that apple barrels had to be "of the following dimensions. Head diameter 17 1/8 in., length of stave 28 1/2 in., bulge not less than 64 inches outside measurement," with a volume of 103 imperial quarts (Apple Capital Museum Society, n.d.). With some simple math, the quart volume was converted into an approximate equivalent in bushels. Bushel amounts will be provided in the footnotes for clarity.

[20] Longley provided numbers in bushels. He assumed a three to one conversion from bushel to barrel while this study assumes a 3.23 to one conversion. Since at the time the apples were most likely measured in barrels, this study uses his conversion rate to switch them all into barrels. The bushels are provided for accuracy: 28,000 (1880-1884); 534,000 (1890-1894); 1,113,000 (1900-1904); 2,810,000 (1910-1914); 3,502,000 (1920); 4,413,000 (1924).

more expensive, dessert apples were largely ignored because of the dominance of the British market (Conrad, 1980).

Competition from other apple growing regions, such as Ontario, British Columbia, Australia, and the United States began as early as the 1890s. Nova Scotian apples developed an unreliable reputation. In the late 19th century, Robert Haliburton got frustrated with this reputation and wanted to improve his competitive advantage. He called on the Nova Scotian government to create an organization system to guarantee apple farmers send "only the very best to a market in which excellence is rewarded" (Haliburton in Hutten, 1981, p.32). In 1901 the Federal government passed *The Fruit Marks Act* and instated an enforced grading system for apples (Hutten, 1981).

Introduction of chemical inputs

The prominence of apples in Nova Scotia in the late 19th and early 20th centuries led to increasing problems with pests. The early 20th century was also when the government began to take a systematic interest in agriculture and the use of pesticides. Under the request of the NSFGA, an agricultural research station was established in Kentville in 1910 by the provincial government (Hutten, 1981). The NSDA also produced pest bulletins and hired pest inspectors and entomologists.

One of these pests was the brown-tail moth. The brown-tail moth came from Europe and was known for "defoliating" trees. In Europe, it was kept under control by local enemies. It most likely arrived in Nova Scotia through the extensive cross-Atlantic trade that was going on at the time and was first identified in Nova Scotia in 1907. That same year, the provincial government started sending out inspectors to study apple orchards and detect pests.

The brown-tail moth was such a growing problem that in 1913 a special bulletin was put out with "the very best coloured illustrations" so that everyone would know how it looked (Matheson, 1913, p.5). The generalized audience for this bulletin shows not only the pervasiveness of the pest, but also the pervasiveness of the apple in Nova Scotia— "everyone should become familiar with the various stages in the life-history of these two insects [the bulletin also contained information about the gypsy moth] and should continually watch for

their appearance in his neighbourhood**”** (Matheson, 1913, p.5). It seems as if the apple was important enough to Nova Scotia that it was every citizen’s responsibility to guard against the spread of destructive pests.

For the first three years of inspection (1907-1910), the inspectors were paid solely by the Province of Nova Scotia. However, starting in 1910, the Federal government gave money to double the number of inspectors. Here we see the apple industry receive both Provincial and Federal support. For the season of 1912 to 1913, the Provincial and Federal government spent about $5000[21] combined on inspectors (Matheson, 1913).

The apple maggot was another common apple pest that was first reported in 1913. It later became such a larch menace that NSDA established a branch called the maggot control board to deal with the problem. The apple maggot, as its name would suggest, almost exclusively attacks apple trees, particularly sweet apples that ripen early in the season (Brittain, 1917). It is an early example of seeing pesticides as the only sensible way to remove pests. Although an agricultural bulletin from 1917 says that one can control the apple maggot by destroying fallen fruit, experiments “indicate that a cheaper and easier method may be found in the use of arsenical sprays” (Brittain, 1917, p.4). The bulletin then goes on to suggest a spray cycle that includes five sprays throughout the season.

In the early 1900s, pesticides were made with of a range of chemicals mixed with water. Farmers would then apply the spray through a 10 to 15 foot hose with a spray nozzle at the end and a hand pump to push the spray out (Hutten, 1981). In 1915, 230 properties were inspected for apple maggots in the Windsor region of Nova Scotia. Of the 230 properties, only 49 had started spraying; 16 out of 49 of the sprayed orchards and 28 out of 182 unsprayed orchards were infected with apple maggots. In the same year, 455 properties were inspected in the Digby region of Nova Scotia. All seven of the sprayed orchards and 93 out of 448 unsprayed orchards were infected (Brittain, 1917). By looking at the numbers provided it seems that spraying did not actually protect the apples from the apple maggot. On the other hand, the bulletin says that inspectors never found a severe infestation of apple maggots in a “large commercial orchard, or in the main fruit belt of Nova Scotia…it would therefore seem that the

[21] According to the Bank of Canada inflation calculator, that is about $100,000 in present value.

maggot is chiefly a serious pest in small somewhat neglected orchards, and rarely does damage in large commercial orchards where modern spraying methods are employed" (Brittain, 1917, p.10). Already by 1893, the NSFGA said that spraying with arsenates to prevent insects was a "recognized necessity" (Hutten, 1981, p.91). The comments in the bulletin seem to show that by 1917, most large-scale, export-oriented apple farmers in the Annapolis Valley, the key apple growing region of Nova Scotia, were almost all using pesticides.

This development of chemicals was "paralleled by the introduction of machines with which to apply them" (Hutten, 1981, p.103). In 1904 there was a serious case of fungus, called black spot, which affected the apple industry. The Federal government brought in an experimental power sprayer that ran on gasoline, rather than a hand pump. It was much more efficient than a hand pump, but at the time it remained too expensive for most farmers and could not fit in older orchards where the trees were planted close together (Hutten, 1981).

This was the beginning of fighting pests with chemical warfare. It was also a continuation of the perceived battle between agriculturalists and nature. Before pesticides, in a report of the Nova Scotia Exhibition of 1854 there was a sense of pride in the transition from "unbroken wilderness" to productive agriculture (Executive Committee of the Nova Scotia Industrial Exhibition, 1854, p.13). Conquering nature was violent; nature was something to be broken and required hard labour. They said that the change towards a productive landscape was not from the "waving of a wand", instead, it took "many a sturdy blow" from axe men "before the wilderness was made to blossom as the rose...Beautiful Farms and neat and comfortable Houses are now seen where formerly naught but the trackless wilderness" existed (Executive Committee of the Nova Scotia Industrial Exhibition, 1854, p.14).

This violence towards nature can be seen in the introduction of pesticides too. In the world of pests there was a tension between those who declared pesticides a necessity in the war on nature, and those such as Robert Starr, an apple farmer and past NSFGA president who said in the mid-18th century that birds are the "best reliance of the orchardist, and the best protectors of the trees. They were allies, designed by Providence, to aid man in all such battles" (Starr in Gwyn, 2014, p.47). This tension between those who thought agriculture was a fight

against nature compared to those who thought it worked with nature would only become more pronounced as technologies allowed for more invasive agriculture.

Pesticides were not the only new agricultural input of the 20th century. Commercial fertilizers also began to grow in prominence. In the past, fertilizer took the form of fish waste, manure, ash, and other nutrient-rich additives that would have been available on the farm, as well as growing nutrient transferring cover crops such as clover and then plowing them in the soil in the spring (Hutten, 1981). The 1933 NSDA report spent 28 pages discussing different fertilizers, implying an interest and rising importance. The report still seemed slightly suspicious of recommending commercial fertilizers that require large amounts of "cash outlay" or extra spending when available waste products from the farm did the same job of providing nutrients to the soil (NSDA, 1934). However, the provincial government was interested in soil fertility and began studying it in the Annapolis Valley in 1913. In 1932 the province established a committee on Physiological Disorders of the Apple to study soil nutrients in a systematic way and to ensure the soil could support the future apple crop. This obsession with soil nutrients would only increase as the decades went on.

The 1930s were a turning point for commercial fertilizer. The NSDA report actually comments on the changing norms. Even with the report's caution about large amounts of money required for purchasing fertilizer, the NSDA notes the incredible capability of synthetic fertilizer being able to contain six times as much plant food as homemade fertilizer (NSDA, 1934). This shows the shift between seeing soil nutrients as something a farmer could nurture through the proper recycling of waste materials, towards something that needed to be understood by government, and aided with capital-intensive synthetic inputs.

The first two hundred years of apple growing in Nova Scotia were undertaken with minimal foreign inputs. It was challenging to make farmers reliant on inputs and capital. Farmers own the farm land, or the means of production, and can create sustainable cycles where they produce all their inputs and outputs. The use of pesticides and fertilizers is one of the marks of the "penetration of capital into agriculture" (Lewontin, 1998). It means the farmer can no longer produce everything on the farm and must use money. The use of these inputs

was a personal choice, however, pesticides and fertilizers became increasingly prevalent as they allowed farmers to increase yields and reduce labour costs (Lewontin, 1998).

War, trade, and continued success

At first, WWI did not pose a great threat to the Nova Scotia apple industry. However, the Halifax Explosion of 1917, apart from causing mass destruction and death that devastated the province, also made it more difficult to ship from the Halifax port. As well, by 1917 the seriousness of the war escalated and many merchant ships were sunk at sea by enemy submarines. Therefore, in 1917, the British government declared a shipping embargo for everything except critical foodstuff; apples were barred from their largest market. However, the Ontario apple crop had failed that year because of weather, so the United States bought many of Nova Scotia's apples. The embargo was lifted in 1918 and did not cause too much pain for the apple industry (Gwyn, 2014).

After WWI, many efforts were made to open the world up again to trade. By 1929, international trade had risen above pre-war levels. However, the expansion rate was slowing. 1929 was also when the stock market crashed in the United States, solidifying the economic depression in the Western world in the early 1930s (Hall & Ferguson, 1998). [22] In many areas, agricultural prices were weak and European countries began adopting protectionist policies (Rooth, 2010). In 1931, England elected a new government that increased tariffs. The new chancellor, Neville Chamberlain, was a strong protectionist and faced "widespread pressure to introduce protection and imperial preference" (Rooth, 2010). Despite this, Nova Scotian apple production and prices for Nova Scotia apples continued to remain steady. As apple farmer E. Haliburton, noted, "depression years were not terribly hard on the Valley…we were more prosperous during the thirties than at any other period" because "we bought everything cheap, and apple prices were steady" (Haliburton in Hutten, 1981, p. 44).

[22] For more information on the Great Depression please see:
Hall, T. & Ferguson, D. (1998). *The Great Depression: An international disaster of perverse economic policies.* Michigan: University of Michigan Press.

Without more in-depth research it is presumptuous to identify exactly why the Nova Scotia apple industry did not feel the same pain of the Great Depression as severely as other agricultural producers. However, one reason could be the agreements passed at the 1932 British Imperial Economic Conference held in Ottawa. It was called to discuss economic questions amongst members of the British Empire. The object of the conference was "improvement of trade among the countries of the empire [and] the inauguration or development of something like an empire economic system" (Potter, 1932, p.811). Britain wanted greater Empire unity and the Dominions wanted individual trade advantages with Britain (Potter, 1932). There was intense rivalry for the British market among countries in and out of the Empire. Therefore, with the prospect of privileged entry into the British market, the Dominion countries had a lot to bargain for at the conference (Rooth, 2010).

Despite the fact that most people thought the conference did not establish much at the time, Canada generally came out of the negotiation with a good deal. The conference resulted in a bilateral treaty that allowed dominions to export raw materials into the British market without tariffs if they gave preference to British manufactured goods in their local markets (Rooth, 2010). This is commonly known as the British Preference Tariff (Rooth, 2010).

Canada, and particularly Nova Scotia, benefited from the British Preference Tariff as a producer of mostly raw materials in the form of agricultural products. It alleviated competition pressures from apple growers in the United States because they now needed to pay an extra tariff to ship apples to England. However, the British Preference Tariff did more than give Nova Scotia a competitive advantage. It also encouraged British apple growers, since they too had an advantage over international apple markets. The British Preference Tariff led to British agricultural protectionism and the creation of the British apple market which would later harm the Nova Scotian apple industry (Rooth, 2010).

In the short-term, the tariff was good for the industry. A year after it was passed, in 1933, apple production hit its peak in Nova Scotia at 2,862,658 barrels. Of the apples produced, 280, 874 barrels were used in evaporator plants to make dried apples, 15,370 were canned, and 127,994 were made into cider (NSDA, 1934). Despite recent troubles with international trade and the creation of the British apple market, apples were still almost entirely an export crop

with 2,267,592 barrels exported, or 79% of total production. Even with their growing apple market, Britain was by far the largest importer, taking 1,886,347 barrels of the export crop (NSDA, 1934). In this period of 1849 to 1933, we can see apples put Nova Scotia on the world stage. We can also see the apple grow into an industry that was export oriented, increasingly input intensive, and contributed to the identity and livelihood of many Nova Scotians.

Apple as Failed Industry (1939-1980)

The previous section chronicled how the apple brought Nova Scotia onto the world stage as more than just a cold, dreary colony of Britain, and became a global commodity. This period begins in 1939 with WWII and the ability of apple farmers in England to meet domestic demand; it ends in 1980 which food regime theory claims is the decade of the dawn of liberalized trade and globalization (McMichael, 2009). This chapter will narrate the failure of the apple industry in Nova Scotia. It will also describe the changes that took place in agriculture as it became more production-oriented and dependent on inputs. Using Friedmann and McMichael's (1989) regime theory, this chapter will highlight the significance of the changes in agriculture and how it was connected to a shift from state-driven to capital-driven agricultural economies.

The apple industry in Nova Scotia from 1939 to the 1980s contains many of the themes present in Friedmann and McMichael's (1989) description of the second food regime which took place from the 1950s to the late 1980s. Between the first and the second food regime, "the overriding shift [was] from state to capital as the dominant structuring force" (Friedmann & McMichael, 1989, p.112). There was a movement towards the durable food complex where perishable foods that used to have to be consumed locally could be processed and marketed anywhere (McMichael, 2009). Food regime theory will help illuminate the increased importance of capital that was necessitated by high-input agriculture, and also the importance of the emergence of canning to the Nova Scotia apple industry in the context of the durable food complex.

Early Warning Signs

Before starting in 1939, it is important to re-examine Nova Scotia in the 1920s and 1930s and the time of the apple rush. The history of the apple in Nova Scotia in the 1920s and 1930s told a contradictory story. These were the years of financial success, but in retrospect they were also the beginning of the end for the industry. Throughout the apple industry's history in Nova Scotia it had suffered from a reputation of cheap apples. As Ralph Eaton, an influential apple grower said in 1909, "notwithstanding all the laurels we have won...we are

annually growing an enormous amount of poor and practically worthless fruit" (Eaton in Gwyn, 2014, p.71). The apple industry had also relied enormously on the export market. The wild oscillations of the international economy in the 1920s and 1930s after WWI made apple farmers wary (Gwyn, 2014). Concerns about the long-term fiscal outlook led the Provincial government to appoint a commission in 1930 to investigate the Nova Scotia apple industry. It made many suggestions which were largely not followed up on, or at least not for a few more decades (Gwyn, 2014).[23]

One of the many suggestions that had been noted throughout the history of the apple in Nova Scotia was that "many market problems could be solved if the producers would recognize the necessity for observing the details necessary to place a good quality pack[24] on the market" (NSDA, 1934, p.104). In 1934 the Federal government established the *Natural Products Marketing Act* which led to the creation of the Fruit Export Board, which gave licences to export apples. It forced higher quality exports and charged apple shippers 1 cent on every barrel shipped to support administrative costs. This improved the reputation of Nova Scotian apples in a time when Britain was beginning to cultivate their own apples. However, the fee for shippers caused tension in the apple industry in Nova Scotia (Hutten, 1981; Conrad, 1980). Shippers thought the extra cost was unnecessary as their business depended entirely on quantity, not quality, while most farmers wanted a way to guaranty quality control. Because of protests by the shippers, after a few years the *Natural Products Marketing Act* was declared void and was replaced by a less stringent and less powerful overseeing body.[25]

Despite these tensions, apple production and sales remained high throughout the 1930s, with an average annual crop of about 1.7 million barrels over the decade (NSDA, 1939). Even so, Nova Scotia started consciously cultivating a local market for their agricultural products. The NSDA marketing division created the 'Buy Home Products' campaign in the early

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[23] It suggested selling apples in boxes, having an inspector for all fruit, and not allowing the export of the lowest quality fruit (Gwyn, 2014).

[24] A bad pack was a barrel with attractive and good quality apples on the top and the bottom, and poor quality apples in the middle (Conrad, 1980).

[25] There is a history of a heated relationship between apple growers and shippers. For a more detailed account please see:
Hutten, Anne. (1981). *Valley gold: The story of the apple industry in Nova Scotia*. Halifax: Petheric Press.

1930s to encourage the apple market at home. They also formed the league of loyal Nova Scotians, where anyone could become a member if they pledged to give preference to Nova Scotia products (NSDA, 1934).

1933 represents this contradictory narrative of success and decline of the apple industry in the 1920s and 1930s. 1933 was the peak year of apple production, and yet, the NSDA report from the year recognized that "little ha[d] been accomplished by the Division to improve the marketing of apples" (NSDA, 1934, p.110). Even as the market exploded, from 1,167,333 barrels in 1920 to 2,862,658 barrels in 1933, there were fears that it would soon implode (Longley, 1932; NSDA, 1934).

Declaration of War

September 3, 1939 marked the beginning of WWII, and with it, the NSDA's commitment to enlist the farmers of Nova Scotia "in a greater production effort" to support the war (NSDA, 1940, p.10). In order to increase production for WWII, the provincial government instated many new policies and subsidies. For example, a "substantial government cash subvention" kept limestone, a soil additive, at $1.50 per ton; fertilizer companies agreed not to increase their prices by more than $1 per ton; mechanized tractors and plows were lent to farmers at low prices to allow those without the capital to purchase machines to mechanize, cutting down on labour costs and increasing yield (NSDA, 1940). The war-inspired policies to increase production continued on and the latter half of the 20th century became obsessed with yield. This is evidenced by the fact that between 1931 and 1961 yield per apple tree went from 1.8 to 5.2 bushels (Hatchard, 1980).

Other than government aid to farming in general, WWII was not positive for the apple. As noted by the NSDA marketing branch, "a vital blow was struck at the apple industry of the province when the war was declared last September, and a severe curtailment of shipments overseas resulted" (NSDA, 1940, p.107). In the previous chapter it was shown that a majority of Nova Scotian apple sales went to England and therefore trade restrictions from the war severely limited this market. Since so many people in Nova Scotia relied on apple exports for their income, the Federal government orchestrated a support system. The Federal government

negotiated an agreement so that 1.5 million barrels of apples would be sold to processing plants in the Nova Scotia region for 65% of their average price, while the rest would be sold to wholesalers.

This marked a huge jump in the amount of apples that were processed and led to the rise of durable food products. In 1938, 240,000 cases of canned apples were produced, and in 1939 the number was around 1 million. The processing plants also began making apple juice, which quickly became popular with the Nova Scotia public. Increased efforts were put into the 'Buy Home Products' campaign for fresh apples. Despite the fact that the NSDA reported that everyone worked well together, they acknowledged that it was still a challenge to absorb such a large volume of apples into a place that was not used to them (NSDA, 1940).

The shift towards durable food products in Nova Scotia was in line with the broader global trend towards a durable food complex as identified in Friedmann's and McMichael's (1989) second food regime. Durable foods mean food that is canned, frozen, or processed to extend its lifetime. In the second food regime, there was a move to increase the processing of agricultural products and integrate them into agro-food and corporate distribution chains. Corporations became more important for both food production and distribution. With a longer shelf life, foods that were once perishable and had to be consumed locally could be manufactured and marketed elsewhere. This shift towards durable products began with the apple during WWII, and took off globally in the 1950s, reflecting a "larger trend to mass consumption and mass production of standardized products" (Friedmann & McMichael, 1989, p.108). Not only did the durable food complex allow perishable foods to be sent around the world with more freedom, it also meant that oligopolistic corporate manufactures became the main purchasers of raw materials as well as the main marketers of products (Friedmann & McMichael, 1989). Apples were no longer sold from farmer to individual, but from farmer to corporation to consumer.

Despite the faltering of the export-oriented apple market and reliance on turning apples into durable foods, Nova Scotia remained an agricultural province. Harkening back to the 1760s and the arrival of the New England Planters, the Nova Scotia Land Settlement Board made efforts to "get more suitable settlers on all the worthwhile farms owned by the Board that had

been abandoned by original settlers" (NSDA, 1940, p.172). Instead of settlement being used to lay claim to land, it was being used to replace farmers as they left their profession. Already, there was an inkling of the rural exodus that is increasingly common today. To encourage new settlers, the board gave 37 loans to settle 56 new people. The board realized the importance of following up with settlers and ensuring they had the technical skills to succeed in farming. With the increasingly technical nature of farm work, and a lack of interest among the children of farmers, there was a need for official farming education. The NSDA started classes in the technical aspects of farming such as soil chemistry, sprays, and irrigation. Farming began to be seen as a profession one learns about through scientific knowledge, rather than as an essential skill for life passed on from parents to children (NSDA, 1940).

As well as studying to become farmers, farmers were studying and experimenting on fields. The NSDA set up an experimental plot called Mouth Denson Orchards where they could test the effectiveness of different pesticides. There was a heavy reliance on spraying and a trust that it was always the way to solve the issue of pests. The control board was so committed to pesticide use that it advised "the destruction of trees" if thorough spraying could not be conducted (NSDA, 1940, p.177). The 1939 report notes that the apple maggot was relatively under control by then because of effective spraying programs. This total reliance on pesticides in the case of the apple maggot points to the broader trend of the increasingly technical nature of apple production in Nova Scotia.

Overall, 1939 was a successful year in terms of production. According to the meteorological report, there were no outstanding events that seriously affected the apple. In total, 2,300,000 barrels of apples were produced. However, even if there was no sense of failure on the production side, the consumption side of the equation heavily decreased because of trade restrictions. Only 350,170 barrels of apples were exported, 118,308 were sold to local markets, 1,223,910 were sold to processing plants, and the rest were either fed to animals or discarded (NSDA, 1940).

1939 marked the beginning of the end for the apple industry in Nova Scotia. It was the year when the British apple market became self-sufficient, and the year when England began closing their apple market to international producers in earnest. At the same time, "the conflict

in Europe dropped the guillotine on the Nova Scotia apple industry" (Hutten, 1981, p.45). WWII prevented any trade that would still have been desired. The disappearance of the British apple market was one of the most important causes of the failure of the apple industry. The failure of the apple in 1939 was a failure of consumption, not production – that is, apples were still being produced, but no one wanted to buy them. Apples were only sold because of government intervention, and even so it was at depressed prices. Without customers, the apple industry could not flourish.

The end of war, the beginning of failure

1945, as noted in the first sentence of the NSDA report "will be most vividly remembered as the year when the war ended" (NSDA, 1946, p.6). However, the second sentence describes the other outstanding feature of the year which was the "failure of the apple crop which yielded only 325,000 barrels" (NSDA, 1946, p.6). Apple production had never been so low since Nova Scotia became a serious apple-producing region and was far beneath the 2 million barrel annual average. After about 50 years of high yields and importance, the apple was a staple crop, and its absence was sorely missed.

Unlike the failure of the apple on the consumption side in 1939, the actual apple crop failed in 1945. This was because there was a late frost in March and April which caused serious damage to the buds forming on the apple trees, destroying about 80% of the crop. Although the apple crop suffered heavily, these weather conditions led to one of the best hay harvests in the history of Nova Scotia. This is a reminder of how dependent agriculture is on environmental conditions, and how the humble weather can have vast impacts on the economic lives of many people in a region (NSDA, 1946).

Since the late frost destroyed about 80% of the crop, the "apple marketing problems were almost non-existent" (NSDA, 1946, p.43). This speaks to two things. First, it reveals just how tough trade restrictions were on the apple industry as the lack of a need for marketing high production came with relief.[26] As well, it was probably assumed that exports to England

[26] Over the 6 years of WWII less than 5 million barrels of apples were shipped to England. In 1940 and 1942 no shipments were made at all. This number is small when it is considered that in 1938 alone almost 1.8 million barrels were shipped to England (NSDA, 1949).

would increase after WWII again, even if not to their historic levels. In the past, about 80% of apples were exported to England—the same amount that got destroyed by the frost. Perhaps this frost, right at the end of WWII and the trade restrictions, gave the Nova Scotia apple industry another year of hope that there would be a resurgence of the market.

Arguably, because of the loss due to weather, those involved in the apple industry did not realize the extent of the closing of the apple market in England. From other actions in 1945, it is clear that the NSDA did not think the apple industry was preparing for failure. Funded by the NSFGA, a committee was set up to visit other apple growing regions across North America and study their methods of cold storage to extend the marketing season. The resources invested in research imply that there was still hope for the success of the apple industry in the future.

The committee gave nine recommendations which helped influence the increasing move towards capital intensive, mechanized agricultural production, and processing and handling that allowed the farmer to defy natural tendencies to deteriorate. The key recommendation was to construct forced air circulation storage systems. The construction of these storage facilities required money; increasingly, apple farming and developments required serious capital investment. To respond to this, in 1945 the Provincial government passed the *Act to Provide Loans for the Establishment of Cold Storage Plants*; most notably, they gave out $115,000[27] to the United Fruit Company of Nova Scotia (NSDA, 1946).[28] Climate control was always understood as a good way to preserve apples and that is why they were stored in fruit cellars in the past. Unlike cellars, cold storage plants require lots of energy. The extra energy was worth is because artificially climate controlled storage areas, especially as technology advanced, allowed apples to maintain their quality and crispness until the next harvest (O'Rourke, 1994). Cold storage is a way to defy natural seasonality and have fresh apples available all year round.

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[27] According to the Bank of Canada inflation calculator, that is the equivalent of about $1.6 million in 2014.

[28] The United Fruit Company of Nova Scotia was a cooperative. Cooperatives played an important role in the apple industry in Nova Scotia, but escape the scope of this thesis. For more, please see:
Hutten, Anne. (1981). *Valley gold: The story of the apple industry in Nova Scotia*. Halifax: Petheric Press.

Another seemingly insignificant recommendation of the committee was that standard box packing be implemented in Nova Scotia instead of the barrel. One proof of a successful industry, like the apple industry in the past in Nova Scotia, is that it produces spin-off industries. Apple barrel making required skill to get the measurements and curvatures right and thus employed many people in Nova Scotia (Hutten, 1981). Boxes, on the other hand, can be constructed by unskilled labourers or machines. This small move to boxes over barrels set off a change towards increased mechanization in the industry. Not only could boxes be made in a more mechanized fashion, but the box shape allowed for increasing mechanization in the actual processing and packaging of apples. After studying other apple regions that used box storage, the committee suggested looking into mechanical graders, box conveyer systems, and other cutting-edge apple processing machinery used in large apple-producing regions in North America (NSDA, 1946). The interest in bringing Nova Scotian processing techniques up to industry standard shows that they knew the Nova Scotia apple industry was lagging behind, but implies they thought it would continue to be important within the province.

The transfer of technologies of war

According to Ron Kroese, an environmental leader and current environment program director at the McKnight Foundation, "World War Two did not so much end…as turn its guns and bombs on the land" (Kroese in Roberts, 2013, p.35). Wayne Roberts, internationally recognize food policy leader, calls the post-WWII food system a modernist one. That is, it revels in technology's ability to free humans from nature's rules. The poisonous gases and chemical advances of WWII were applied in the agricultural battle against pests and weeds. The mechanical advances of WWII, combined with a modernist desire to free humans from "scarcity, ignorance and drudgery" spurred on the burgeoning pre-war move to mechanization (Roberts, 2013, p.36). It must also be remembered that this move towards mechanization, pesticides, herbicides, and synthetic fertilizers also meant that agriculture became more reliant on energy. This was provided for through the affordable post-WWII abundance of fossil fuels (Roberts, 2013).

In North America, and the United States especially, there was a faith put in technological progress in agriculture. In the 17th and 18th century in Nova Scotia the apple orchard acted as proof that humans could domesticate and control the wilderness. Technological improvements continued this dream and the human ability to execute it. Although not Nova Scotia specific, this notion of domination of nature through agriculture can be seen clearly in a film by the American Petroleum institute in 1950. It says with new petroleum-inspired innovations in agriculture, farmers could "fight the odds of nature instead of giving into them" (Film Counselors, 1950).

As can be seen from the previous chapter, these changes were already stirring before WWII. However, the move towards high-input, highly mechanized, high-yield warfare agriculture really picked up after WWII. Spray circles, or organizations in each county that gave advice to farmers about spraying, became more active upon the end of WWII. This is because there were qualified men that could be trained, and with the War over it was justified to put more resources into the spray circles (NSDA, 1946). In 1949, there was mention for the first time of 'weedicides', or chemical weed killers which we now refer to has herbicides. They were found to be effective, but still too expensive for regular use. Classes on soil management increased and the use of synthetic fertilizers was casually mentioned throughout the report, suggesting it had been completely incorporated into mainstream farming. Interestingly, there was a small section of the report entitled bee poisoning. Already at the time, it was noticed that "the mortality among bees as the result of the use of arsenical sprays was very high" (NSDA, 1946, p.130). However, instead of decreasing the use of pesticides, it was thought that the only way to prevent bee loss was "to move the bees to a location where spraying is not being carried on, and then bring them back after the danger of poisoning is over" (NSDA, 1946, p.130). It seems in the agricultural war too, causalities and displacement were seen as unfortunate necessities.

Not everyone was immune to the obvious warning signs of indiscriminate spraying. In 1929, Allison Pickett, the provincial entomologist, began questioning the spray program. He was the person who introduced the idea of spray circles to educate farmers about pesticide best practices. Most people were huge supporters of pesticide use and each new wave of pests

that threatened commercial damage was fought with a chemical compound; growers and the government failed to think farther into the future and evaluate "the escalating warfare between man and the many competing species which interfered with his daily work" (Hutten, 1981, p.95).

A few farmers, like Jack Marriott from Starr Point farm who put sheep on his orchards to eat apple maggots, recognized less capital intensive and destructive ways to destroy pests. But Marriott was the exception. Despite Pickett's calls to curb pesticide use, he was told his job as provincial entomologist was to create "visible results which would control the bugs and put money in the growers' pockets," not worry about environmental concerns (Hutten, 1981, p.101). There was no budget to study ecological issues, but he and some supporters did sneaky research. Eventually, farmers and the Federal and Provincial governments began listening to Pickett. By 1951, "most growers had become convinced that the modified spray program not only reduced costs, but encouraged the buildup of natural control factors" (Hutten, 1981, p.102). The modified spray program definitely curbed pesticide use and revealed that humans can have a significant negative impact on the environment. However, a reliance on chemicals was entrenched in post-WWII agriculture.

Long lasting changes

After years of war-related trade restrictions followed by destructive weather, 1949 still showed "no improvement in the apple market" (NSDA, 1950, p.139). The agricultural conditions for the year were satisfactory and 1,262,881 barrels of apples were produced. The export market was severely decreased, and apples all over North America were plentiful, making it harder for Nova Scotians to sell their apples domestically. Nova Scotian apple farmers had been suffering for a while, so the province got the Federal government to make an arrangement with the British Ministry of Food to enable Nova Scotia to ship 500,000 barrels of apples to England at the depressed price of $3.90 per barrel. Here we see the government intervene to help ease the 'material struggles' of the farmers who were dependent on large exports to England (NSDA, 1950). However, the 1949 NSDA report finally recognized that "with the closing of the [British] market" there will need to be long-lasting changes in marketing strategies (NSDA, 1950, p.139).

In 1949, even though there were unemployment problems and a surplus of soldiers returning from WWII, there was still a need for immigrant farm labour because "a great many of the unemployed men will not consider accepting farm work and, of course, a great many are not qualified to seek farm employment" (NSDA, 1950, p.135). The beginnings of our current struggle with aging farmers could already be seen in Nova Scotia by the 1940s.[29] This problem of farm labour shortages, ironically, was made more difficult by an increasing use of labour-saving mechanization. As the report notes, "the farm hand must be capable of operating expensive machinery" and have technical skills, rather than the intimate knowledge passed on through a lifetime of experience living on a farm as would have been conventional in the past (NSDA, 1950, p.135).

The move towards mechanization and technical skills could also be seen in the way soil nutrients were understood. In the 1940s the NSDA initiated a Farm to Farm survey where they would analyze soil samples in a laboratory from any farm that requested it. This was to inform farmers of what fertilizer to use (NSDA, 1950). Rather than being in touch with the land, and nurturing it to create healthy soil, fertile soil was simply understood as a composite of specific nutrient levels that could be adjusted through synthetic additions. This is a move away from farmers seeing themselves as part of maintaining the soil, towards specialists studying the soil and then farmers adding the proper array of nutrients.

Farmers struggled to take proper care of the soil. Already in 1939 the NSDA noted that after humans remove the trees and ground coverage to create farm land, there is a risk of soil erosion. They called on every farmer to at least partially mitigate this "immense loss" (NSDA, 1940, p.148). However, the problem persisted. As reported by the NSDA in 1949, a study from the previous year revealed that soil erosion "is much more extensive and is more serious in this Province than is generally recognized" especially when it came to the erosion of the "all-important top-soil" that provides nutrients for plant growth (NSDA, 1950, p.78).

Another one bites the dust

[29] According to the 2011 census, 48.3% of farmers in Canada were 55 years old or above (Statcan, 2012).

The NSDA report from 1960 is markedly smaller than the previous books, and is also the first that does not start with a meteorological report. Although this may seem like a small change, it arguably represents a major shift that took place in agriculture. Agriculture was no longer about a human relationship with the earth, instead it was about mining the soil for commodities. The report itself acknowledges the constant changes in agriculture and says that there is a new emphasis on farm management. The tone is also different: this report has a business oriented rhetoric, rather than the explanatory tone of past reports. The NSDA reported positively that the emphasis on farm management had "resulted in more rational decision-making by the farmers of the province and this higher level of management has been identified with higher output per unit" (NSDA, 1960, p.25). For the first time, there is an emphasis on production and yield. Rational decisions are defined within the paradigm of high production, not quality or sustainability of the product. Farming became something done by experts—scientists figured out soil requirements and spraying regimes, business people marketed the product.

The increased directive force of capital and capital accumulation, as described by Friedmann's and McMichael's food regime theory (1989), is visible in this report. For the first time there is a section on the current value of farm capital in Nova Scotia, such as land, building, livestock, implements, and machinery. 1959 was a year of unattractive agricultural prices, but "farmers of Nova Scotia have made greater gains in developing their operations on a commercial business basis than ever before" (NSDA, 1960, p.7). The report also noted the trend towards larger farms being operated on a business-like basis.

For the first time, apples do not have their own section in the statistics part of the report. Instead, reports of animal and animal products took up more space. This fits with Friedmann's and McMichael's description of increased consumption of animal products per capita with the coming of the second food regime (1989). As well, by 1959, most apples were stored and transported in boxes, not barrels. Because of this change, their production began to be measured in bushels.

The 1950s marked the depth of failure for the Nova Scotia apple industry. By 1957 this failing spiral stabilized, but only about half of the apples trees from 1939 were still in existence

(Conrad, 1980). In 1959, 699,690 barrels[30] of apples were produced (NSDA, 1960). The apple was still the largest agricultural fruit product by far.[31] However, the contraction from historical production peaks was so large, and the economic devastation so vast, that this qualifies as failure. For a graphical look at the alarming decline in apple production please see figure 2.

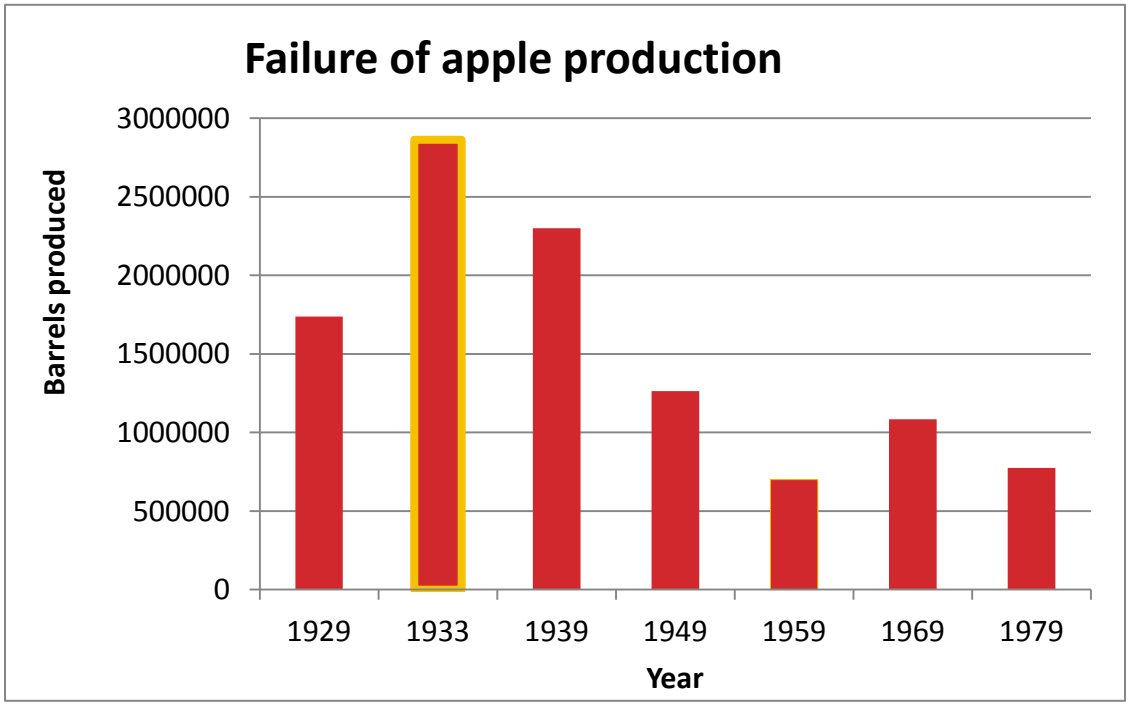

Fig.2 This represents apple production every 10 years from 1929 to1979. Note that 1933 is the year with the highest yield of apples in Nova Scotian history. These numbers were gathered from NSDA reports from 1934, 1939, 1949, 1960, 1970, and 1980 (see works cited for details).

For the first few years of the faltering apple market the Federal government, after urgings from the NSFGA, helped out the Nova Scotia apple farmers. The Federal minister of agriculture in the 1950s, James Gardiner, realized that "growers were in desperate straits" (Hutten, 1981, p.149). The Federal government helped set up the half million barrel deal with Britain in the 1940s and also helped subsidize orchard improvement. On the other hand, Conrad argued that the Federal government purposely confined agriculture in the Annapolis Valley to the regional market and did not help search for external markets. This meant the industry fell into a dependence on government aid and would remain underdeveloped (Conrad, 1980). The NSFGA petitioned for short-term government support, but failed to plan into the

[30] 2,260,000 bushels
[31] In the same year, the pear crop reached 35,000 bushels (NSDA, 1960).

long term. As well, many, including the NSDA itself recognized the NSDA and the NSFGA were not effective at marketing the apple (NSDA, 1934; Gwyn, 2014). However, neither party can be blamed entirely for this failure of the apple industry as by this point it seemed inevitable. England's sell-sufficient apple market, as well as an increase of apple orchards internationally made the sector even more competitive (Hutten, 1981; Gwyn, 2014). Between 1962 and 1987 the top three exporters of apples were France, Chile, and Italy, with Canada not even making the top ten (O'Rourke, 1994).

Changing markets, changing production

After the historic low of apple production in the 1950s, the apple industry slowly began to rebound because a "strong demand for the crop ha[d] been established on local domestic markets" (NSDA, 1970, p.9). Farmers focused on thinning their orchards and "concentrated on producing quality rather than quantity" (NSDA, 1970, p.21). It seems there was a real acceptance of the changing nature of the apple market –orchard planting slowed and unpopular varieties were uprooted. While Prescott himself brought over one hundred apple varieties to Nova Scotia, and farmers used to grow a diversity of varieties, there was a movement towards efficiency and growing a higher quantity of a less diverse variety of apples (Hutten, 1981; NSDA, 1970). In the United States, a study found that between 1892 and 1910 commercial apple varieties went from 735 to 472, by 1941 the diversity had fallen to 269, and by 1975 only about 100 varieties were grown commercially (Wynne, 1975). Farmers wanted to specialize in what was popular. A similar trend was visible in Nova Scotia. Already in 1926 there was a call by the NSDA of agriculture to grow fewer varieties in order to take advantage of the economic benefit of mass production. Starting soon after, famers were told to focus on only seven of the most popular varieties: Crimson Gravenstein, Cox's Orange, Red King, Golden Russet, Red Spy, Baldwin, and McIntosh Red (Eaton, n.d.). By the 1940s the economic pressures of failure led to the NSDA helping this variety consolidation along with the orchard rehabilitation program. It subsidized farmers to switch over to marketable varieties (NSDA, 1949).

By the late 1960s, herbicides had become mainstream. They were used on about 60,000 acres of cropland, and were even used by the Provincial government for aesthetic purposes on highways and public access places (NSDA, 1970). In 1969, aerial spraying of pesticides on orchard blocks by helicopter was first introduced for experimental purposes. The aerial spraying program seems to contradict a move towards the modified spay program, however, it fit with the move towards mechanization and growing farm sizes (NSDA, 1970).

The NSDA purposefully encouraged increases in farm size. In the 1960s, Nova Scotia became part of the Federal ARDA project 22015 on farm consolidation and land use. The number of farms and acreage developed for agricultural use continually decreased in Nova Scotia as there was a trend "toward fewer and larger farms" (NSDA, 1970, p.28). It seems that in the quest for efficiency, there was a move towards bigger, monoculture apple orchards.

Nova Scotian farmers produced 1,083,591 barrels[32] of apples in 1969. This was a relatively large increase from the depths of 1959, but still only 50% of average annual production in the 1920s and 1930s. 1969 is a notable year because it is the first year farmers could buy crop insurance to cover spring-seeded grains, fall-seeded grains, and tree fruits (NSDA, 1970). Farms were so large that a crop failure would not only mean the loss of an annual income for one family, but for all the people that worked on the farm.

In 1979, 774,615 barrels[33] of apples were produced. Of these, 6.4% were exported, 55.5% were processed, and 38.3% were sold fresh within Canada (NSDA, 1980). These numbers represent a marked change in apple distribution. As the large export market in Europe disappeared, Nova Scotia had to reorient its apples to the local and processing markets. The processing market responded much more quickly to the loss of the export market, but the local market for fresh consumption was eventually cultivated as well.

Figure 3 outlines the changing market. The first graph from 1933 shows the apple's dispersion at peak production when most exports were still going to England. The graph from 1939 shows the sudden reliance on processing necessitated by WWII. The graph from 1979 shows the growth of the local market and continued reliance on processing.

[32] 3,050,000 bushels
[33] 2,420,000 bushels

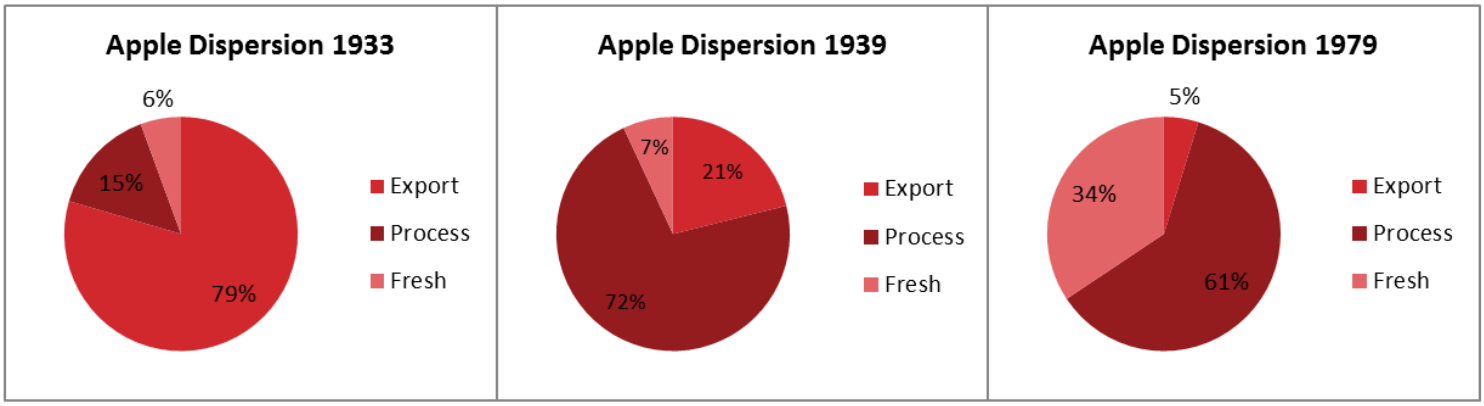

Fig.3 These charts follow the dispersion of apples in three key years – the peak year of production, the first year of WWII, and at the end of period of time studied in this thesis. These numbers were gathered from NSDA reports from 1934, 1949, 1960, and 1970 (see works cited for details).

Core Changes

By 1980, or the official end of this study, fruit products as a whole made up only 7% of Nova Scotia's agricultural cash income while animal products accounted for 75% of farm income (NSDA, 1980).[34] Here, the increased economic viability of animal production is visible. The trend towards increased animal product consumption did not go unnoticed by the NSDA. In the 1980 report there are tables of the per capita consumption of red meat and poultry in Canada, showing that they were tracking and responding to consumer demands.

Since the peak of the apple industry in Nova Scotia, apple orchards were torn up, apple varieties were streamlined to meet consumer desires, pesticides, synthetic fertilizers, and herbicides were used extensively, machines largely replaced human labour, farm sizes grew, there was an increased emphasis on high yield agriculture, soil eroded, and agriculture began to have a serious impact on the environment. Increased mechanization in both growing and processing of apples required more initial capital investment. The move towards larger and more productive farms shows the emphasis on profit and capital accumulation. The failure of the apple industry in Nova Scotia happened in the midst of creation of the modernist food system.

[34] Dairy products made up 29% of cash farm income, cattle and calves 17%, hogs 11%, poultry 10%, and eggs 8% (NSDA, 1980).

Conclusion

Looking back at where we came from allows us to better understand where we want to go. This study has presented a select history of the apple from 1605-1980. In the 17th and 18th centuries, the apple, and agriculture more generally, was used as a settlement tool. The apple was one of the factors that allowed the Europeans to appropriate Mi'kmaq land, supported settlement by provisioning the settlers with cider, was used to attract people to settle on Nova Scotia soil and solidify control over the area, and was also a symbol of the European's relationship with nature. In the 19th century, the apple put Nova Scotia on the world stage and helped the English realize the potential of this tiny corner of the British Empire. In the early 20th century, the apple trade reached its peak, providing money, jobs, and a sense of identity to the farmers of Nova Scotia, specifically those in the Annapolis Valley. During this time, the apple industry became more mechanized and chemical input-intensive. After WWII, the trends towards mechanization and chemical inputs became further entrenched as farms attempted to become more efficient and productive. This is the period where the apple industry failed.

The question remains: why did the once-promising Nova Scotia apple industry eventually fail, despite significant geographic advantages and a promising early history? While it is impossible to give a conclusive answer, some preliminary conclusions can be made.

First, protectionist economic policies of the 1920s and 1930s encouraged the creation of a European apple market. 1939 marked the year when the British apple market became self-sufficient and England bought significantly fewer Nova Scotian apples. Second, the Nova Scotian apple industry relied too heavily on one consumer. Since between 75-80% of their sales were to England, the closure of this market gutted the industry. The industry suffered from putting all its apples in one basket, so to speak. Third, a problem that plagued the industry from its inception was that of quality control and a lack of differentiation. Nova Scotia grew mostly medium quality, cheap cooking apples because that is what the British wanted in the late 19th and early 20th centuries. As the British market closed, and international apple production increased, Nova Scotia had no way to stand out in the increasingly competitive global apple market. Nova Scotia, as was noted time and time again, has prime agricultural conditions for apple growing, yet it failed to take advantage of this. It focused on producing a cheap raw

material rather than the differentiated or value-added product that the climate would allow. Fourth, although environmental factors, such as an early frost in 1945 and Hurricane Edna in 1954 led to the failure of individual apple crops, this study found that climatic factors did not lead to the trend of failure that began after WWII. Fifth and finally, the NSFGA and the NSDA can be blamed for non-aggressive marketing techniques and not attempting to foster new markets after the loss of trade with England.

One bad apple don't spoil the whole bunch, girl

Despite the fact that the industry failed after WWII, it has not completely disappeared. In fact, the tale of the apple industry from 1980 onwards has two contradictory themes. The first is a notion of gloom as everyone realized the apple industry might never again be economically viable, let alone as lucrative as it once was. The second is a notion of hope as a new variety of apple, the honeycrisp, was invented, the government gave money for orchard rehabilitation, and farmers moved towards differentiated and value-added products.

The apple industry struggled to make money because of a lack of markets, and the high cost associated with chemical inputs and labour. Even with mechanization and a move towards consolidated farms, this still posed a problem. By 1992, Federal and Provincial government support payments accounted for more than 16% of apple farm revenue (Gwyn, 2014). Huge farms, the result of the consolidation that started in the 1960s, were bringing in revenue, but they were not making an overall profit. Between 1980 and 1990, the 11 biggest apple growers had an average revenue of $116,100, but they still had a net loss of $0.65 per bushel. Subsidies were paying the way and it was thought that if the big, high-input, high-yield farms could not make money, then small scale farms certainly would not be able break even (Gwynn, 2014). These difficulties were compounded by the fact that the global apple market was highly subsidized by governments, which led to over production and a collapse in the price of apples in the 1990s on a global scale (O'Rourke, 1994; Gwyn, 2014). As well, local supply chains became more consolidated, which benefited some, but forced many other growers to struggle as they found their farms in the wrong locations for the convenience of large supermarkets (Gwyn, 2014).

However, the 1990s also brought hope to the Nova Scotia apple industry. In 1994 the first significant government grant, totalling one million dollars from the Federal and Provincial governments, was given to support farmers as they tore out undesirable apple tree varieties for more popular ones. 1991 marked the introduction of the honeycrisp to Nova Scotia. As the name suggests, the honeycrisp is a sweet and firm apple which is great to eat raw. Nova Scotia has an ideal climate to produce a perfect honeycrisp, so in 2005, the Nova Scotia government gave $235,000 for five years with a goal to plant 300,000 trees, 70% of which would be honeycrisp. Neither of these goals was reached in full (Gwyn, 2014). However, the honeycrisp has caught on around the world and Dela Erith, recent president of the NSFGA, still sounds the same as apple growers all the way back in the 19th century by claiming that Nova Scotia's climate is perfect for apples, specifically the honeycrisp: "the combination of our cold fall nights and warm fall days causes the apple to develop that incredible iridescent red color that it is so well known for. It's an awesome product. Consumers love it" (Erith in Mason, 2010).

With this renewed hope came a need for apple products to differentiate themselves. Andrew O'Rourke, professor of agriculture and economics at Washington State University, wrote in 1994 that "the consumer market is going to become increasingly segmented, with specific niches requiring different products" (O'Rourke, 1994, p.211). The apple industry in Nova Scotia has been trying to develop niche markets in two ways. One way to do this is through technological innovation and a continuation of the recent past. It is an attempt to use science to make Nova Scotia apples stand out. The second is a return to the distant past. It is an attempt to re-ignite local economies, focus on organic production, and make quality value-added products.

Vasantha Rupasinghe is the tree fruit research chair at the Truro Agricultural College. One of his research goals is to develop and evaluate "value-added health food" and "natural food additives" (Dalhousie University, n.d.). He has noticed the trend to incorporate nutrients, such as omega 3s, right into the food we eat and is researching how to make the apple healthier (Mason, 2010). He is also working to develop apples that are the right size and shape for processing, and apples that can have a longer shelf life and will not brown as quickly (Mason, 2010). Okanagan Specialty Fruits, an agricultural biotech business also wants to

improve the apple through science. They created the Arctic apple by genetically modifying the golden delicious so that it does not brown when cut and exposed to air. Proponents say it will be beneficial for the pre-cut apple industry. However, Robert Peill, current president of the NSFGA said that people are "jittery about anything genetically modified" and that the introduction of this variety could jeopardize all of Canadian apples in order to benefit the very small pre-cut apple market (Delaney, 2014). It is still not certain whether the genetically modified apple will be approved for market.

Another way to differentiate a product is to move towards local and organic production, as seen in the tobacco industry in the United States. In 2007, the theme of the NSFGA annual convention was to focus on local consumers, a far cry from the export-oriented markets of old. The Nova Scotian government also launched the Select Nova Scotia campaign to encourage local consumption, which is reminiscent of the Buy Home Products campaign of the 1930s. This is picking up on the consumer trend to support local food in order to invigorate local economies and cut down on carbon emissions from food transport (Roberts, 2013).

As well, instead of trying to make money by selling a vast quantity of medium quality apples, there is a trend towards value added. One way to add value is by growing organic apples. According to the government of Nova Scotia, there is a strong organic community in the Maritimes asking for more organic produce. Growers are slowly responding and in 2006 there were 6,000 acres of organic apple production (Government of Nova Scotia, n.d.). Another way to add value is through processing. It seems the apple is going back to its roots, so to speak, and cider is catching on again. Almost 400 years after the Acadians made cider, Hanspeter Stutz opened up a winery in Grand Pré making fine apple dessert wine, and then cider as well in 2001. Unlike 20th century processing, "it's not enough just to make, say, ten million litres of juice…we can do much more with apples" (Stutz in Mason, 2010).

Sowing the seeds to a new food regime

As this study comes full circle with a return to the apple cider of Grand Pré it is beneficial to re-examine food regime theory. The first food regime centered on state-led, colonial-style trade. The second food regime used science and inputs to industrialize food

production and led to what is now called the modernist food system. This study of the apple in Nova Scotia ended in 1980, approximately coinciding with what many regard as the end of the second food regime. McMichael argues that the third food regime started in the late 1980s and was characterized by deepened global exchange, consolidated supply chains, and an increasing connection between fossil fuels and food production (McMichael, 2009).

Beyond being a tool for analysis, food regime theory has "ethical potential' because it illuminates "how we live on the earth, and how we live together" (McMichael, 2009, p.164). It forces us to think about agriculture in a more holistic way in that it erases the society-nature binary, politicizes the food system, and helps us think about it as more than a capital-driven entity (McMichael, 2009). The apple industry in Nova Scotia will likely never return to the peak days of production in the 1930s, but it has potential to succeed in a new way by focusing on local, organic, and value-added markets. In order to be successful, this study argues that the apple industry in Nova Scotia needs to transition into a fourth food regime, based on a different set of values, a transformed relationship with nature, and a new approach to world markets.

We study the past to understand where we came from, who we are now, and where we will go in the future. The tragedy is not the failure of the apple industry in Nova Scotia, but if we fail to heed the warnings associated with its decline. There is growing evidence that the modernist food system of the third food regime is failing both the planet and the people it is intended to feed. In an age of peak oil, climate change, growing hunger, and obesity we need to move away from mechanized, anonymous, globalized, high-input, highly processed agriculture and food. The real agricultural failure at stake here is if we fail to transition into a fourth food regime — a food regime that focuses on vibrant and economically sustainable local food systems that provide jobs for people, not machines, and is full of compassion for fellow humans and the earth.

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