“Reasonable Tact and Diplomacy”: Disease Management and Bovine Tuberculosis in North America: 1890 - 1950

by

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ABSTRACT

“REASONABLE TACT AND DIPLOMACY”: DISEASE MANAGEMENT AND BOVINE TUBERCULOSIS IN NORTH AMERICA, 1890-1950

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This dissertation is an investigation of bovine tuberculosis eradication in Canada and the United States from the beginning of formal intervention in the early 1890s to 1950. A zoonotic disease, capable of passing from animals to humans, Bovine tuberculosis emerged as a significant public health and livestock health issue in the late nineteenth century. Eradicating bovine tuberculosis, therefore, came on two fronts; suppressing and managing the disease in livestock, and preventing diseased livestock products from human consumption.

Using the jurisdictions of Ontario and New York State, this study details bovine tuberculosis legislation over the roughly sixty years it took to successfully suppress and manage the disease. Particular attention is directed towards the formation, practice, and transformation of policy on both sides of the border, the public and livestock health implications of the disease, and the role of the state and veterinary medicine in disease intervention and management. This work complements and builds upon studies produced by scholars such as Olmstead and Rhode, Jones, and Jenkins, who have adopted various approaches to the history of bovine tuberculosis. In particular, by placing bovine tuberculosis intervention in New York State and Ontario alongside one another, key contrasts are observed in the structure of authority for disease control, competing ideas about the nature and implications of the disease, and the policies that resulted.

Over time, distinct programs practiced on either side of the border grew into similar, widespread national testing programs with compensation for livestock owners. This study will explore the tremendous collaboration between Canada and the United States in terms of bovine tuberculosis thinking and practice that saw management efforts unfold, and shed light on an underexplored body of individuals who were critical to the suppression and management of not only bovine tuberculosis, but a host of other infectious diseases: veterinarians. Veterinarians such as John G. Rutherford of Canada and Veranus Moore of the United States were central to the formation, practice and transformation of bovine tuberculosis policy in the early twentieth century. It would be through these individuals that the power of the state would meet the disease on the ground. Bovine tuberculosis, despite the fanfare that surrounded the scientific understanding of it discovered in the nineteenth century, was not a disease suppressed and managed through a dramatic intervention of science, but a steady and dedicated intervention of the state. It was bureaucratic innovation, not necessarily scientific innovation that saw this disease successfully brought under control.
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Introduction:

It is recognized that tuberculosis is widely prevalent among cattle and other animals and that the frequency with which this great evil occurs is increasing rather than declining. As tuberculosis is one of the strictly preventable infections, there is good ground for the belief that through the formulation and enforcement of proper regulations the disease may eventually be entirely suppressed.$^1$

This quotation was taken from the final report of the International Commission on the Control of Bovine Tuberculosis, published in 1910. The commission was appointed in 1909 by the American Veterinary Medical Association and was made up of top Canadian and American veterinary scientists, members of the meatpacking and dairy industry, and public health authorities from both sides of the border. Their task was to study the problem of bovine tuberculosis and the shape of intervention in both Canada and the United States to date, and to recommend a new program of legislation for each nation to follow.

The International Commission was a pivotal event in the long history of bovine tuberculosis, a serious and sometimes deadly infectious disease of livestock. Bovine tuberculosis was the result of a bacterium known as Mycobacterium bovis, a variant of the Mycobacterium tuberculosis complex. A rod-shaped bacteria, it was first identified by Robert Koch in 1882. The most frequent cause of the disease in animals is airborne exposure to the bacteria that then infects

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the lungs and thoracic lymph nodes as it requires few organisms to infect individual animals.\(^2\) Cattle may also contract bovine tuberculosis by ingesting, food, water, or milk infected with mucous, urine, or feces contaminated with \textit{M. bovis}. In these cases the pathogen concentrates primarily in lymph tissues in the intestinal tract.\(^3\) In addition to causing bovine tuberculosis in animals, \textit{M. bovis} is also one of the three strains of \textit{Mycobacterium tuberculosis} (\textit{M. tuberculosis}) that affects humans.\(^4\) Bovine tuberculosis emerged in the late nineteenth century as a significant animal and public health issue and possesses a controversial past. The scientific understanding of the disease was not always clear, but its potential implications for livestock and human health were very serious. Bovine tuberculosis had the potential to spread to every corner of the livestock industry and devalue this important part of the agricultural economy. In humans, it had the potential to claim many lives.

This dissertation examines bovine tuberculosis suppression and management in Canada and the United States from 1892 to 1950. It focuses on New York State and Ontario, and explores the formulation, implementation, and influence of bovine tuberculosis legislation in these two jurisdictions. It begins with the first programs devised to address bovine tuberculosis in New York State in 1892 and ends with the incorporation of the last bovine tuberculosis restricted area in Ontario in 1950. In doing so, this project connects with the broader historical issues of the management of emerging infectious diseases and the intersection of human and animal health.

New York State and Ontario are important and ideal jurisdictions to examine. Located in eastern North America, both Ontario and New York State possessed substantial human and domestic livestock populations. For example, by the time the final legislative programs for bovine tuberculosis in both New York State and Ontario were implemented in 1917, 1919 and 1922 respectively, both jurisdictions contained large and valuable livestock populations. New York State in 1920, for example, boasted a cattle population of around 2,144,244, valued at $198,826,728. The cattle population of the United States at this time stood roughly at just over 66 million. Roughly three percent of American cattle resided in the geographically small State of New York. This quantity of livestock, in addition to the numbers of cattle that would transit through the state to other locations, makes New York an epidemiologically important place to consider.

As one of the major cattle and particularly dairy centres in Canada, Ontario, like New York State, is an epidemiologically important location to consider. When the province’s final legislative program, the Restricted Areas Plan, was introduced in 1922, Ontario boasted a cattle population of approximately 2,836,181. Canada’s cattle population in total in this period stood at roughly 9,719,869, placing nearly thirty percent of Canadian cattle in Ontario. The province, therefore, was a significant locus in the Canadian livestock industry and proved to be an important reservoir of bovine tuberculosis.

This study primarily centres on the formation and implementation of disease policy and offers a significant contribution to the historiography of bovine tuberculosis and the history of disease generally. First, this study presents a counter-narrative to the “great scientists” and “great cures” attitude towards the history of disease and argues that the suppression and management of bovine tuberculosis was the result of a sustained bureaucratic effort, rather than a dramatic intervention of science. Secondly, this study explores the role of veterinary medicine and the state. Veterinary science and veterinarians are regular features of historical examinations of bovine tuberculosis. This study builds on this tradition by exploring the role of veterinarians as in the formation and implementation of bovine tuberculosis legislation and their role as policymakers. Thirdly, this study presents an in-depth examination of bovine tuberculosis and disease management in eastern Canada and the United States. The historiography of bovine tuberculosis and livestock in general tends to be one that is progressively westward or very broad and not focused on any one place. Some historians have begun to place emphasis on the east and this study will build on that momentum. Finally, building on Ontario and New York, this study will contribute to the ongoing historiography of bovine tuberculosis and disease by exploring how the disease was suppressed and managed in different political jurisdictions. Ontario and New York State, with similar human and livestock populations, illustrate how two similar jurisdictions went about about disease management in very different ways, largely due to the structure of authority that governed intervention.

Bovine tuberculosis is a zoonotic disease, meaning it can pass from animals to humans. People most commonly contract the disease through the ingestion of infected meat and milk.  

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The intimate connections between humans and cattle created by this disease came to the fore in the late nineteenth century. This was a period that saw a great transformation in the scientific understanding of bovine tuberculosis and the significance of its place in the human and animal populations of North America. The formal identification of the bacillus that caused tuberculosis occurred in 1882 by the German bacteriologist Robert Koch. The identification of the bacillus and the subsequent development of a diagnostic agent, tuberculin, to identify the disease was a significant event in the history of the disease and strengthened the growing concerns and call to action in that period regarding the disease both in humans and livestock.

Since the late 1960s, historical examinations of bovine tuberculosis have been comprised of a handful of core works. Those of particular importance to this study include works by J. Arthur Myers and James H. Steele, Keir Waddington, Barbara Rosenkrantz, Susan Jones, Alan Olmstead and Paul Rhode, and Jane Jenkins. Myers and Steele’s 1969 work *Bovine Tuberculosis Control in Man and Animals* stands as the first and foundational examination of the eradication of bovine tuberculosis. Their work, exploring a more positivist “…achievement in gaining mastery over a disease by man…”\(^\text{10}\) examines, among other aspects, the genesis of veterinary medicine and animal disease intervention as a state activity, the contentious science of tuberculosis, the existence of the disease in human populations, and eradication initiatives for the disease in livestock worldwide. The attitude of “great scientists” and “great cures” permeates other early works on the history of the disease as well. J. Arthur Myers, for example, chose to title his 1940 work *Man’s Greatest Victory over Tuberculosis*.\(^\text{11}\)

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The varied reactions to bovine tuberculosis by different groups of people have long been a central thrust in the historiography of the disease. Myers and Steele, for example, examine bovine tuberculosis intervention in various parts of the world in their work. The second half of the work, authored by Steele, provides several summaries of global bovine tuberculosis eradication work. For example, Steele writes extensively of Germany and Great Britain’s long struggle with bovine tuberculosis. He notes, for example, the alarming post-World War II rate of bovine tuberculosis in Germany, which stood roughly at 60% of the national herd. Beginning their eradication program in 1952, the German government reported their national herd, which stood at just under 12 million animals, free of tuberculosis by 1962.12

Chronicling the response to bovine tuberculosis reveals the magnitude of issues the disease created for both livestock and public health. George Jasper Wherrett explores the historical relationship of Canadians with tuberculosis, a disease he characterizes from the outset as one that “…struck terror in human hearts.”13 Wherrett’s volume contains a single chapter on bovine tuberculosis in Canada in which he outlines the public health issues bovine tuberculosis presented in the form of contaminated meat and milk, the various eradication programs implemented by the Canadian government, and the incorporation of bovine tuberculosis in various international tuberculosis conferences in the early twentieth century.14 Wherrett’s work is similar in many ways to Myers and Steele’s in that while acknowledging the often contentious

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12 Myers and Steele, Bovine Tuberculosis Control in Man and Animals, 262-272. Steele’s examination of China’s bovine tuberculosis eradication is decidedly thinner. Noting an unnamed survey, the rate of bovine tuberculosis was estimated to be somewhere between 5% and 10% in the mid 1950s. After the application of tuberculin to their dairy cattle (again, Steele makes no mention of the form or function of this testing program), by 1964, the rate had fallen to less than 1%. See Myers and Steele, Bovine Tuberculosis Control in Man and Animals, 292.
14 Wherrett, 137-148.
scientific understanding of bovine tuberculosis and the implementation of programs to combat it, the story told is one of ultimate triumph.

The process of creating bureaucratic structures to address bovine tuberculosis connects Myers and Steele to more recent treatments of the disease. Throughout the first half of the book, Myers explores the establishment of animal health as an activity of the American government. In doing so, he emphasizes the necessity of government intervention and oversight in animal health issues and the centrality of infectious disease in that intervention, highlighting the role of bovine tuberculosis in the establishment and operation of various aspects of animal health infrastructure. Myers explores the establishment of the Bureau of Animal Industry (BAI) in 1884 and a selection of its divisions directly related to bovine tuberculosis, including the Inspection of Meats Division in 1890, the inclusion and expansion of the Quarantine Division, first established in 1865, and the Tuberculosis Eradication Division in 1917.15

The shape and transformation of bovine tuberculosis legislation in the United reflected the growing problem in that period of the disease as an animal and human health issue and how private solutions over time transformed into a large state effort to eradicate the disease.16 Alan Olmstead, for example, argues that the United States, despite some setbacks, experienced “…spectacular success”17 in its animal health infrastructure. Through the provision of incentives to obtain participation by livestock owners, and despite the controversy regarding the nature of

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15 Myers and Steele, *Bovine Tuberculosis Control in Man and Animals*, 73-83.
the disease, not only did the United States experience success in its own eradication efforts, but the American government in turn influenced other eradication programs worldwide.

The process was seldom straightforward, however, as opposition from the livestock community mounted in the wake of uncertain and contentious science and the potential losses they would incur from mandatory eradication programs. Although earlier works such as Myers and Steele’s highlight the opposition to tuberculin testing and bovine tuberculosis eradication generally from the perspective of those who implemented the programs, more detailed treatments of opposition are a more central feature of recent studies of the disease.18 Olmstead and Rhode examine opposition to American bovine tuberculosis policy in works published in 2004 and 2007.19 They highlight, for example, one individual whose opposition to tuberculosis eradication in livestock exposed potentially thousands of animals to the disease. James Dorsey, a cattle dealer in Northern Illinois, became notorious in the late 1910s for purposely selling tubercular cattle to buyers across the United States and beyond for profit. They note that, as a result, bovine tuberculosis spread to various parts of the United States as well as Canada and Mexico, exposing healthy animals as well as humans to the disease.20 The stories of opposition are interesting unto themselves, but also reveal broader issues about the eradication of bovine tuberculosis. One was the problematic place of compensation in eradication efforts. This dissertation will demonstrate the necessity and result of its provision, but Olmstead and Rhode argue that its introduction presented challenges for the American government. They write that by offering incentives that were too generous, livestock owners took undue advantage of policies. On the other hand,

18 See Myers and Steele, *Bovine Tuberculosis Control in Man and Animals*, 91-95.
incentives that were not generous enough turned livestock owners off from testing their herds, particularly those of higher value and thus those thought particularly susceptible to contracting and spreading bovine tuberculosis.\textsuperscript{21} The opposition to bovine tuberculosis programs illustrates the uncertainty with which bovine tuberculosis programs were implemented. There were individuals who took advantage of this circumstance, as Olmstead and Rhode examine in their profile of James Dorsey, but ultimately the opposition and uncertainty gave way to widespread participation in bovine tuberculosis eradication.

This study addresses and builds on another growing body of historical scholarship related to bovine tuberculosis which centres on the public health implications of the disease and its role in public health reform. Bovine tuberculosis posed a serious threat to public health through infected meat and milk. Bovine tuberculosis had the potential to permanently disfigure people or even cause death. State authorities therefore had to address the disease on two fronts: livestock and humans. Although intimately intertwined, the response to bovine tuberculosis in these two populations would diverge in the first decades of the twentieth century with public health. Intervention would take the form of treating and creating bureaucratic structures to control the processing and distribution of meat and milk through pasteurization, certified milk, and meat inspection.

Bovine tuberculosis one aspect of a much larger history of tuberculosis. Kathryn McCuaig, for example, incorporates a short discussion of bovine tuberculosis into her larger examination of tuberculosis in twentieth century Canada. Her discussion of bovine tuberculosis is generally confined to the place of the disease in childhood tuberculosis. Her study argues that bovine

\textsuperscript{21} Olmstead and Rhode, Not on My Farm! Resistance to Bovine Tuberculosis Eradication in the United States,” 802-804.
tuberculosis intervention in the twentieth century can be considered within a larger framework of prevention and treatment for tuberculosis in childhood. She argues that children with tuberculosis constituted a distinct set of tuberculosis patients with specialized needs. Bovine tuberculosis was an important part of this, as milk-drinking children were more susceptible to the disease and therefore in great need of intervention for the disease in cattle. She goes on to outline, for example, that treatment for infection in the bone and skin, heliotherapy, was more successful in children than in adults.²²

Unlike Sheila Rothman, Barbara Bates, and to some extent Katherine Ott, whose studies focus on the experience of people’s suffering from tuberculosis and the medical community that grew and transformed to accommodate their care, Georgina Feldberg’s study of tuberculosis centres on the hygienic practices and therapy treatments that were pursued in the United States as opposed to active BCG (Bacille de Calmette et Guerin) vaccine development that was common in other parts of the world, including Canada. She argues that choosing to pursue this form of treatment reflected a relationship between medical science and social factors such as race and class. For example, promoting better hygiene in the home as a means to prevent the spread of disease reflected as much about prevailing attitudes regarding race and class as it was sound and practical medical advice.²³ Social attitudes such as class will enter into this discussion in Chapter IV of this examination. Philanthropic work with the poor, for example, was a significant motivating factor in the introduction of pasteurization there.


The genesis, implementation, and politics of public health measures such as pasteurization, certified milk, and meat inspection have received significant attention from historians in recent years. There are several that might be explored but the ones pertinent to this study and ones highlighted in scholarship surround the politics and varied ways reform for meat and milk was carried out, and the connections between the meat-eating and especially milk-drinking public with the livestock community identified through these reforms.

Forming and implementing meat inspection, pasteurization, and other measures to ensure the quality and safety of meat and milk was far from straightforward. The presence of bovine tuberculosis in meat, for example, revealed a host of interconnected issues. Its presence was the result of diseased animals in the food system, but also inadequate or non-existent measures to detect these animals through processing and distribution to the public, putting lives at risk. The horrors of the American meatpacking industry were chronicled in the 1906 work *The Jungle*, by Upton Sinclair, and spurred the American Bureau of Animal Industry and, shortly after, the Canadian Health of Animals Branch to enact legislation to regulate the industry. A number of scholars have chronicled the development of meat inspection, such as J. Arthur Myers and J. Brian Derbyshire.\(^{24}\) However, historians such as Keir Waddington and William Cronon have increasingly placed meat inspection and bovine tuberculosis within a broader context of state involvement in public and animal health, and the involvement of the state in the growing food industry in the late nineteenth and early twentieth centuries.\(^{25}\) Cronon, for example, places meat inspection and the presence of diseases like bovine tuberculosis in the context of America’s


growing industrial food system.\textsuperscript{26} This study will build on Cronon’s work by exploring how the state became involved in meat inspection and regulation in New York and Ontario.

The relationship between meat and bovine tuberculosis has particular importance to this study. In his examination of bovine tuberculosis and the regulation of the meat industry in Great Britain, Waddington notes that the identification of diseases like bovine tuberculosis in an age of increasing meat consumption provided a professional opportunity for the veterinary community to become increasingly involved in public health.\textsuperscript{27} This study will build on these ideas by exploring the role of the state and particularly veterinarians in the formation and practice of meat inspection in Canada and the United States. Meat inspection and the presence of bovine tuberculosis in meat did as much for the veterinary community in terms of enhancing its professional standing as the veterinary community did for protecting public health. The role of the state and veterinarians in public health also extended to intervention in milk quality and safety in the late nineteenth and early twentieth century.

Perhaps more than meat, the threat bovine tuberculosis posed to public health through milk produced a more layered and complex intervention of the state. Several works have been produced on the history of dairy and dairy reform, exploring various aspects of its history. An exhaustive accounting of them will not follow here. Rather, what will follow is a selection of key recent works in the history of dairy and dairy reform.

Bovine tuberculosis would have a significant connection to the establishment and function of dairy processing, distribution, and reform throughout the nineteenth and twentieth centuries. A good number of examinations focus on the dairy industry in the progressive era, during which

\textsuperscript{26} See Cronon, 207-262.
milk production, distribution and consumption became part of the sweeping public health reforms of the period.\textsuperscript{28} Several works including those by Susanne Friedberg and E. Melanie Dupuis, and upcoming work by Kendra Smith-Howard chart the transformation of milk from an uncommon to a widely consumed substance. This growth reflected a number of distinct but interconnected factors such as improvements in rail transportation, falling prices and the wider availability of milk, and the decline of breastfeeding.\textsuperscript{29}

The influence of transporting milk over long distances and the challenge of locating cattle supplying tubercular milk have come under examination by historians in recent years. Susan Jones, for example, has explored efforts in England and the United States to map the source of tubercular milk. Her exploration of the English city of Manchester beginning in the 1890s, for example, reveals that the city’s chief bacteriologist and pathologist, Sheridan Deléphine, was able to trace the source of tubercular milk to dairy cattle on farms surrounding the city. By tracing and mapping tubercular cattle, reducing their numbers, and updating data on the location of remaining diseased animals, Jones illustrates that Deléphine was not only able to “…map and standardize animal bodies…,”\textsuperscript{30} but also that through this effort a measure of safety for public health supplies was ensured through area-based veterinary intervention, rather than


through treating the milk itself.\textsuperscript{31} Jones’ examination highlights an important aspect of the response to bovine tuberculosis, particularly where dairy cattle were concerned. Intervention took many forms simultaneously. Pasteurization was practiced at the same time as efforts such as tracing tubercular cattle to dairy farms and certifying milk. The veterinary contribution to public health in this manner was significant and was practiced in many places, including New York State and Ontario.

Chapter IV will illustrate that with the widespread consumption of milk, the growth of milk-borne illnesses, and the identification of the tuberculosis bacillus in the 1880s, calls for state intervention for the safety and quality of milk increased. Milk reform was a less than straightforward process, depending greatly on funding, the political will of individual communities, and the varied acceptance of the pasteurization process. Jane Jenkins, for example, examines the politics surrounding pasteurization in the Canadian Maritimes. She explores the politics surrounding the introduction of pasteurization in St. John, New Brunswick, in the 1920s. A vocal debate over whether or not to introduce the measure erupted in the city and reflected larger issues about the role of the state in the livestock industry and public health as well as the modernization of the dairy industry to a larger, more industrialized system.\textsuperscript{32} Debate over the effect of pasteurization on the quality of milk versus other interventions, such as pure or certified milk, erupted and reflected apprehension over the possible increased costs on producers and consumers.\textsuperscript{33} These issues are ones that surfaced in both Ontario and New York State and will be explored as part of a larger comparison of how pasteurization and meat inspection interventions

\textsuperscript{31} See Susan Jones, “Mapping a Zoonotic Disease: Anglo-American Efforts to Control Bovine Tuberculosis,” 139-141.


\textsuperscript{33} Jenkins, “Politics, Pasteurization, and the Naturalizing Myth of Pure Milk in 1920s Saint John, New Brunswick,” 99. See also
were shaped and implemented in these two locations. For both places, pasteurization was gradually adopted over a period of decades. This revealed the varying attitudes of the various stakeholders who would be affected by the process. Some members of the public, for example, questioned the safety of pasteurization, and many dairy farmers opposed the added costs pasteurization would add to the cost of their product. As a result, a combination of pasteurization, certified milk (raw milk certified as coming from disease-free cattle), and no intervention at all were practiced throughout Ontario and New York State, resulting in an uneven public health response to the disease.

The uneven response to bovine tuberculosis for public health may well be extended to the response to the disease in cattle as well. Domestically in both Canada and the United States, bovine tuberculosis legislation was voluntary. Although market incentives and peer pressure from other livestock owners compelled many livestock owners to comply beginning in the late 1910s and early 1920s, the voluntary nature of legislation on both sides of the border resulted in a patchwork of tested and untested herds. Indeed, one of the biggest criticisms of bovine tuberculosis intervention from the scientific and legislative communities was the non-comprehensive way in which legislation was carried out. On the other hand, governments and the scientific community were hesitant to employ compulsory measures given the uneven support for intervention.

Regardless of the uneven application of bovine tuberculosis intervention, over several decades the slow and steady application of legislation saw every cow in the State of New York and the Province of Ontario brought under one of a number of legislative programs. Undertaking this herculean task was an army of veterinarians. Their place in the history of bovine
tuberculosis, alluded to already, was critical to the successful response to the disease and one that remains elusive in the historiography of the disease.

The role of veterinarians is central to this study and presents a significant contribution to the historiography of the disease. Veterinarians were involved in all levels of bovine tuberculosis intervention. They embodied the authority of the state by carrying out the identification and disposal of tubercular animals. They disseminated information on the disease and educated the livestock community and the wider public on what the disease was and the necessity of its suppression. They were also central architects of bovine tuberculosis legislation, from the beginning in the 1890s to the final legislative programs created in Canada and the United States in the late 1910s and early 1920s. The role of veterinarians has received limited attention from historians and this dissertation will provide a more thorough examination of this essential body of experts.

Historians such as Susan Jones have increasingly begun to evaluate the role of veterinarians and their role in transforming the economic and social value of animals. For example, she illustrates how veterinarians played a significant role in raising the profile and economic value of America’s livestock industry through the intervention against diseases such as bovine tuberculosis.34 Other historians such as Olmstead and Rhode examine the role of veterinarians in the formation of animal health infrastructure, their role in negotiating the relationship between the state, disease, and the livestock community, and their role in shaping attitudes towards the disease.35 Margaret Derry, for example, notes that a significant factor in the cooperation of

Ontario livestock owners with the state in bovine tuberculosis intervention was the confidence they had in the veterinarians organizing and implementing the programs. Of one particular veterinarian, John G. Rutherford, a Canadian veterinarian who figures prominently in this study, Derry notes: “...Rutherford held clear ideas about the nature of cattle disease, its relation to humans, and the needs of farmers.” In addition, Derry notes the role of veterinarians like Rutherford and other scientific authorities in providing leadership during a time of a contentious scientific understanding of bovine tuberculosis, a sentiment echoed by other historians.

Despite the incorporation of veterinarians into the narrative of the history of bovine tuberculosis by scholars, their treatment of the profession in relation to the disease remains limited. Veterinarians appear in administrative positions and their presence is assumed on the ground carrying out the work of bovine tuberculosis testing, etc. Although veterinarians are mentioned in various administrative capacities, their presence as a constant and central body in the history of bovine tuberculosis is limited in the historiography of the disease. Bovine tuberculosis was eliminated from Canadian and American livestock herds through a slow and steady decline. Veterinarians were a central, critical, and constant presence in this slow and steady decline. This was not just the case for those on the ground doing the physical work of suppression and management, but extended to the architecture of bovine tuberculosis legislation. Not enough has been said about the central role of veterinarians as policymakers in the formation of bovine tuberculosis legislation on either side of the border, an aspect of the disease this study

will attempt to address. Veterinarians were central architects of the final legislation programs that saw the successful suppression and management of bovine tuberculosis in the late 1910s and early 1920s. Two veterinarians in particular, John G. Rutherford of Canada and Veranus Moore of the United States, were central in the formation of the American Cooperative State-Federal Bovine Tuberculosis Eradication Program, and the Canadian Accredited Herd and Restricted Areas Plans. They were also central in forming a transnational vision of the disease which was critical for the success of the final legislative programs on both sides of the border.

Finally, this examination makes an important contribution to scholarship by considering the suppression and management of bovine tuberculosis in the two distinct political jurisdictions of Ontario and New York State, and the United States and Canada more generally. Various studies of bovine tuberculosis have incorporated multiple jurisdictions into their analysis, but are often examined in limited depth, more often serving as brief illustrations. For example, Olmstead and Rhode provide very brief summaries of various American state and local control efforts, but provide very little analysis of how their programs functioned on the ground. Likewise, their presentation of the Cooperative State-federal Bovine Tuberculosis Eradication Program provides a summary of the legislation, but provides little analysis of the program’s function on the ground. This study examines, in depth, how eradication work functioned in two distinct political jurisdictions. With their shared border and high volume of cattle trade, New York State and Ontario shared many microbes, including bovine tuberculosis. While their programs initially

39 Olmstead and Rhode, “An Impossible Undertaking: The Eradication of Bovine Tuberculosis in the United States,” 750-761. They note the uneven reduction of bovine tuberculosis throughout the United States after the introduction of the Cooperative State-Federal Program, explaining that the Midwestern United States made rapid progress with the program given the lower rates of infection there, whereas New York State made slower progress given their higher rate of infection. They also note that California saw its bovine tuberculosis program get worse between 1924 and 1934. See pp.757-758.
were quite distinct, by the late 1910s, similar programs were running parallel on both sides of the border and this study examines how that was achieved and functioned.

Some studies have begun to examine more localized issues related to bovine tuberculosis. Susan Jones, for example, in her article mentioned earlier, has examined the challenges of tracing sources of tubercular milk in communities in Britain and the United States.\(^{40}\) Olmstead and Rhode, on the other hand, examine the difficulty of carrying out bovine tuberculosis intervention in different political jurisdictions. Their examination of Wisconsin and Illinois illustrates that the distinct approaches taken in different jurisdictions without consultation or cooperation with each other had significant consequences, such as the intentional sale or movement of tubercular cattle from areas with strict tuberculosis regulations to jurisdictions where tuberculosis legislation was less stringent.\(^{41}\)

Examining the two jurisdictions of New York State and Ontario is appropriate given the close relationship between the Canadian and American veterinary communities, the international nature of the disease, and the eventual collaboration between veterinary, sanitary, and state authorities on the final legislative solution to the problem of bovine tuberculosis. Not only does examining these two jurisdictions reveal the collaborative nature of veterinary medicine and bovine tuberculosis legislation thought and practice, but examining New York State and Ontario reveals a number of contrasts as well. The very different approaches taken to respond to bovine tuberculosis beginning in the 1890s to the late 1910s reflects the very contrasting authority structures placed in charge of bovine tuberculosis work in Canada and the United States. It also


\(^{41}\) Olmstead and Rhode, “The “Tuberculosis Cattle Trust”: Disease Contagion in an Era of Regulatory Uncertainty,” 938-941.
reflects the different attitudes government, veterinary, and public health authorities held about the disease. Whereas New York State initially viewed bovine tuberculosis in cattle as a public health issue and authority was placed with the State Board of Health to respond to the disease, Ontario’s response was the jurisdiction of the federal Department of Agriculture, which viewed the disease largely as an imported disease and responded to it as such. Over time, the bureaucracy of disease control in these two jurisdictions would transform, shifting from more insular and narrow responses to the disease to a more broad-based legislative agenda that that encompassed the whole of the livestock industry and placed the industries of these two jurisdictions in the wider global livestock market. These jurisdictions also reflect a shift in attitude towards bovine tuberculosis that set it apart from other livestock diseases in the period. Although initially the aim of bovine tuberculosis work was to eradicate the disease from existence, over time a shift in attitude from eradication to suppression and management occurred on both sides of the border. What is most revealing about this disease and the way it was managed, however, was that a dramatic intervention of science did not occur. Although scientific research on bovine tuberculosis would continue throughout the late nineteenth and early twentieth centuries, the scientific understanding of bovine tuberculosis was largely established by the 1890s. It was therefore an exercise in bureaucracy that saw this disease successfully suppressed and managed through a remarkable slow and steady decline.
Chapter I:

Facilitating the Bacillus: M. tuberculosis, Livestock Systems, and the Spread of Sickness, 1830 – 1890

The beginning point of this study centres on the structural factors that led to the introduction and spread of the bacillus responsible for bovine tuberculosis throughout the nineteenth century, with an emphasis on the growth of the cattle populations of Ontario and New York State, the role of breeding cattle, the participation of Canadian and American cattle in the global livestock economy, and the unregulated and sometimes dangerous environments surrounding milk and meat distribution. While a number of these elements have been examined by historians, a brief exploration of them is worthwhile as each would influence the development of bovine tuberculosis. The structures that facilitated the bacillus and how they came about in large part explains how and why bovine tuberculosis manifested itself in the ways that it did. In cattle, bovine tuberculosis manifested itself as a largely introduced disease that slowly spread from

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farm to farm through buying, selling, and herd improvement. In humans, bovine tuberculosis was literally consumed by the public, mainly through meat and milk contaminated by the bacillus.

Canadians and Americans witnessed their domestic livestock populations develop from small numbers of locally-owned cattle for local consumption and grow into an international industry from the seventeenth century through to the early twentieth century. This growth of livestock was influenced by a number of factors, both domestic and international. As settler nations, both Canada and the United States were heavily influenced by agricultural development and transformations in different parts of Western Europe. For example, the Dutch were very influential in New York for the introduction of cattle early in its history. This influence would later be replaced by the British, who also would come to dominate cattle introduction and improvement in Ontario. These international influences were joined in time, mainly in the nineteenth century, by domestic developments such as breeding cattle and growth of the domestic livestock economy in Canada and the United States. While the centre of livestock production and distribution would in time move progressively westward, eastern regions such as Ontario and New York remained important breeding, transit, and research centres for cattle as well as possessing large domestic cattle populations, all important consideration for infectious diseases. This motion of cattle, travelling short and great distances, established the structures that facilitated the spread of bovine tuberculosis.

Expanding alongside the industrial economies of Canada and the United States in the nineteenth century were population centres and agricultural production, of which livestock was a significant part. This expansion, which at times was quite rapid and done with little government oversight, provided the means for the spread of microbial diseases in livestock. This level of growth was achieved as the result of many years of introducing and carefully breeding cattle. In
Ontario, for example, the rise of mixed farming in the nineteenth century provided opportunities and incentives for livestock production. Furthermore, innovations in rail and water transportation, such as the building of transcontinental railways and the development of canal systems, facilitated the spread of livestock.

Breeding cattle were central to the spread of bovine tuberculosis. They were deliberately introduced onto farms to improve the genetic quality of stock and were highly mobile, and thus possessed the very real potential to spread sickness. Often imported from Great Britain, which was known to have high rates of bovine tuberculosis, breeding cattle became an initial focus of eradication efforts. The structures that facilitated the spread of the bovine tuberculosis bacillus also extended to human populations. Bovine tuberculosis was a disease literally consumed by people through infected meat and milk. That they contracted the disease in this manner was symptomatic of unregulated and unsanitary systems of meat and milk distribution. Overall, the structures that facilitated the disease in both cattle and humans would come to be well-understood by various government and scientific authorities, and became a central part of the various initiatives to eradicate the disease beginning in the late nineteenth century.

The Growth of Livestock in Ontario, 1870 – 1890

Understanding the world into which bovine tuberculosis was introduced and its spread facilitated is critical in order to explore more comprehensively the processes and wider ramifications of eradicating bovine tuberculosis in humans and cattle. As the primary host of the disease it is necessary to consider the growth of the cattle population of Ontario. Although there have been an
abundance of historical examinations focusing on the agricultural and livestock history of Ontario and Canada more generally, it is worth briefly exploring the broader history of agriculture and the growth of livestock in Ontario, as it will set the stage and contextualize later chapters. While a number of aspects of the history of livestock in Ontario might be considered, what is essential in terms of this study is that while cattle had long been part of the landscape of Ontario and Canada, at a certain point, beginning around the 1870s, cattle took on a more prominent role in Ontario’s agricultural economy and grew in terms of international trade and domestic populations. Consequently, it was during this time that the epidemiological stage was set in motion for bovine tuberculosis.

The first permanent herds of cattle were introduced into Canada by the French beginning in the eighteenth century. Although cattle had been brought over in small numbers before then, it was not until this period, when permanent settlements were established, that cattle arrived in any substantial numbers. New France’s cattle population grew steadily throughout the eighteenth century. This growth was the result of both importation and domestic breeding. Cattle were sent regularly to New France until the early 1670s, after the departure of Intendant Jean Talon. Upon his departure, he informed the King of France that the colony possessed enough cattle to sustain itself and, consequently, fewer were sent. This led to a greater effort at breeding, and led to a

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2 Some relevant recent titles include, for example: Margaret Derry, Bred for Perfection: Shorthorn Cattle, Collies, and Arabian Horses Since 1800 (Baltimore: The Johns Hopkins University Press, 2003), and Margaret Derry, Ontario’s Cattle Kingdom: Purebred Breeders and Their World. It is worthwhile to note that livestock history possesses a substantial body of literature. Some titles include: Alvin Howard Sanders, A History of Aberdeen-Angus Cattle with Particular Reference to Their Introduction, Distribution, and Rise to Popularity in the Field of Fine Beef Production In North America (Chicago: The Lakeside Press, 1928), and James Sinclair, A History of Shorthorn Cattle (London: Vinton & Co., 1907).

3 Proulx, for example, in his study of the transportation of people and goods between France and New France, notes that cattle were a regular cargo item throughout the seventeenth and eighteenth centuries. While some were consumed by crews during their long voyages, many were specifically shipped to provide meat and dairy to those settled in New France. See Gilles Proulx, Between France and New France: Life Aboard the Tall Sailing Ships (Dundurn Press: 1984), 102.
distinctive Canadian breed, the Canadienne or Canadian.\(^4\) In 1706, for example, 14,191 cattle were accounted for, followed by 24,866 in 1720, and 33,179 in 1734.\(^5\) Upon the Conquest of 1760, English settlers began to import other breeds such as Herefords, Galloways, and Shorthorns. In addition, settlers from the United States, especially those Loyalists who left America in the wake of the American Revolution, brought cattle with them.\(^6\)

Upper Canada grew in population and agricultural activity throughout the early nineteenth century and was dominated by wheat production.\(^7\) Cattle were present in this period for domestic meat and milk consumption as well as rural leather production. Douglas McCalla, for example, notes that tanneries outnumbered woolen mills in 1840s Upper Canada. These tanneries provided needed leather for saddles, harnesses, and other tack, as well as other items such as shoes and boots.\(^8\)

It is evident that a fluid, moving livestock economy was well in place by the nineteenth century. Though cattle would not occupy a central role in Ontario’s agricultural economy until later in the century, they existed in large quantities and networks, both formal and informal. In

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\(^4\) For a more extensive discussion of the Canadienne or “French Canadian” as it was also known, see John E. Rouse, *World Cattle III: Cattle of North America*, 271-275.


the early nineteenth century, for example, the border between Canada and the United States was porous, with cattle being driven to and from different buyers. John Rouse, for example, notes a number of cattle drives between Canada and the United States, and vice versa, beginning around 1822. In Ontario, cattle achieved a more prominent position in the agricultural economy in the 1870s and are part of a larger story of agricultural transformation in the province. The growth of cattle production in Ontario experienced uneasy but relatively steady growth throughout the nineteenth century and was the result of a number of factors, but the two most notable were the growth of mixed farming and international trading opportunities for livestock and their products.

The rise of mixed farming in Ontario in the latter part of the nineteenth century has been a debated topic amongst Canadian historians. Some argue that mixed farming was part of the Ontario, and indeed Canadian, economy generally far earlier than had previously been assumed. Some of the advantages of this type of farming included less risk and cost, as well as stability. Margaret Derry notes that early scholars portrayed wheat as an economic staple central to economic growth in Ontario and that livestock had a less important role. McCalla and Marvin McInnis, for example, note that while wheat was an important crop, it was not as economically critical as previously assumed. McInnis, for example, in his examination of Peel County, notes that only about one-quarter of prime agricultural land was devoted to wheat cultivation. The production of livestock, then, was likely greater, though McInnis is careful to caution that wheat was still a critical source of income for farmers. It was the crop most likely to

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9 Rouse 267.
12 Derry, 5.
be produced in surplus while livestock was produced more for personal consumption and for sale in local markets.  

Mixed farming provided new opportunities for farmers. The planting and harvesting of forage crops allowed farmers to more profitably raise larger numbers of cattle. It also allowed farmers to participate in a growing global market for agricultural products from North America. This included live cattle as well as a host of products such as dressed beef, butter and cheese. To participate and compete in a growing domestic and international livestock economy, farmers required not only market demand and the types of farming operations conducive to participating, but they also required animals capable of participating as well. Thus, the nineteenth century saw the adoption and development of livestock improvement in Canada and the United States. These animals, largely imported from Western Europe, Great Britain in particular, would greatly aid in the creation of a competitive and profitable livestock economy.

Considering Canada broadly in the nineteenth century, Great Britain and the United States were targets for Canadian agricultural exports in this period when bovine tuberculosis first became a disease of concern. At the time of Canadian Confederation in 1867, Canada, and certainly Ontario, greatly depended on Great Britain for its economic prosperity. Conversely, Canada depended on Great Britain for the majority of its imported goods. The economies of both Canada and Great Britain grew steadily throughout the nineteenth century until the early 1870s.

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13 Derry, 6. See Marvin McInnis, “Perspectives on Ontario Agriculture, 1815-1930,” Canadian Papers in Rural History. ed. Donald Akenson (1992): 70-83. See also Douglas C. McCalla, Planting the Province: The Economic History of Ontario, 1784-1870. See also John McCallum, Unequal Beginnings: Agriculture and Economic Development in Quebec and Ontario until 1870 (Toronto: University of Toronto Press, 1980), 20-24. McCallum notes that the same time Ontario farmers were struggling with issues related soil exhaustion and thus declining their wheat yields and profits, they were increasingly facing competition from wheat farmers in Western Canada. See also Derry, 6.

14 See Derry, 108-111. For a more extensive discussion of the development of dairying in Canada, see Harold Innis, ed., The Dairy Industry in Canada.
when a worldwide economic recession began in 1873. Canada’s agricultural exports to Great Britain grew in the wake of this recession due to high demand. The growth of Canada’s trading relationship with Britain was furthered with preferential tariffs in the 1890s that were designed with “…attempts at imperial solidarity.”\textsuperscript{15} By the first decade of the twentieth century, live cattle ranked third amongst Canadian exports to Great Britain. Markets were again affected in 1913 with a global recession but recovered with the outbreak of World War I.\textsuperscript{16}

Canada also enjoyed a strong trading partnership with the United States throughout the later nineteenth and early twentieth centuries. This trading relationship remained relatively strong despite the United States ending the Reciprocity Treaty (also known as the Elgin-Marcy Treaty) that had governed the free trade of goods since the 1850s. With the outbreak of the American Civil War (1861-1865) and British support for the Confederate South, many Americans joined an already growing protectionist movement to abolish the Reciprocity Treaty in 1866.\textsuperscript{17} Despite this, Canada’s trading partnership with the United States remained relatively stable. Like its trading partnership with Great Britain, Canada experienced changes in its trading relationship with the United States following the global recession of 1873. As a result, the United States exercised greater protectionism and Canadian exports fell. Conversely, Canada began to import more goods from the United States in this period. A further shift in Canada’s trading relationship with the United States occurred in the wake of the economic recession of 1913.

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\textsuperscript{15} Derry, 4-5.
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American protectionism lessened in the wake of this recession and in the wake of World War I, and Canadian economic interests shifted somewhat from Great Britain to the United States.\footnote{Michael Hart, \textit{A Trading Nation: Canadian Trade Policy from Colonialism to Globalization} (Vancouver: University of British Columbia Press, 2002) 88. See also Derry, 4-5.}

**Breeding Cattle and Ontario’s Livestock, 1830 - 1890**

Purebred cattle and those who bred them occupy a central role in the eradication of bovine tuberculosis and will surface throughout this examination. These cattle, whose introduction began around the 1830s and 1840s, played a critical role in the growth and availability of cattle products domestically as well as participation in the international livestock economy. The introduction of purebred cattle also produced a class of influential farmers who bred cattle and improved the herds of countless other farmers. Some of these individuals would become quite influential in shaping policy related to livestock disease management. The examination of purebred breeding cattle also offers a first glimpse into the entry of bovine tuberculosis into North America. Purebred cattle were the primary vessels through which bovine tuberculosis penetrated Canadian and American cattle herds and were the first segment of the cattle population focused on in the first bovine tuberculosis eradication.

The improvement of cattle breeds was beneficial for a number of reasons. By breeding their cattle, farmers ultimately built more productive and valuable herds. These cattle also contributed to a more productive, profitable livestock economy. However, a number of pathogens were introduced as a result of improvement, of which bovine tuberculosis was one.
These pathogens ultimately cost the livestock economies of both Canada and the United States tens of millions of dollars in lost animals and other costs associated with eradicating them.

The improvement of Ontario’s cattle can be connected to a number of agricultural transformations occurring in Britain in the nineteenth century. These transformations came largely in the wake of significant internal political events that in turn influenced other nations.  

The enclosure movement, along with the repeal of the Corn Laws in 1846 that opened up Britain to cheaper imports of grain and encouraged mixed agriculture domestically, made livestock improvement an increasingly attractive opportunity. Throughout the mid to late nineteenth century, Britain experienced what Derry calls a “Golden Age” for livestock improvement and mixed farming, which received a great deal of attention and emphasis. This type of agriculture remained relatively profitable throughout the later nineteenth century, despite the depression of the agricultural market from the early 1870s to the mid 1890s. Even after the mid 1890s, livestock remained profitable.

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20 Of the numerous political events that occurred throughout Britain in this period, the most significant one as it relates to livestock development is the enclosure movement. Enclosure had been a constant practice in Britain for centuries. For example, one historian, J. R. Woodie, suggests that approximately 45 percent of England was enclosed in 1500, rising to 47 percent by 1600, and by 1700 was 71 percent. These enclosures were largely agreements between a few landowners and many of them ended up in court, contesting the specifics of the enclosures they had agreed to. The need to give enclosures more legal standing gave rise to the Parliamentary enclosures that occurred mainly between 1750 and 1830. See J.R. Wordie, “The Chronology of English Enclosure, 1500-1914,” *Economic History Review* (1983): 593-609 Beckett, 35-36, and Derry 17.


22 Derry 17. See T.W. Fletcher, “The Great Depression of English Agriculture, 1873-1896,” *The Economic History Review* (1961): 430-31. Fletcher notes that while many English farmers found profit and prosperity by turning to livestock, many remained committed to traditional arable farming that was often less profitable.
There were a variety of individuals who bred livestock in Britain throughout the nineteenth century. The first were tenant farmers who improved cattle in order to earn higher incomes and consequently improved the estates of their landlords. While these farmers and their animals played a part in the introduction and spread of bovine tuberculosis, a group of cattle breeders of a more wealthy class became more prominent. These men engaged in breeding more as a hobby than as an actively profit-driven agricultural venture but nevertheless the esteem they brought to the activity widened the publicity it received. This variety of individuals involved in livestock improvement would be reflected in Ontario.

In Ontario, purebred cattle breeders, like those in Britain, occupied a variety of social classes. Some were practicing farmers who had migrated to Canada beginning in the 1830s and 1840s, bringing with them their farming backgrounds and ideas about cattle improvement and connections with family and friends involved with livestock. As Derry notes, “they were, therefore, in an ideal position to import exceptional stock through family chain connections and, with their knowledge of animal breeding, to create breeding herds of superior, and ultimately expensive, stock.” Furthermore, given their agricultural background in Britain, they would have been aware of the value that their superior cattle would have for wealthy buyers interested in improvement animals. These farming breeders, as Derry further argues, “…were in effect, the experts when the term ‘breeder’ is applied.”

The more prominent group of cattle breeders in Ontario consisted of more wealthy individuals who, as in Britain, were not full-time farmers, but owned farms and participated in

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23 Derry, 15-17.
24 Derry, 16.
25 Derry, 18.
26 Derry, 19.
cattle breeding more informally as a past-time and owned considerably more valuable purebred herds. Many were Scottish migrants who held high positions in government and employed individuals to run their farms for them. Derry examines some of these individuals, including George Brown, who founded the Canadian newspaper the Globe, and David Christie, a Canadian Senator. Among the many breeders of various social and political standings and backgrounds in Ontario throughout the late nineteenth and early twentieth century, one stands out among them for his relationship to bovine tuberculosis. He not only brought attention to the merits and importance of purebred cattle, but he was actively engaged in the discussions and formation of bureaucratic structures for its control.

Like many wealthy purebred breeders in Ontario, William Cameron Edwards built his reputation and business in areas other than raising stock, preferring to keep his interest in cattle as more of a hobby than a full-time operation. Edwards established his first mill at the age of twenty-four in 1868, naming it W.C. Edwards & Co. The mill, located in Rockland, Ontario (east of Ottawa, Ontario), was central to the economy of the community, employing a large percentage of its residents. His involvement in Canadian politics began in 1891 when he was elected as a Member of Parliament for Russell Township, Ontario (south of Rockland), where he lived. In all, Edwards served more than a decade in the House of Commons as a member of the Liberal Party.

27 Derry, 18.
28 “Sen. Edwards, Big Lumberman, Dead at Ottawa,” The Globe, September 19, 1921, 7. Edwards was born in 1844 in Clarence Township, Russell County (southeast of Ottawa) to parents who had immigrated from both England and Scotland. Edwards did not receive any advanced education; rather, he found work in forestry after his education at the Ottawa Grammar School. Over time Edwards opened a number of branch mills in the surrounding area, employing thousands of men. He was connected to the wider business community as a director of the Canadian Bank of Commerce, the Trusts Corporation of Toronto, and a number of other companies. In the years of his retirement and leading up to his death in 1921, his lumber holdings were merged with the Riordan Pulp & Paper Co. See also Valerie Knowles, First Person: A Biography of Cairine Wilson, Canada’s First Woman Senator (Toronto: Dundurn Press, 1988), 48–49.
29 “Sen. Edwards, Big Lumberman, Dead at Ottawa”
He was named to the Senate in 1903 and was a personal friend of Wilfrid Laurier’s. Throughout his political career he was a consistent advocate of reciprocity and lower tariffs.\(^{30}\)

Though his involvement in the lumber industry is what Edwards is best remembered for, he was also keenly involved in agriculture and raising livestock. He served as president of the Russell Agricultural Society and owned a large farm. Although not much survives in the way of knowledge about Edwards’ operation, it is fair to say from his involvement in the politics of cattle that Edwards not only had a keen interest in agriculture, but a keen interest to see agriculture and livestock develop in Canada.\(^{31}\) Edwards would become a vocal contributor to the various debates surrounding bovine tuberculosis in Canada and would serve on the International Commission for the Control of Bovine Tuberculosis.

It is worth considering the process of livestock improvement itself as it raises a number of questions. Why was it needed? What purpose or goals did it serve? Was it effective? Were there any consequences? To capture, at least in part, the shape of livestock improvement on the ground and the relationship breeders had with their cattle, it may be useful to explore briefly one breed of cattle.

There are several breeds of cattle that have become synonymous with the products they produce – Holsteins and Jerseys for milk, and Black Angus for beef, to name a few. Each breed of cattle has its own unique history of development and dissemination, but there is one breed of cattle that became prominent in Great Britain during the nineteenth century and spread throughout Canada and the United States through the work of breeders like Edwards. These were Shorthorn cattle. The origins of Shorthorn cattle and their spread and popularity in North

\(^{30}\) “Sen. Edwards, Big Lumberman, Dead at Ottawa”

\(^{31}\) “Sen. Edwards, Big Lumberman, Dead at Ottawa”
America reflect the broader shape of livestock improvement and the agricultural connections between Great Britain and North America.\textsuperscript{32}

Shorthorns had particular physiological qualities that made them desirable to a wide range of livestock owners. They were known for producing both large quantities of milk as well as meat. These dual and profitable traits of milk and meat production (called “breed grace” by George Burrows, an historian of the breed) became very desirable and breeders increasingly searched them out from the late eighteenth century through the nineteenth century. For Shorthorn bulls, breeders searched for animals that possessed a wide frame from which a lot of meat could hang, as well as a mellow disposition for handling. For cows, they selected individuals that produced average amounts of milk and a compact frame that set them apart from less desirable cows.\textsuperscript{33}

The exact geographical origins of Shorthorn cattle are somewhat unclear though the general consensus is that the cattle from which the breed descended were brought to parts of Britain (Northeastern England, specifically) from Holland in the early eighteenth century and over time they were bred with local herds and distributed.\textsuperscript{34} Two of the earliest, if not the earliest, documented breeders of Shorthorns were Robert and Charles Colling. The brothers, who were from Durham County, England, purchased a bull and cow separately that became founding individuals of the breed.\textsuperscript{35} These cattle would be bred with domestic cattle in the surrounding

\textsuperscript{32} For a more thorough examination of the history of the Shorthorn breed, see Margaret Derry, \textit{Bred for Perfection: Shorthorn Cattle, Collies, and Arabian Horses Since 1800.}
\textsuperscript{33} George T. Burrows, 11-12.
\textsuperscript{34} Burrows, 11.
\textsuperscript{35} Grant MacEwan, \textit{Highlights of Shorthorn History} (Winnipeg: Comprint Publishing, 1982), 13-14. The region that the Colling brothers came from was one well-known for breeding cattle. The area itself was full of good grazing land and produced Durham and Teeswater cattle (both of which were of Dutch origin). They were both dark in colour and produced large quantities of milk. See MacEwan, pp. 14-15. See Derry, \textit{Bred for Perfection}, pp. 19-20. Derry traces the descendants of Colling’s Shorthorn cow called “Duchess”.
area and make their way to Scotland where their improvement met domestic needs as well as addressed the demand for cattle overseas in North America. In Scotland these cattle became desirable export animals which grew in importance as the export of other animals, notably Clydesdale horses, declined with advances in mechanized agriculture.  

Strong breeds of cattle were much desired in both Canada and the United States throughout the eighteenth and nineteenth centuries as populations rose dramatically in large part because cattle were not native to North America and their improvement had not really been a significant object of interest in prior centuries. Shorthorns would become a popular imported breed and gained a reputation as “good sailors.” It is possible to trace these animals from their original owners to their destinations and it is remarkable how long a journey these desirable cattle took. For example, in 1833 a cattle dealer named Roland Wingfield of Guelph, Ontario, imported two Shorthorn bulls and six heifers from England. Over the course of a few weeks, they were shipped by boat from England to Montreal, where they were placed on a boat to Ottawa and then to Kingston and on to Hamilton. The cattle were then shipped by rail to Guelph where they were sold to John Howitt, an English landowner and farmer who had brought his considerable wealth to Upper Canada and settled near Guelph as a breeder.

Many farmers desired shorthorns. For example, a few years after Howitt bought his imported Shorthorns, Adam Fergusson began establishing his own Shorthorn herd in Woodhill,
Ontario. Fergusson, a Scottish immigrant, later became a member of the Upper Canada Board of Agriculture and was instrumental in the successful lobbying of the Government of Upper Canada to appoint an official veterinarian, laying the groundwork for what would become the Ontario Veterinary College.\(^4^0\)

The place of breeding cattle in the history of bovine tuberculosis in Canada is not to be underestimated. Breeding cattle were often imported to Canada from Great Britain, a significant reservoir of bovine tuberculosis. Understanding the shape of livestock improvement, the attitudes towards it, and its goals, in part helps to explain how bovine tuberculosis was introduced to Canada the way it was and how the initial response to the disease was framed. For Canada, breeding cattle would be the initial focus of bovine tuberculosis legislation and many livestock breeders would be vocal critics of this legislation.

**New York State’s Cattle Landscape, 1830 -1890**

While Ontario’s livestock population grew throughout the nineteenth century and Ontario farmers participated in the growing global trade of livestock and dairy products, south of the border, American farmers were doing much the same. As Rouse notes, it is inevitable that

\(^4^0\) MacEwan, 35. Fergusson was a wealthy magistrate in Scotland but a keen agricultural enthusiast. A director of the Highland Society of Scotland, he was sent by the Society to Canada and the United States in 1831. This culminated in his 1833 publication Practical notes made during a tour in Canada, and a portion of the United States. Impressed by the potential of Canada, Fergusson relocated to Upper Canada in 1833. Fergusson was raised livestock as more of a hobby than as a vocation and advocated livestock improvement, becoming one of the first individuals to import Shorthorn cattle from Britain. See Elwood H. Jones, “Adam Fergusson,” in *Dictionary of Canadian Biography*. Vol IX (2000).
comparisons are made about cattle growth and breeding in Canada and the United States. Both nations share a similar history of development and population, environment, activities, etc. In this latter part of the chapter, American livestock production, specifically in New York State, will be explored in order to define the shape of this particular jurisdiction that bovine tuberculosis affected. New York State’s livestock certainly did not exist in isolation. Indeed, theirs was intertwined with a number of other states as well as Canada’s. This portion of the chapter will outline the origins of cattle in the state, the improvement of cattle throughout the nineteenth century, and the participation of New York State in the global livestock economy.

Cattle in the United States, like Canada, have deep European origins, with the first known introduction of domesticated cattle to the Americas by the Spanish in the early sixteenth century. In the area now politically defined as the United States, the most significant introduction of domesticated cattle accompanied the migration of European settlers from Great Britain and the continent in the early seventeenth century. In places such as Virginia for example, English colonists imported domestic cattle to exist alongside their agricultural establishments.

Cattle have been a part of the agricultural landscape of what is now New York State from the time of its settlement by the Dutch in the early seventeenth century. Henry Hudson first explored the region that would become New York in 1609 under the service of the Dutch and the area was named New Netherland. A few years later, in 1613, the Dutch established a trading post on Manhattan Island, but it was the establishment of the Dutch West India Company in 1621 that

41 Rouse, 268.
42 See Virginia DeJohn Anderson, Creatures of Empire: How Domestic Animals Transformed Early America (Oxford: Oxford University Press, 2004), 75-106. See also Rouse, 343-344.
motivated the settlement of the area and, in 1625, New Amsterdam (later New York City) was founded. 43

In was with the founding of New Amsterdam that livestock began to appear. Cattle are recorded as entering New Amsterdam in 1625 under the authority of Peter Eversten Huft, a director of the Dutch East India Company. The livestock, numbering 103, were brought from the Netherlands, though their health varied. Despite the importation of cattle in the early years of Dutch colonization, agricultural development was slow to progress. The Dutch East India Company intended New Amsterdam and the surrounding area to serve mainly as a trading post and therefore did not actively encourage immigration in large numbers. Those who did reside permanently in the colony did so as tenants for the company, who strictly governed who could settle and determined the returns they received. 44 By 1640, a more liberal settlement scheme was in place in New Netherland and the area experienced an influx of new migrants that were not exclusively Dutch. Indeed, into New Amsterdam came Walloons from what is now Belgium, Huguenots from France, and Puritans from England, to name a few. 45 As the population of New Amsterdam and the surrounding area grew in this period, cattle production grew to meet local demands and slaughterhouses were common. Though cattle would grow in numbers in this


44 Thompson notes one particularly unscrupulous official named Wouter Van Twiller. He arrived as Governor of Manhattan Island in 1633. On his arrival, there was a good number of livestock on the farms of the island, however when his administration ended there were very few animals left. Thompson notes Van Twiller received a large number of cattle from residents which were then sold to the English or added to his own farm. Thompson notes that while Van Twiller boosted his own prosperity at the expense of the residents of Manhattan, other areas such as Long Island and Staten Island grew in terms of settlers and livestock numbers. See Thompson, 38.

45 Thompson, 37-38. Thompson notes that the religious tolerance was an important factor in the population diversity of New Amsterdam and new Netherlands in the latter half of the seventeenth century. The Dutch government did practice the levels of religious intolerance that other European powers did in this period and thus were more relaxed about who was allowed to settle in lands they controlled.
period, they were largely allowed to run free. Raising cattle lacked a formal structure of ownership, storage, and overall organization.46

New Amsterdam was seized by the English in 1664 and was rechristened New York. The transition to British rule in New York altered the landscape for livestock in two ways. First, cattle became more regulated. Under Dutch rule, many residents of New Amsterdam owned cattle communally and individual animals were not generally marked for ownership. After the takeover by the English, under the authority of the Duke of York, marking cattle became required, tolls were imposed in order to maintain roads, and cattle were not allowed to roam freely from field to field.47 Second, under English rule the number of cattle in New York increased. One alderman in the Colony noted in 1698 that there had been a considerable increase in the number of cattle and their value had doubled over the previous fourteen years.48

The livestock economy of New York prior to the American Revolution (1775-1783) was similar to other colonies along the eastern seaboard. Alongside places like New England, for example, New York was a productive agricultural area, allowing for a prosperous trade in various meat products and livestock with colonies in the West Indies. Items included salted beef, bacon, live cattle, and horses. Dairy production, on the other hand, was not as prosperous. New York was not alone in this position; indeed with the exception of Pennsylmania, most colonies in the East did not excel in dairy production in this period. As Ontario experienced in the early nineteenth century with the decline of wheat production, soil exhaustion played a significant role in New York’s limited dairy production. Hay was not grown in large, organized quantities to support large numbers of cattle over winter, nor was grass sown in quantities sufficient for

46 Thompson, 39.
47 Thompson, 39-40.
48 Thompson, 40.
pasturing over the summer months. Not surprisingly, cattle produced limited amounts of milk and in fact New York imported many dairy products, butter from Ireland for example, whereas the limited amounts of it made in New York were sent to the West Indies, often in adulterated forms. 49

The American Revolution, for agriculture in New York, was profitable. New York was in an area occupied by the British for quite a long period and thus provided a ready market for livestock and their products. The British were also willing to pay the inflated prices demanded by New York farmers. During the Revolution, New York cattlemen preferred to sell to the occupying British who paid them in hard currency. However, with American forces in Westchester County and from New Jersey, cattle shipments were often halted and confiscated. 50

While livestock exports were still an important aspect of New York’s as well as surrounding states’ agricultural landscapes, in the wake of the American Revolution, Thompson notes that agriculture became a more settled activity and the development of a more domestically oriented livestock and agricultural economy was pursued. 51 This seemingly brought some stability to the area.

While after the Revolution New York became more settled in terms of the agricultural landscape and cattle exports continued the livestock economy as compared to that of other states in the surrounding area, Pennsylvania, for example, was not considered overly strong. One of the challenges facing livestock in New York in this period was transportation. In order for cattle to make it to markets in New York for sale from the major cattle-producing areas in Westchester

49 Thompson, 40–41.
50 Thompson, 71. Thompson notes that there were a number of cattle dealers very loyal to the patriot cause. One New York dealer, John Pessenger, was personally tapped by George Washington to buy cattle for the American Army. See Thompson, 71.
51 Thompson, 71.
County, Staten Island, and New Jersey, they had to be transported by boat. In the era before steam, this made markets in New York inaccessible and very expensive. In addition to issues of accessibility, New York in this post-Revolutionary period remained diverse in its livestock operations, reflected in levels of expertise and improvement. Along the Hudson River, Dutch farmers continued to raise cattle to meet their own personal and community needs but did not aggressively pursue other markets for their products. Dutch farmers in New York tended not to feed their cattle over winter with hay, relying instead on roots. This was in stark contrast to Hugenot (French) farmers in New York who were advocates of the use of hay for winter feed. This somewhat minor example illustrates the very different ideologies or philosophies behind raising cattle in this one geopolitical area. While this hodgepodge of livestock practices persisted for some time, they would change as the nineteenth century approached due to the agricultural development of parts of Western New York, the expansion of livestock into the West, and general changes in attitudes towards livestock breeding.52

One of the most important developments in the agricultural economy of New York was the opening up of the western Genesee area towards the end of the eighteenth century. The soil quality of this untapped agricultural area was very rich and pasturing land was easy to come by and did not require manure to return nutrients to the soil. Many of the farmers who initially settled in this area were from New England and brought their well-bred livestock with them.53

Overall, what can be said about livestock raising in New York leading into the nineteenth century is that it was a mixture of different practices and levels of engagement with both domestic and international economies. New York just at the dawn of the nineteenth century

52 Thompson, 71-73.
53 Thompson, 72.
possessed a largely insular agricultural economy. Export and slaughter in great numbers were not practiced and this period might really be characterized as a building-up period. As the nineteenth century progressed, however, with key developments in transportation and the settlement of the West, New York would become an important hub in the American cattle market.

The Erie Canal was a defining construction project for nineteenth century America. Among its many achievements, it linked New York City with the Great Lakes. The creation of this navigable waterway had a number of implications, among them the transportation of agricultural goods that was made more efficient and cheaper than overland driving. During the construction of the Canal between 1817 and 1825, New York was well-positioned to not only supply labour for the Canal, but also, with the gradual build-up and expansion of livestock and agriculture throughout the eighteenth century, were able to supply cattle to the growing West as well as serve as an important hub for the eastward movement of western cattle to markets on the Eastern seaboard and across the Atlantic.\(^{54}\)

At the same time that people and goods began to move westward and back with the development of the Erie Canal, attitudes towards livestock breeding were also undergoing transformation. The election of Thomas Jefferson as the third president of the United States in 1801 introduced a number of new political ideas to the nation. Thompson notes that at the same time these new political ideas were introduced to the American mainstream, so too were new ideas about livestock breeding and agricultural practices. It was in the early nineteenth century, for example, that artificial fertilizers were introduced and used by American farmers all over the

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nation. At the same time, Thompson notes, the importation of breeding cattle from Europe increased as did interest in agriculture, as evidenced in popular newspapers and the founding of agricultural groups and societies.\textsuperscript{55}

In terms of improvement cattle, New York began importing larger numbers of European cattle in the early nineteenth century, around the same time as Ontario. New York farmers were not alone in this activity, and indeed a number of states such as New England were also importing cattle in this period as participation in dairying increased. In New York, Genesee County and the areas along the Ontario border became large livestock areas. It was in these areas during the early nineteenth century that improvement cattle appeared. Shorthorns, cattle that were popular with Ontario farmers for their suitability for both dairy and meat production, were also favoured by New York farmers. In 1823, for example, three shorthorns, a bull (named Washington) and two heifers, were imported by Stephen Van Rensselaer.\textsuperscript{56}

By the American Civil War (1861-1865), New York was well on its way to becoming a significant centre for livestock, both in terms of domestic production and as a transit hub for the large numbers of cattle moving westward. Beginning in 1817, cattle were driven from Ohio into New York and arrived in fair condition. With this first successful transit of cattle was

\textsuperscript{55} Thompson, 78-79. Thompson notes that the spread of agricultural knowledge, etc, was not unique in theory to this period. Indeed in the mid-eighteenth century, Benjamin Franklin had advocated the teaching of agriculture in colleges, etc, however it would not be until Jefferson’s period that these things would take root amongst the population. See Thompson, 79.

\textsuperscript{56} Thompson, 83-84. Van Rensselaer was the 8\textsuperscript{th} patron (until the term was abolished in 1775) of the Manor of Rensselaerswyk, which covered most of current-day Albany and Rensselaer counties. A patronship was the name for a large landowner, similar to a feudal lord, in Dutch-controlled New Netherland. Van Rensselaer served in the War of 1812 and was a statesman for New York for many years. He put much of his estate under cultivation and was keenly interested in the economic and agricultural development of New York. He was an advocate of canals, especially one linking the Hudson River and the Great Lakes and was a member of the first canal commission in 1810. Van Rensselaer was president of the first board of agriculture for the state and along with Amos Eaton, co-founded the Rensselaer Polytechnic Institute. See “Stephen Van Rensselaer,” \textit{Dictionary of American Biography}. Vol. 10. Ed. Dumas Malone (New York: Charles Scribner’s Sons, 1936), 211-212.
accomplished, New York became a regular destination for American cattle bound for the eastern seaboard and beyond.\(^5^7\)

**On the Move: Cattle in Transit in the Nineteenth Century**

This chapter has so far introduced the world that facilitated the spread of bovine tuberculosis by examining the introduction and growth of the cattle populations of Ontario and New York. It was a world in which the growth of the livestock economy was influenced by a number of international and domestic events including recessions, land acquisition, and mass immigration. The epidemiological stage that the growth of Ontario and New York’s livestock populations set was furthered by the active genetic improvement of cattle. These animals, bought and shipped in small numbers, greatly facilitated the spread of disease. What is particularly noteworthy about these animals is their mobility. There is a tendency to think of cattle as stationary animals. While many cattle spent their entire lives in one place, producing milk or fattening for slaughter, many were very mobile. Mobile livestock, such as breeding animals, came into frequent contact with herds. The combination of growing populations of cattle and contact with mobile animals carrying disease facilitated the spread of sickness. The aspect of motion will surface at various points throughout the thesis as much of the bureaucratic effort to eradicate bovine tuberculosis in both Canada and the United States did not involve actively curing cattle of tuberculosis, but arresting the movement of diseased cattle. This was achieved, in part, through controlling and monitoring cattle as they moved to various locations throughout their lives.

\(^5^7\) Thompson, 94.
The movement of cattle is evident in briefly exploring the physical expansion of the livestock populations of Canada and the United States, and the place of Ontario and New York in that expansion. In the United States, for example, the locus of livestock production there shifted to the West throughout the latter half of the nineteenth century, in particular in the years following the American Civil War. Cities like Chicago became major sites of cattle shipping and processing.\textsuperscript{58} New York remained a vital point in this growing national and international network of livestock throughout the late nineteenth and into the early twentieth century despite the locus of cattle shipping to the West.\textsuperscript{59} Despite the locus of livestock production and processing steadily moving westwards in the latter half of the nineteenth century, New York State retained a very large livestock population. This was mainly to meet the needs of its large population, which by 1850 had exceeded one million.\textsuperscript{60} Even as late as the 1880s, note both Roger Horowitz and Betty Fussell, New York remained a leading beef producer in the United States until the introduction of refrigeration technology made it possible and where profitable to place greater separation between the point of slaughter and processing, and the point of consumption.\textsuperscript{61}

It is often the growth of the railways that points to a dramatic transformation in the movement of livestock. Initially, railways in Canada were slower to develop than in the United States. For example, by the 1840s, the United States had laid several thousand miles of track

\textsuperscript{58} A crucial study on the role of Chicago and the Midwestern United States for the livestock industry is William Cronon, \textit{Nature’s Metropolis: Chicago and the Great West.}

\textsuperscript{59} For further general studies on the expansion of America’s cattle industry, see such works as Rudolf Alexander Clemen, \textit{The American Livestock and Meat Industry}, and Jeremy Rifkin, \textit{Beyond Beef: The Rise and Fall of the Cattle Culture} (New York: Dutton, 1992).


while Canada fell behind. By the 1850s, however, Canada was actively pursuing multiple railway projects, including the Grand Trunk which ran from Ontario to Quebec and American States such as Vermont, Michigan, and Connecticut. This would provide an efficient link for cattle to be loaded on to ships bound for the growing British market for Canadian beef cattle by the 1870s.

While rail provided new transportation opportunities for cattle, the movement of cattle had been an active character of the livestock economy of America well before the age of rail. Jimmy Skaggs, in his work on the development of the American meatpacking industry, characterizes the movement of cattle as one consistently accompanying Americans expanding westward. Highlighting the work of nineteenth-century American historian Frederick Jackson Turner, Skaggs draws attention to the emergence at the end of the nineteenth century of a “rancher’s frontier.” Individuals raising cattle, whom Turner referred to as “cow drivers,” included large ranchers, farmers and owners of small herds. They actively drove their animals on foot to waiting markets in the east, of which New York was one. Indeed, the traffic in live cattle remained so consistent and high throughout the nineteenth century from both domestic and interstate traffic, that a tunnel was built under Twelfth Avenue in New York City in the 1870s to herd cattle through the city to various slaughterhouses, thereby avoiding the streets and offending any passersby.

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62 Douglas McCalla outlines the issues that arose in this period surrounding railway development in his work Planting the Province: The Economic History of Upper Canada, 1784-1870. An emphasis on canal building, and issues with public funds and outside investors in part explain the slower pace of railway development in Canada as compared to the United States. See pp. 199-.
64 Jimmy M. Skaggs, 3-4.
65 Fussell, 21-22. Fussell highlights the 1846 work of a butcher named Thomas De Voe called Market Book. Among his many observations of slaughterhouses in New York City, he notes the “cow tunnel” of Twelfth Avenue.
Driving cattle to New York and other destinations along the eastern seaboard such as Philadelphia by foot was not the only way cattle made the increasingly long journey as livestock production moved west. Water transportation was a vital aspect of the movement of goods back and forth between the eastern seaboard and the expanding West. William Cronon notes that the natural environment played a determining factor in the growth of livestock in the west and the relationships that developed between mid-western and western livestock raisers and dealers and markets in the east, New York State being prominent among them. For Cronon, Chicago became a centre strategically able to buy and sell various agricultural goods in the east because of the Great Lakes, the Erie Canal, and the Hudson River. Chicago’s price structure, according to Cronon, left it in an advantageous position with its merchants able to buy large quantities of goods in the east and have them shipped by boat back to the Midwest, which was less costly than overland. The same was true of their agricultural products moving east. However advantageous water transportation was, Cronon is careful to caution though that while the natural environment and the system of canals built to more easily navigate them gave cities like Chicago greater access to New York, by the late nineteenth century it was necessary to access New York for other reasons. By this period, New York was positioned as the main financial centre of America, most of the major banks were headquartered there, and the ports serviced the overseas shipment of a variety of products, and because of these developments New York had the most direct and immediate access to European markets. So strong became the connection between east and west, Cronon notes:

City streets became places where the products of different ecosystems, different economies, and different ways of life came together and exchanged places. “There can be no two places in the world,” wrote Margaret Fuller in 1843, “more

66 Cronon, 60-61.
67 Cronon, 62.
complete thoroughfares between [Chicago] and Buffalo. They are the two correspondent valves that open and shut all the time, as the life-blood rushes from east to west, and back again from west to east.”  

While water transportation was certainly an advantage for those seeking an efficient and cost-effective method for moving agricultural goods between western and eastern regions of the United States, it was the introduction and widespread embrace of the railroad that would have a transformative effect on livestock in America. In 1852, two railway lines (the Michigan Southern and Michigan Central) with direct access between Chicago and New York were completed. Over time, the railways would make shipping agricultural goods by water obsolete but in the early years of rail, this was not necessarily the case. As Skaggs notes, in 1855 the Erie railroad charged over twelve dollars per head of cattle to ship from Ohio to New York. This was well beyond what drovers charged and given the crowded and often dangerous conditions live cattle experienced in rail cars, many farmers were more comfortable to have drovers casually and relaxingly fatten their cattle as they drove them to the east.  

The introduction of refrigeration technology in the 1880s would again transform the livestock economy of America. Because of this vastly cheaper technology, it became possible to ship fresh cuts of meat to eastern markets and onward to Europe.  

For Canada, the movement of cattle and the development of livestock production in the West have long been part of the historical narrative of Canadian agriculture. Significant to nineteenth century Western Canada were the influence of trends in American livestock development, the railways, and the relationship the region shared with the east. Though this will

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68 Cronon, 61. See S.M. Fuller, Summer on the Lakes in 1843 (New York: Little Brown, 1844). Fuller was a journalist and an early publisher and advocate of women’s rights in America.

69 Skaggs, 21.

70 See Skaggs, 91-94.
not be an exhaustive account by any means, it is hoped that a better understanding of the linkages and development of networks in livestock will be framed as it will surface throughout the thesis. These networks would not only grow the nation’s livestock, but also provide the means by which bovine tuberculosis would spread from coast to coast.

Edward Brado, in his work on the origins of ranching in Alberta, notes that the cattle industry of the west began with settlers in the Red River Colony beginning in 1811. The settlers purchased cattle from both the Hudson’s Bay Company and the North West Company, desiring them more for dairy than meat given the buffalo population in the vicinity. Over the coming years, cattle were introduced in varying quantities from a number of sources from the United States.  

While cattle had been introduced to the Canadian west in the early nineteenth century, the incredible growth the industry experienced occurred in 1860s when the demand for beef increased in the east as a result of the American Civil War, railway construction that had connected the midwestern and western United States to the east and European markets, and mining operations that, along with railway construction, required beef for consumption. In the 1870s, Europeans began occupying the prairie region and cattle numbers began growing. Some historians note that the growth of cattle in this region essentially mirrored similar developments in the United States as a whole. Higher prices for cattle in the east after the Civil War (MacLachlan notes that a steer would fetch $36.39 in New York, while in Texas it would fetch $5.59) drove many southern and western livestock drovers to take their animals east. These

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72 See MacLachlan, 9.
cattle, now part of what MacLachlan labels a “truly continental market,” also serviced the growing mining and railway operations stretching west.\textsuperscript{74}

By the 1880s the Canadian Pacific Railway had reached Alberta, providing access to eastern markets. The connections that western cattlemen had with the east were quite strong, however. Despite large numbers of American cattle populating the prairies, Ontario provided large numbers of purebred cattle to improve the quality of herds. Derry notes that it is difficult to determine how many purebred cattle in west were from Ontario, but by the turn of the century most assumed that purebred stock in the west owed their origins to Ontario. Initially, Derry notes, buyers of purebred Ontario stock were ranchers or representatives of ranchers, but by the 1910s most transactions between Ontario breeders and individuals in the West were with other breeders, indicative of a more established livestock system.\textsuperscript{75} Unfortunately for the West, as Derry argues, the purebred stock that did make its way west was often diseased. Indeed this would have significant implications for disease and will be discussed in a later chapter. The west became something of a dumping ground for purebred tubercular animals in the early twentieth century. As Ontario livestock owners began to address the disease in their herds and participate in a number of government eradication programs, some owners chose to sell their infected cattle at a lower cost to buyers in the west rather than slaughter them. These buyers seemed more concerned with low prices than with the quality of the cattle they received.\textsuperscript{76}

A continental market existed for livestock between Canada and the United States in the nineteenth century. While the Canadian and American markets were not completely integrated,

\textsuperscript{74} MacLachlan, 9. He notes that historian David Breen cautions simplifying this explanation, advocating the importance of the Canadian government in the development of ranching in the prairies in addition to American interests.
\textsuperscript{75} Derry, 119. Derry also notes that Ontario enjoyed a thriving purebred cattle trading relationship with Quebec. See Derry, 118-119.
\textsuperscript{76} Derry, 120-121.
they were certainly not independent of one another. The disease pool for bovine tuberculosis, therefore, encompassed both countries. Prior to the rise of mixed agriculture in Ontario in the 1870s, cattle imported from the United States were a regular feature of the agricultural landscape. Prices for American beef were low and cattle were regularly imported. Furthermore, by the mid-nineteenth century, the development of railways and the Reciprocity Treaty of 1854 saw further exports of cattle to the United States. This continued throughout the 1860s as demand for beef and beef cattle increased as a result of the American Civil War. As MacLachlan notes, the abrogation of the Reciprocity Treaty in 1866 reduced the number of cattle going to the United States, however a profitable market for cattle, particularly calves, remained. For older, or finished, cattle, towards the end of the nineteenth century, the market for Canadian cattle shifted to the United Kingdom.

Bovine Tuberculosis and Humans: Facilitating the Consumption of Consumption

Like a lot of zoonotic diseases, bovine tuberculosis can be thought of as two separate diseases. On the one hand, it was a serious infectious disease that affected livestock. On the other hand, it at the same time was a serious public health disease. While this examination is principally

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77 MacLachlan, “The Historical Development of Cattle Production in Canada,” 5. To note, American cattle had been entering Canada long before this period. For example, Maclachland notes that cattle along with ideas about breeding and raising accompanied the influx of United Empire Loyalists at the end of the eighteenth century. See MacLachlan, “The Historical Development of Cattle Production in Canada,” 4.

focused on the eradication of bovine tuberculosis in cattle, the disease in humans warrants consideration. Although intertwined, ultimately bovine tuberculosis in humans and cattle were dealt with separately. In the case of New York State, for example, public health authorities directed the initial attempts to eradicate the disease in cattle beginning in 1892. Furthermore, one piece of Canadian legislation, the 1914 Municipal Tuberculosis Order, was a livestock testing program directly tied to public health, providing testing specifically for municipal dairy cattle.

In humans, eliminating bovine tuberculosis meant eliminating the pathways the bacillus needed to infect humans. This largely meant eliminating the disease in meat and milk, the most common vessels of the disease. It would be a difficult and arduous task, taking several decades to accomplish, especially in the case of milk. The production and distribution of tubercular meat and milk reflected the intersection of a number of processes. This included the presence of diseased livestock in the food system, a relative absence of unified sanitation and safety standards, and changes in the scale and scope of meat and dairy consumption, production, and distribution.

There are a number of ways that humans contracted bovine tuberculosis. The most common was to ingest the bacteria through infected meat and milk. In the late nineteenth and early twentieth centuries, this is where the majority of human cases of bovine tuberculosis originated. The disease often resulted in a severe and sometimes deforming infection and, given its demographic and tendency to affect children, it became a disease of great concern. It is worth noting, however, that bovine tuberculosis may pass between humans and animals in ways apart from consumption. These routes of infection generally occurred in two ways. The first was infection through inhalation. For farmers and farm workers operating in close proximity to tubercular cattle, it was possible, though remote, to inhale bovine tuberculosis in aerosol form.
Active bovine tuberculosis bacilli contained in cattle sputum were readily found on the walls of dairy sheds. A second route of infection was through direct contact with the skin. Of the two uncommon ways of contracting bovine tuberculosis outlined here, direct skin contact was the most uncommon. It afflicted a small number of individuals who handled tubercular meat and was known as “butcher's wart”, similar to “Prosecutor's Wart” by *M. tuberculosis* that occasionally afflicted anatomists handling cadavers who suffered from tuberculosis.79

Turning to the consumption of tubercular meat and milk specifically, bovine tuberculosis present in meat may be destroyed through cooking but, if undercooked, was able to pass the bacteria on to humans. Milk, on the other hand, before the widespread introduction of pasteurization, was largely consumed raw. This was true of rural environments where it was consumed directly or very close to its source, and in urban environments where milk was pooled from several sources and distributed. If one or more of the cattle contributing to that pooled milk was infected with tuberculosis, the entire supply was affected.

Once ingested through meat or milk, bovine tuberculosis could affect the body in a number of different ways. Most commonly, the infection would occur in the tonsils or intestines. Intestinal tuberculosis resulted in the inflammation of the intestinal tract and severe diarrhoea. Infection in the tonsils often affected the cervical lymph nodes causing noticeable lesions or abscess that sometimes spread to the sinus. Furthermore, dissemination of bovine tuberculosis in the blood either through ingestion or in those rare cases, inhalation, could result in infection in

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the joints or bones. Bovine tuberculosis was capable of producing devastating disease in the people afflicted with it. The fact that it was most commonly ingested in meat and especially milk, thought to be a pure and nurturing substance, certainly lent bovine tuberculosis a menacing quality.

**Conclusion: The Stage is Set**

Both Canada and the United States experienced tremendous growth in their cattle populations throughout the nineteenth century and they would quickly find themselves participating in a growing international livestock economy. The products these nations produced, including butter, meat, and cheese, would be in high demand from overseas consumers and herds in Ontario and New York State would grow to accommodate these demands. In order to meet both domestic and international demands for both livestock themselves as well as the products they produced, owners turned to breeding to improve the quality of their animals as well as the products they provided. By the 1890s, it was clear that a mobile livestock population was a global reality and its biological consequences were becoming more clearly evident. These cattle, often imported from Great Britain, introduced diseases such as bovine tuberculosis the herds they were meant to improve. As vessels of disease, they linked North America and Europe not only economically, but biologically as well.

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80 See Skuce and Neill, 75-76. For a further description of the shape of bovine tuberculosis infection in humans, see also J. Arthur Myers, *Man’s Greatest Victory Over Tuberculosis*, 199-210. See also J. Arthur Myers and James H. Steele, *Bovine Tuberculosis Control in Man and Animals*, 57-66.
Humans facilitated the spread of bovine tuberculosis within their own populations as well. The industrialization of meat processing and distribution, following a pattern of so many consumer products in the nineteenth century, meant that meat from much further distances made its way on to the plates of consumers. The driving of cattle over longer and longer distances made meat more anonymous in terms of where it came from and the diseases it carried, and before the advent of meat inspection in 1906/07, there were few regulations for its safety and quality. The situation for fluid milk was not altogether different. Milk became a more widely consumed substance by the end of the nineteenth century in both Canada and the United States. Produced in ever-growing cities as well as rural areas with little intervention to ensure its quality and safety, the result was an often adulterated and diseased product.

As *M. bovis* maneuvered its way through the structures and products that facilitated its spread, an army of dedicated scientists was putting forth a tremendous effort to research and understand it. This was the response to the bacillus. Although individuals had been dealing with bovine tuberculosis for many years, the more formal response to the disease began in the early 1880s with German bacteriologist Robert Koch’s identification of the bacillus. Chapter II will demonstrate that the path to a unified understanding and attitude towards bovine tuberculosis was seldom straightforward. Several decades of dissent, debate, and research would follow Koch’s work in the 1880s, but all with the ultimate goal of effectively eradicating the disease.
Chapter II:

The Biomedical Response to Bovine Tuberculosis and Emergence of the Veterinary Profession in Canada and the United States, 1791-1890

Bovine tuberculosis emerged as a serious disease of livestock and humans in the late nineteenth century. By this period a number of inter-connected factors facilitated the spread of the disease. The growth of domestic populations of cattle, breeding, the international cattle trade, and the overall mobility of livestock, facilitated the spread of sickness. Bovine tuberculosis, through these factors and by the nature of the disease itself, crept into and spread within herds, from farm to farm, county to county, and nation to nation throughout the nineteenth century, becoming a formidable disease to eradicate. The formidable nature of the disease lay not in its dramatic presentation. Indeed, bovine tuberculosis was not a dramatic disease compared to others in this period.

Individuals began trying to understand the properties of bovine tuberculosis beginning in the late eighteenth and early nineteenth centuries. This chapter will examine the characterizations and scientific study of bovine tuberculosis from its appearance in early animal health literature to German bacteriologist Robert Koch’s formal identification of the tuberculosis bacillus in 1882. Koch’s subsequent introduction of the diagnostic agent tuberculin in 1890 as well as later
controversies surrounding his views on the nature of bovine tuberculosis will also be explored. Overall, a number of ideas about the bovine tuberculosis emerged in this period, some of which were later confirmed through scientific research. In investigating bovine tuberculosis, early writers and the more formal scientific community that followed later in the nineteenth century would demonstrate a transformation in the scientific understanding of disease and disease patterns.

Key to the relationship between disease patterns and the changing scientific understandings of disease in this period was the emerging profession of veterinary medicine. This body of individuals was central to the identification and eradication of bovine tuberculosis. They were directly involved in the scientific investigations of the disease and the legislation designed to eradicate it. Moreover, they were central to the implementation of various pieces of legislation and the formation of animal health infrastructure more broadly, which will be examined in more depth in Chapter III. Armed with the germ theory of disease and the emerging scientific understanding of bovine tuberculosis, and the means to diagnose it, and granted the authority to detect and eliminate it, veterinarians would be powerful representatives of the state and indeed embodied the point where the state met the disease itself.

**Defining Bovine Tuberculosis, 1796 – 1901**

The story of defining bovine tuberculosis did not begin with Robert Koch in 1882. While his identification of the bacillus responsible for the disease was in itself a watershed moment in not only the history of tuberculosis, but in the history of bacteriology more broadly, his work was
part of a much larger history of individuals working to define and understand the disease. As one of the oldest diseases known to man, there has been no shortage of writing on tuberculosis, but for bovine tuberculosis the most revealing descriptions of it lie in farriery literature. It is in these works that a collective set of ideas on the nature of the disease and how to address it were expressed. Over time, these would transform into formal scientific treatises on the disease.

Tuberculosis, or “consumption” as it is generally referred to, was a common feature in early animal health literature. While descriptions of the disease in animals varied in length and depth between different works, some commonalities existed. The first concerns the description of tuberculosis in animals generally. Overall, a number of authors note that consumption was a difficult disease to define. William Taplin, for example, writing in 1796, noted “…no description of disease, has been more hacknied, more prostituted and perverted, than the very name of consumption…it has for ages been an excellent mask of mystery.”

Although an admittedly difficult disease to define, descriptions of consumption in animals generally described it as a disease of a wasting nature and one that primarily affected the lungs. Writing later in 1864, for example, Robert Jennings noted that consumption was “…technically known as phthisis pulmonalis – is the termination of chronic disease of the lungs.”

There were a number of symptoms associated with consumption in animals. Some were associated with the behavior of the animals, such as a refusal to eat, lethargy, as well as

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2 Robert Jennings, *Cattle and Their Diseases, Embracing their History and Breeds, Crossing and Breeding, and Feeding and Management; with the Diseases to Which They are Subject, and the Remedies Best Adapted to Their Cure* (Philadelphia: John E. Potter and Company, 1864), 217. Knowlson wrote of consumption as being a “…want of nourishment and a waste of flesh.” Knowlson, 195.
noticeable physical symptoms such as weight loss and a lack of strength. One of the most
common external symptoms of consumption written about in farriery literature was the “yellow
matter” produced by affected animals. For example, in 1828 A. Lawson wrote that animals
affected with consumption often sneezed a “…yellowish curdled matter.” John Knowlson
described a similar symptom years later in 1843, noting that affected animals “..gleet at the nose
and throw a yellowish matter.” This yellowish matter extended to the internal evidence of the
disease as well. Jennings, for example wrote of “…organs [becoming] filled with cysts, or sacks,
containing a yellowish or yellowish-white fluid, which in time is hardened, producing a
condition in the lungs known as tuberculous.”

Writers pointed to a variety of causes of consumption in animals. Some connected it with
other diseases. Lawson, for example, noted in 1828 that farcy and glanders, when fixed on the
lungs, could develop into consumption. George Dadd noted that colds, left untreated, could lead
to consumption. He also wrote that consumption was hereditary; an idea that persisted for some
time. The environments in which animals lived were also promoted as a cause of the disease, in
the form of damp stables and a lack of air circulation.

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4 Lawson, 92.
5 Knowlson, 195.
6 Jennings, 217.
7 Lawson, 93. It is now known that bovine tuberculosis can affect horses, but only in very rare cases. Glanders is a bacterial zoonoses that primarily affects horses. It is typically ingested through contaminated feed and water and results in an infection of the upper respiratory tract. In its most severe form, animals develop a cough and fever, with infection spreading to the internal organs and death. Farcy was generally defined as a less severe, chronic form of glanders.
9 Knowlson, 196.
A number of cures or treatments for the disease were suggested. They ranged from bleeding to purges with mercury, to concoctions containing a variety of common medicinal ingredients of the period. In one work, for example, a compound of ginger, emetic tartar, camphor, opium, oil of caraway, and molasses was recommended.\(^\text{10}\) However, as much as various treatments were promoted, there were those who were unconvinced that anything could be done to alleviate the suffering of animals afflicted with consumption. Jennings, for example, noted that “…no treatment will be of much service here. It is, therefore, better, if the animal is not too poor in flesh, to have it slaughtered.”\(^\text{11}\)

The idea of consumption in animals being a contagious disease was not something widely posed or discussed in early animal health literature.\(^\text{12}\) Overall, late eighteenth and early nineteenth century observers described consumption in animals as a wasting disease that often grew out of other known ailments or was inherited. Though some of the observations about the disease from this literature were later confirmed through scientific research, others were disregarded. Regardless, this literature reveals that many investigating animal disease in this period did have working awareness and knowledge of a number of aspects of bovine tuberculosis long before it was formally identified. While these works would continue to be published well into the twentieth century, the knowledge about bovine tuberculosis would change substantially. Throughout the latter half of the nineteenth century a number of researchers worldwide brought the disease under formal scientific investigation. The most celebrated was Robert Koch, who formally identified the bacillus responsible for the disease in 1882.

\(^\text{10}\) Lawson, 94. This compound was meant to induce perspiration in the animal, a common method of treatment. Compounds inducing vomiting, urination or defecation were also common.

\(^\text{11}\) Jennings, 217.

\(^\text{12}\) Consumption in animals if anything was regarded as an inherited disease in this period as opposed to an infectious disease. This stands in contrast to a growing understanding of contagion in this period through the experience of diseases such as rinderpest, which emerged in the 1860s. See Worboys, *Spreading Germs: Disease Theories and Medical Practice in Britain, 1865 – 1900*, 56-60.
The characterizations of scientific investigations into tuberculosis and its bovine form by historians have changed considerably in the last few decades. Historians such as J. Arthur Myers and Rene and Jean Dubos, for example, writing about tuberculosis in the 1940s and 1950s, focused on what John C. Burnham described as “…emphasizing individual physicians, and was positivistic or progressive, within a framework of the “onward and upward” march of medical science.” The 1970s saw more critical histories of tuberculosis emerge. Writers such as Ivan Illich, Susan Sontag, and Michael McKeown began to explore the experience of illness and turned a critical eye towards the medical profession, moving away from the “onward and upward” approach to the history of tuberculosis and questioning how substantial a role medical science really played in the decline of the disease. The last two decades have seen further social, environment, and particularly global histories of tuberculosis emerge. These histories build on earlier works on tuberculosis that explore the experience and social circumstances, susceptibility and treatment of the disease. Many recent histories of the disease also place tuberculosis in a wider environment and global context, especially given the global nature of other diseases such as HIV/AIDS and the emergence of new antibiotic-resistant strains of tuberculosis.

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15 Bryder, Condrau and Worboys, 7-18. There are several examples of more recent histories of tuberculosis that capture these themes. See, for example, Thomas Dormandy, The White Death: A History of Tuberculosis (London: the Hambledon Press, 1999), Georgina Feldberg, Disease and Class: Tuberculosis and the Shaping of Modern North American Society, Matthew Gandy and Alimuddin Zumla, ed., The Return of the White Plague: Global
The latter half of the nineteenth century saw a transformation in the approach to the investigation of tuberculosis in animals. J. Arthur Myers, for example, characterizes this period, which runs roughly between 1865 and 1882, as a “period of experimentation,” and led to the scientific confirmation of a number of assumptions about tuberculosis in both humans and animals. For Myers, the most notable figure in late nineteenth century tuberculosis research was Jean Antoine Villemin. A French physician, Villemin’s experimental work beginning in 1865 argued that tuberculosis was both a contagious and virulent disease. He first presented in December of 1865 in front of the French Academy of Medicine:

He had actually inoculated material from persons who had tuberculosis or had died of it, into the bodies of small animals which in turn developed the disease. He did this enough times to thoroughly convince himself that this material from the human body contained something which when transmitted to the animal body caused the disease. Therefore, he concluded that tuberculosis is contagious. He said: “Tuberculosis is the effect of a specific, causal agent; of a virus. This morbid agent ought to be found, like its conegers, in the morbid products which it has determined by its direct action on the normal elements of the affected tissues, introduced in an organism capable of being affected by it. This agent ought then to reproduce itself, and to reproduce at the same time the disease of which it is the essential principle and the determining cause.

Villemin’s paper, titled “Cause et nature de la tuberculose,” was met with considerable opposition from his peers, many of whom remained convinced that tuberculosis arose spontaneously in the body or from the number of other causes posed previously. Regardless,

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17 Myers, *Man’s Greatest Victory*, 89. For more extensive information on the life and career of Villemin, see Dubos, 98-100, and Waddington, The Bovine Scourge, 32-36.
Villemin continued to pursue his tuberculosis research in the years that followed his 1865 paper to the French Academy of Medicine and subsequently published further research in 1868 that confirmed his findings. Villemín also made a number of additional observations and arguments about the nature of tuberculosis. The two most prominent concerned the nature of the disease in humans and animals, and the relationship of environment and population density to incidences of the disease. He asserted that animal and human tuberculosis were identical diseases in terms of how they developed in the body. Villemin also argued that if tuberculosis were a spontaneous disease, as so many believed, then it would not follow the patterns he observed. These patterns, he argued, were closely related to population density and environment. Higher incidences of tuberculosis were observed in factory and dense housing environments, as well as in the movement of people from known areas of infection to new ones.

Villemin’s work was followed by several others, such as Auguste Chauveau and Arnold Klebs. These men, among others, contributed scientific evidence to the contagious nature of tuberculosis and its influence on the human and animal body. Auguste Chauveau, a French veterinary scientist, for example, published experimental findings about the same time Villemin did in 1868, demonstrating that tuberculosis could be contracted through ingestion.


21 Meyers, Man’s Greatest Victory, 90.

tuberculosis by ingesting meat infected with the bacillus.²³ Klebs was a Swiss medical researcher and the son of Albrecht (Edwin) Klebs, a prominent tuberculosis researcher who pursued various pharmacological cures for tuberculosis in the nineteenth century. Klebs left Europe in the 1890s and followed his father to the United States where he practiced and did tuberculosis research in Chicago. He became a vocal advocate for the prevention of tuberculosis through improved hygiene and treating the disease in sanatoriums.²⁴

Villemin contributed important knowledge to the understanding of tuberculosis. His research aided in the transformation of “consumption,” a disease associated with heredity, one’s overall constitution and environment, and a host of other explanations, to “tuberculosis,” a microbiological organism defined through scientific means. More recent scholarship on the history of the disease, however, places less emphasis on “great” individuals such as Villemin and more on the continuity of ideas and practices. Worboys, for example, posits that “…historians have been interested in Villemin’s work because of its seeming anticipation of modern views.”²⁵ According to Worboys, “…changes were more complex, showing as many continuities as changes. Medical understanding … of the disease was in flux before the arrival of the Tubercle bacillus, and this state of affairs continued in its wake.”²⁶ For example, Worboys notes that early understandings of consumption were based largely on observation and assumptions. These included assumptions about a person’s susceptibility or predisposition to the disease given

²³ See Myers, “Development of Knowledge of Unity of Tuberculosis and of die Portals of Entry of Tubercle Bacilli,” 224.
²⁴ Klebs would go on, in the 1890s and early 1900s, to publish a number of works on tuberculosis, including Tuberculosis: A Treatise by American Authors (New York: D. Appleton and Company, 1909). He would eventually donate his extensive collection of several thousand rare books on tuberculosis to Yale University. For more biographical information on Klebs, see Leona Baumgartner, “Arnold Carl Klebs, 1870-1943,” Bulletin of the History of Medicine vol. 14 (1943): 201-216. See also Leona Baumgartner, “Arnold Klebs as Humanistic Scholar,” Bulletin of the Medical Library Association vol. 32 (1944): 85-95.
²⁵ Michael Worboys, Spreading Germs: Disease Theories and Medical Practice in Britain, 1865-1900 (Cambridge: Cambridge University Press, 2000), 197.
²⁶ Worboys, 231.
heredity, lifestyle and environmental factors. These observations were built on in the 1860s by scientists such as Rene Laennec who observed microscopically tubercle nodules in the body and made connections between damaged lung tissue and observed clinical symptoms. Though Villemín’s arguments regarding the infectious nature of the disease emerged in this period as well, his experiments, Worboys notes, were confined to laboratory conditions, and individuals had a hard time transferring his ideas into real world conditions in which infection might occur. Therefore, despite the emergence of laboratory investigations into the disease in the latter half of the nineteenth century, ideas about heredity, environment, etc, persisted and treatments well into the twentieth century incorporated many of these ideas.27

While a number of questions regarding tuberculosis were resolved by individuals like Villemin, a fundamental one remained. What was tuberculosis? Although much research had been pursued throughout the latter nineteenth century, the purpose of which was to determine the cause and properties of tuberculosis, the causative agent of tuberculosis was yet unknown. Thus, the research that had been done on tuberculosis in many ways stood on shifting ground as the causative agent was still a mystery. This was to change in 1882 with German bacteriologist Robert Koch, who determined a bacillus was responsible for the disease. His research was more than the act (albeit significant in itself) of identifying bacteria under a microscope. Koch’s work set in motion the eventual campaigns to eradicate tuberculosis in animals and humans. He was part of a wider movement beginning in the late nineteenth century that saw active campaigns to eliminate a number of diseases, and saw the role and authority of the state grow in the control and elimination of disease.

27 See Worboys, 193-197.
Robert Koch was born in 1843 in Germany to a mining official. Unlike his brothers, who pursued careers in business, Koch chose to study science and medicine beginning in 1862 at the University of Gottingen. Following his graduation in 1866 he was appointed a district medical officer and began, on his own time, researching anthrax, a cattle disease common to the area he lived in.\(^{28}\) His research was no doubt inspired by his mentors from Gottingen, in particular Jakob Henle, an anatomist and histologist who published a paper in 1840 titled “On Miasmas and Contagions and on the Miasmatic-Contagious Diseases,” in which he argued that infectious diseases were the result of living organisms.\(^{29}\)

Although the anthrax bacillus had been identified prior to Koch’s research, it had not been demonstrated that the bacillus was indeed responsible for the disease.\(^{30}\) Koch demonstrated this property of the bacillus through his laboratory work and was published in 1876, gaining him immediate attention from the scientific community:

Koch succeeded in precisely describing the development of the bacilli into spores and the transformation of the latter back into bacilli and also uncovered the conditions necessary for sporulation (temperature, aeration, humidity). This botanical account, which completely clarified the conditions and circumstances of the life of the anthrax bacillus, allowed for a far-reaching understanding of the etiology and the epidemiology of the disease, yet did not demand a thorough knowledge of the pathology of the disease and the role played by the bacteria.\(^{31}\)


\(^{30}\) Selig, 45.

In the late 1870s, Koch was appointed to the Imperial Health Offices (Reichs-Gesundheitsamt) in Berlin where he began research on tuberculosis.\(^{32}\) He announced his identification of the tubercle bacillus during a paper titled “The Etiology of Tuberculosis” before the Physiological Society of Berlin in 1882.\(^{33}\) In his paper before the Society, Koch described how he was able to identify the bacillus. He began his work by trying to isolate the causative agent of the disease without success. A different method, he discovered, was required and it was his use of a different technique of preparing tissue from tubercular animals for examination that allowed him to finally isolate the bacillus. He wrote: “This proof was possible through a certain staining procedure which has allowed the discovery of characteristic, although previously undescribed bacteria, in organs which have been altered by tuberculosis.”\(^{34}\) Through his staining technique, Koch was able isolate and identify the characteristic rod-shaped bacteria, albeit they were very small structures and thus difficult to see without the proper staining technique.\(^{35}\) His observations culminated in a landmark announcement:

> On the basis of my extensive observations, I consider it as proven that in all tuberculous conditions of man and animals there exists a characteristic bacterium which I have designated as the tubercle bacillus, which has specific properties which allow it to be distinguished from all other microorganisms. From this correlation between the presence of tuberculous conditions bacilli, it does not necessarily follow that these phenomena are causally related. However, a high degree of probability for this causal relationship might be inferred from the observation that the bacilli are generally most frequent when the tuberculous process is developing or progressing, and that they disappear when the disease becomes quiescent.\(^{36}\)

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\(^{32}\) Selig, 46.


\(^{34}\) Koch, 1270.

\(^{35}\) Koch, 1271.

Koch’s identification of the tuberculosis bacillus and was widely reported and scrutinized by his peers. His research also made its way, although to a somewhat limited extent, into the pages of the public press. One newspaper, for example, detailed how Koch was able to isolate the bacillus through his staining technique and hailed it as “…the most remarkable event which has occurred in our decade.” The author was cautious to note though, that Koch’s identification was just that, an identification. “At any rate, the first step has been taken – and a giant stride it is – on the road to the mastery of a disease which kills more people than all the plagues and all the wars and all the famines put together.” This idea was key. Koch’s identification of the bacillus was a significant scientific discovery, but in terms of actively addressing the problem of the disease, its limitations were obvious, according to Dubos:

…[Koch’s identification] did not propound a new conceptual scheme, for the germ theory of disease was already established. It did not offer a new approach to the problem of tuberculosis, for by 1822 the discovery of the microbial agent of the disease was considered only a question of time. The isolation of the tubercle bacillus did not require a new experimental methodology, for Koch merely had to modify details of techniques already worked out largely as the result of his own earlier work. Men were stunned by the practical import of the event, rather than by the intellectual effort involved in its genesis. What electrified the world was not the scientific splendor of the achievement, but rather the feeling that man had finally come to grips with the greatest killer of the human race. The “Captain of All the Men of Death” was not longer a vague phantom.

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40 Dubos, The White Plague, 102. Dubos’ arguments on the overall impact of Koch’s identification of the tuberculosis bacillus have been echoed by more recent scholars. See for example Grandmann, 81-82. and Worboys,
Dubos’ views on the identification of the tuberculosis bacillus have been echoed in recent scholarship. Gradmann, for example, explains that Koch’s identification met with fewer objections from the scientific community because it “…redefined only the pathogen of tuberculosis, not the disease itself.”41 Quoting one observer of Koch, Worboys notes of Koch: “…Koch’s facts could be thus inserted without dislocating anything.”42

With the bacillus responsible for tuberculosis formally identified, the next major development in the scientific response to bovine tuberculosis was the introduction of tuberculin in 1890. Despite its controversial introduction to the global scientific community, tuberculin would become a standard diagnostic agent for tuberculosis in both humans and livestock. The importance of tuberculin cannot be understated; it would make possible the eradication of bovine tuberculosis in the livestock populations of both Canada, the United States, and beyond.43

Tuberculin is a substance which is an extract of the M. tuberculosis bacteria. The bacillus is added to a broth and a small quantity of the substance is injected often into the skin just under the tail of the animal. The substance produces a reaction with those infected with the disease by elevating body temperature as well as producing a swelling at the injection site.44

Tuberculin was presented to the world by Robert Koch at the International Congress of Medicine in Berlin, Germany, in 1890. His announcement that tuberculin could be used to treat tuberculosis was an immediate sensation. English translations of his paper soon appeared and his achievements were heralded in a number of publications. One publication compared Koch’s

41 Gradmann, 205-206.
42 See also Worboys, 210.
44 See Myers, Man’s Greatest Victory Over Tuberculosis, 125-151.
discovery of tuberculin to the discovery of a new shrine in the Middle Ages and wrote of consumptives rushing to Germany with “...hope that at last the wizards of science had discovered a formula by which to conjure away the malady which has eaten its way into their lungs.”

Koch was depicted in a sketch on the same page riding a white horse and holding a microscope; the horse is trampling a menacing looking snake with the words “tubercle bacillus” written down its side. The Lancet proclaimed Koch’s paper was “...welcomed with ‘great tidings of glad joy,’ for it was generally felt that Robert Koch was a man who seldom made a statement which he could not justify, and one who, in this particular instance, must have felt the tremendous issues depending on his utterances.” His discovery was also widely covered in the popular press. Newspapers such as Canada’s Globe heralded the “consumption cure” and the Pittsburgh Dispatch wrote of the world being “…At Koch’s Feet.”

Koch did not escape criticism. The numerous articles heaping praise on him for his discovery also noted his secrecy regarding the composition of tuberculin and the lack of comprehensive, experimental data to support his claims of its properties. The editor of the Lancet noted that Koch was not forthcoming about the composition of his cure, which many came to call “Koch’s lymph.” For his secretiveness, the editor of the Lancet gave him credit, given the early stages of his discovery and the lack of abundant data at that point to support his claims. On

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46 “Character Sketch: Dr. Robert Koch,” 547.
the other hand, concern was expressed that his secretiveness was deliberate as the German government wished to keep the formula and be the sole producer of tuberculin.⁴⁹

Despite concerns, individuals flocked to Germany to be treated in the wake of Koch’s announcement. Sakula notes, for example, that both Arthur Conan Doyle (who, in addition to his writing, was a practicing physician) and the famous surgeon Joseph Lister travelled to Berlin to investigate Koch’s claims, and, in Lister’s case, obtain some of the substance to treat his niece.⁵⁰ Unfortunately, for those who pinned their hopes on tuberculin curing themselves or their loved ones of tuberculosis, it was not to be. In the period that followed his announcement, many of those treated with Koch’s tuberculin experienced severe reactions to the substance and worsening symptoms in many cases.⁵¹ One study of treatment with tuberculin in the Lancet noted that, with the exception of one patient, patients “…were absolutely uninfluenced by treatment.”⁵² Tuberculin, it turned out, was not the miracle cure it was hoped to be.⁵³

Though the failure of tuberculin as a therapeutic treatment for tuberculosis was evident, its value as a diagnostic agent for both humans and animals was quickly recognized. As Keir Waddington notes in his work, the trend of historical work on tuberculin is that it tends to focus

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⁴⁹ “Professor Koch’s Remedy for Tuberculosis,” 1107. Koch did eventually reveal the formula to the scientific community. Tuberculin, he revealed was a “…filtrate from a growth of tubercle bacilli on glycerol broth.” See Sakula, 250. For a more detailed exploration of Koch’s reluctant release of information on tuberculin, see Gradmann, 95-101.

⁵⁰ Sakula, 250.

⁵¹ Sakula, 250.


⁵³ Sakula, 250. Sakula notes that Koch proclaimed that tuberculin was not an effective treatment for all types of tuberculosis. For a more extensive discussion of tuberculin in the scientific community, see Worboys, Spreading Germs: Disease Theories and Medical Practice in Britain, 1865-1900, 224-233. For a more extensive examination of the experimental use of tuberculin on humans, see Gradmann, 127-154.
more exclusively on its relationship to human medicine than livestock. Historians such as Linda Bryder and Michael Worboys focus primarily on the role of tuberculin in the diagnosing and unsuccessful treatment of tuberculosis in humans. While this exclusivity falls appropriately within the scope of their research, Waddington notes that very few historians have turned their attention to the other significant community that tuberculin was applied to: livestock. Tuberculin was an essential element in the eradication of bovine tuberculosis in livestock. It was central to all bovine tuberculosis legislation beginning in the 1890s and was the critical scientific innovation in the eradication of the disease after the identification of the bacillus. After the failure of tuberculin as a curative substance, its diagnostic value seemed somewhat less dramatic. Celebrities the likes of Arthur Conan Doyle did not flock to tuberculin as a diagnostic tool. However, bovine tuberculosis in livestock would be eradicated through this unassuming diagnostic tool along with a series of bureaucratic innovations. It was not dramatic, but it was effective.

A number of studies and commentaries regarding the use of tuberculin as a diagnostic agent appeared in medical, veterinary, and livestock publications shortly after its introduction in 1890 and in the years that followed. As Waddington notes, “…research into the use of tuberculin in identifying tuberculous cattle started shortly after Koch’s announcement of its discovery and, from the start, studies of its veterinary use ran in parallel with work on its medical properties.” There is a clear impression given throughout the 1890s of optimism about the effectiveness of tuberculin in diagnosing bovine tuberculosis in livestock but that the scientific community had a

54 Waddington, “To Stamp Out “So Terrible a Malady”: Bovine Tuberculosis and Tuberculin Testing in Britain, 1890-1939,” 31. Waddington notes, for example, Bryder and Worboys’ examinations of tuberculin in their work focus their research on tuberculin and human medicine almost exclusively.

lot of work ahead of it in terms of setting protocols and supplying evidence of the effectiveness of tuberculin. This work would occupy researchers for years to come.

One of the earliest studies of tuberculin as a diagnostic agent in livestock came courtesy of John McFadyean of the Royal Veterinary College of Edinburgh in 1891. McFadyean described the mixed results he and his colleagues obtained using tuberculin with two cows suspected of tuberculosis. One of the cows reacted immediately and the other, with fewer clinical symptoms, did not react at all to tuberculin. McFadyean posited that further study was needed on the dosage of tuberculin given to an animal and whether or not it was an effective diagnostic agent for livestock with less pronounced cases of the disease. Despite a lack of uniform standards for the preparation and administration of tuberculin (an issue that would take several decades to resolve), it would be a central element in the first eradication legislation in Canada and the United States beginning in the 1890s. Reports and debates about the use of tuberculin and its effectiveness would continue, despite questions, and the growing urgency to test and eradicate tubercular cattle overrode most concerns. The rhetoric of urgency and national importance of eradicating this disease would dominate conversations throughout the following decades. This was particularly evident when one considers where a lot of early herd testing was done with tuberculin. In Canada, for example, positive tuberculin tests were found at the Central

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56 McFadyean was an 1874 graduate of the Royal (Dick) School of Veterinary Studies in Edinburgh, Scotland. Initially focused on anatomy, he soon branched out to bacteriology and pathology. He was appointed Principal of the Royal Veterinary College in London, England in 1894 where he also served as a Professor of Bacteriology and Pathology. McFadyean is widely regarded for his influence on the development of the British veterinary profession, particularly the growth of graduate and professional work in bacteriology and pathology. See “Sir John McFadyean,” Canadian Journal of Comparative Medicine and Veterinary Science vol. 5 (1941): 86-87.


58 See, for example, “Tuberculin and Bovine Tuberculosis in the State of New York,” The Lancet. March 30, 1895. Pp.829-831. The summary here gives the impression while tuberculosis was found in large numbers, tuberculin was not used in all cases and error in its use was common.

Experimental Farm in 1894 and the *Lancet* reported positive tuberculin tests at Windsor on cattle belonging to Queen Victoria. The author noted, “…the value of tuberculin as a diagnostic agent has received striking confirmation.”

Despite the growing support and evidence to support the use of tuberculin in diagnosing bovine tuberculosis, it would remain a source of controversy for years to come. This was especially true of the livestock community, which was most affected by its use. Articles and commentaries would continue to question the effectiveness of tuberculin and those who administered it. Despite this vocal criticism, these individuals made up a very small proportion of the population. Their criticism did not alter the attitude of the veterinary and scientific community regarding the effectiveness of tuberculin or of eradication as a whole, nor did their criticism affect the trajectory of legislation. What they did reflect was that the scientific community was at certain points at odds with the communities they affected and the discord and debate that surfaced regarding bovine tuberculosis eradication was felt at the ground level and would continue throughout the course of eradication work well into the twentieth century.

Olmstead and Rhode for example, argue that many American farmers lobbied against the use of tuberculin and eradication work in general, culminating in very visible demonstration in 1931.

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60 Government of Canada. *Sessional Papers*, no. 8 (1895): p. xv. See also “The Tuberculin Test and Her Majesty’s Herd of Dairy Cows at Windsor,” *The Lancet*. April 15, 1899, pp 1041-1042. Although some revisions to the production of tuberculin were made, the subcutaneous test remained consistent throughout the period under examination in this dissertation. Although other forms of tuberculin tests were developed such as an ophthalmic test that was administered in the eye, the subcutaneous test remained the test overwhelmingly utilized.

known as the Iowa Cow War. The checkered history of tuberculin was central to opposition to tuberculosis work, but so too were other episodes, such as remarks made by Robert Koch in 1901.

The Trouble with Koch: The International Medical Congress on Tuberculosis, 1901

In 1901 at the International Medical Congress on Tuberculosis, Robert Koch stood up in front of his peers to give a paper on the infectious nature of tuberculosis. This congress was one of many such conferences held both nationally and internationally throughout this period. They were conferences held for tuberculosis researchers, policymakers, and those involved in public health to share their knowledge and latest research, and report on the state of tuberculosis in various locations, etc. The importance of conferences, despite their brief appearances, cannot be underestimated. Not only were they venues to share research and debate, but they would also serve as venues in which international collaboration occurred and legislation created. In fact, a tuberculosis conference would create the final legislation to manage bovine tuberculosis in

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62 See Olmstead and Rhode, “Not on My Farm! Resistance to Bovine Tuberculosis Eradication in the United States,” 772-774, 781-791. Though opposition would be present throughout the course of eradication work, ultimately it went ahead regardless of those who objected to it. Over time, incentives such as compensation and other livestock owners pressured those who did not submit their herds to do so or else lose their place in a competitive cattle market, as will be demonstrated later in this examination. Arguably, opposition in Canada and the United States was not intense and only done by a minority of individuals because most bovine tuberculosis testing programs (animals for export, for example required testing) were voluntary. “Voluntary,” of course, is a subjective term as pressure to remain competitive ultimately compelled livestock owners to participate. Nevertheless, some scholars have explored episodes of opposition to bovine tuberculosis eradication. See Olmstead and Rhode, “Not on My Farm! Resistance to Bovine Tuberculosis Eradication in the United States,” 768-809., and Olmstead and Rhode, “The “Tuberculous Cattle Trust”: Disease Contagion in an Era of Regulatory Uncertainty,” 929-963.
Canada and the United States. The International Commission on the Control of Bovine Tuberculosis would begin in 1909 and will be examined later.

In 1901, the International Congress was planned by the British National Association for the Prevention of Tuberculosis, as what historian Susan Jones notes as “…a venue for “public education” as well as the exchange of scientific information.” Koch shocked his audience when he made two pronouncements: Firstly, he announced that bovine tuberculosis was a distinct bacillus among other forms of tuberculosis. Secondly, he announced that because bovine tuberculosis was a distinct bacillus, it posed little to no threat to human health and so the concerns and initiatives in place at that time to protect the public’s health from the disease were essentially unnecessary. Koch’s remarks came in the wake of research published in 1896 by American Theobald Smith, in which he demonstrated that there were two different types of tubercle bacilli. Although indistinguishable under the microscope, the bacilli had distinct characteristics in the body that made them different from one another. Although Koch was correct in his agreement with Smith that bovine and human tuberculosis were distinct bacilli, his assertion that bovine tuberculosis posed little threat to human health set off a wealth of press coverage and dissent within the scientific community. Moreover, as Waddington points out, “…he based his claims on second-hand clinical and epidemiological evidence rather than on the bacteriological studies that had made his name.”

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64 See Robert Koch, “Address on the combating of tuberculosis in the light of experience gained in the combating of other infectious diseases,” Transactions of the British Congress on Tuberculosis (London, 1901). To note, Koch’s paper was published in a number of scientific publications including the journal Nature and the Saturday Review.  
Though some agreed with Koch, most opposed him. One physician, Abraham Jacobi, noted “…the lives of the thousands of babies in the world are far more important than the reputation of one scientist.”67 Within the scientific community, Koch’s announcement was met with relative hostility. His announcement potentially made irrelevant years of research and pronouncements by the scientific community that bovine tuberculosis was indeed a genuine public health threat. The response from the scientific community is interesting as it appears to have been one of more annoyance directed towards Koch than genuinely questioning the infectiousness of bovine tuberculosis. It is clear that, by 1901, the medical and veterinary communities of Canada and the United States and indeed the rest of the world were well convinced that bovine tuberculosis was a genuine threat to public health and were taking active measures to address the disease in both human and animal populations.68 With a great deal of support already in place for bovine tuberculosis, Koch’s announcement had the potential to set back the cause of eradication. The matter would finally be resolved in 1908 at the International Congress on Tuberculosis.69

Koch’s 1901 announcement received attention in the public press in addition to the scientific community. His announcement made front-page news. Toronto’s Globe, for example, pronounced bovine tuberculosis was not transmissible to man on the front page of its July 24, 1901, edition. The Globe carefully noted that those in attendance at the Congress were skeptical

67 Rosenkrantz, 157.
69 Myers notes in his work Man’s Greatest Victory that two significant and immediate critics of Koch were John McFadyean, a noted British veterinarian, and Macyzyk Ravenel, of the University of Pennsylvania, who had been working on similar research to Koch’s with his colleague, Leonard Pearson. They had obtained competing results to Koch and were strong advocates for the eradication of bovine tuberculosis in the United States. See Myers, Man’s Greatest Victory, 109. For a careful examination of Koch’s 1901 announcement, see Waddington, The Bovine Scourge, 114-18.
of his claim that bovine tuberculosis posed little threat to human health and so exhaustive public health efforts in that regard were unnecessary.\footnote{Dr. Koch’s New Theory.” The Globe, July 24, 1901, p.1. The article notes, for example, that Joseph Lister, who was in attendance at the Congress and introduced Koch, expressed his doubt in Koch’s evidence that bovine tuberculosis did not pose a threat to humans. See also “Dr Koch’s New Theory – Important Parts of His New Theory Verbatim,” The Globe, July 26, 1901, p1.}

The debate over Koch’s announcement in the public press underscores the serious public health implications of bovine tuberculosis and tuberculosis more generally in this period. Tuberculosis was a leading cause of death throughout the late nineteenth and early twentieth centuries. Bovine tuberculosis as a form of tuberculosis, largely consumed in infected meat and milk, presented another frightening dimension to an already frightening disease. The demographic bovine tuberculosis typically affected made it especially concerning. As the largest consumers of fresh milk, children were particularly susceptible to contracting the disease. Indeed, the infection of children with bovine tuberculosis and a host of other diseases became an important part of the calls for the reform of milk processing and distribution throughout this period. The numbers of children afflicted with bovine tuberculosis has never been entirely clear, however, there were a few studies that addressed the issue on both sides of the border. In Canada, a study of bovine tuberculosis in children in the city of Toronto determined that fifteen percent of tuberculosis cases in children were bovine tuberculosis.\footnote{See R.M. Price, “Milk and its Relation to Tuberculosis,” The Canadian Dairy and Ice Cream Journal (May 1934): 19.} A further study published in the 1910s in the United States estimated the number of bovine tuberculosis cases in children to be around twenty-seven percent.\footnote{See Charles E. North, “Milk and Its Relation to Public Health,” A Half-Century of Public Health., Ed. Mazcyk Ravenel (New York: American Public Health Association, 1921), 25.}

That there was such a vocal response to Koch’s claims in 1901 indicates as much about the size and scope of animal health infrastructure in this period as its association with bovine
Responding to the Bacillus

Indeed, both Canada and the United States respectively had begun actively intervening in bovine tuberculosis in the 1890s. This initial response to the disease will be explored in Chapter III. Efforts to eradicate bovine tuberculosis would begin in the late nineteenth century in both human and livestock populations regardless of persistent uncertainty over the efficacy of tuberculin and the nature of bovine tuberculosis. Navigating this climate of uncertain science was the emerging profession of veterinary medicine. It would be these individuals who would embody the authority of the state and do the work of eradication.

The Emergence of the Veterinary Profession in Canada and the United States, 1791-1885

Veterinary medicine in North America, as a formally-trained profession, traces its roots to Europe. The first veterinary school in the world was founded in 1761 in Lyon, France. France would be a world leader in the development of veterinary medicine and the investigation of livestock diseases was a central pursuit at the Lyon school from its formation. Lise Wilkinson notes, for example, the involvement of the Lyon school in the successful control of an unnamed epizootic in the Dauphine region of southeastern France in the summer of 1762, boosting its reputation and helping it to earn a Royal Charter from Louis XV in 1764.73

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Veterinary education would have a profound influence on the development of the profession in North America. The Royal (Dick) School of Veterinary Medicine in Edinburgh, Scotland, was first formed in 1823, and a number of its graduates would come to North America and found veterinary schools in Canada and the United States.\(^74\) While formal veterinary institutions were well-established in parts of Europe by the early nineteenth century, it would not be until 1862 that the first veterinary school, the Upper Canada Veterinary College (later renamed the Ontario Veterinary College), was established in Canada. A veterinary college at Iowa State University would follow in 1879 and would be the first in the United States. Given the much later establishment of formal veterinary medicine in Canada and the United States, those who practiced veterinary medicine and actively engaged with various livestock diseases relied mostly on lay practitioners and a wealth of literature produced by individuals trained and untrained in veterinary medicine. In all, the most abundant source of information on diseases like bovine tuberculosis and other animal health issues is a hodgepodge of farriery, disease treatises, and animal husbandry literature (referred to from now on as animal health literature).

The most organized, non-professional veterinary practitioners in both Canada and the United States were called farriers. Broadly speaking, farriers were individuals involved in anything having to do with the shoeing of horses, including physically shoeing horses as well as maintaining the health of their hooves and legs.\(^75\) Prior to the introduction of the automobile in

\(^{74}\) For a more extensive discussion on the development of veterinary schools in England, see Wilkinson, 87-113. For more on the history of the Royal (Dick) School of Veterinary Studies, see M. Sewell, “The Royal (Dick) School of Veterinary Studies,” \textit{The Veterinary Record} vol. 141, no. 9 (1997): 214-216.

\(^{75}\) While not a principal focus of this study, there have been some specific studies of farriers and their place in veterinary medicine. Many of them focus on the role of farriers in the professionalization of veterinary medicine in the late nineteenth and especially early twentieth century. See for example, Abigail Woods, “‘Little, if at all, Removed from the Illiterate Farrier or Cow-leech’: The English Veterinary Surgeon, c. 1860-1885, and the Campaign for Veterinary Reform,” \textit{Medical History} (2010): 29-54. See also Ole Stalheim, “Horse Doctors, Livestock, and Quacks: Veterinary Services in Southeastern Dakota, 1880-1950,” \textit{South Dakota History} (1987): 93-
the early twentieth century, North America was a horse-centred society. While some blacksmiths shoed horses as part of their business, farriers often specialized in it, particularly in cities with their large equine populations and their constant need of care.\textsuperscript{76}

Farriers had a substantial body of literature to consult.\textsuperscript{77} Farriery and animal health literature generally originates in Europe. Smithcors notes that in Germany a veterinary press had flourished since the sixteenth century and it was likely that some of these works made their way to America with German immigrants.\textsuperscript{78} The first recorded instance of veterinary medicine in North America was in 1625 in Jamestown, Virginia, in which a man named William Carter was solicited for his skills as a “veterinarian.” The validity of this record has been challenged, though, as it has been established that the term “veterinarian” was not introduced until 1646 by Sir Thomas Browne. Furthermore, its use as a professional designation would not occur until well into the nineteenth century.\textsuperscript{79}

Smithcors points to James Clark’s \textit{Treatise on the Prevention of Diseases Incidental to Horses} as an early significant work of veterinary medicine in North America. First printed in Edinburgh, Scotland, in 1788 and then reprinted in Philadelphia, Pennsylvania, in 1791, Clark’s work was one of the first works about farriery published for the American market.\textsuperscript{80} In 1795, \textit{The New England Farrier} by Paul Jewett appeared as the first book on farriery specifically written for American farriers. This work was followed by several more and moved beyond on shoeing

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\textsuperscript{77} There are a number of works from this period that were aimed towards these lay practitioners published in North America and Europe. See for example John C. Knowlson, \textit{The Yorkshire Cattle Doctor and Farrier}, I. Daniel Rupp, \textit{The Farmer’s Complete Farrier} (Lancaster, PA: Isaac I. Eshleman, 1844), Francis Clater, \textit{Every Man His Own Cattle Doctor} (Philadelphia: Lea and Blanchard, 1848).

\textsuperscript{78} Smithcors, \textit{The American Veterinary Profession}, 49.

\textsuperscript{79} Smithcors, \textit{The American Veterinary Profession}, 59.

\textsuperscript{80} Smithcors, \textit{The American Veterinary Profession}, 58.
horses to discussion of anatomy and physiology, and descriptions of a number of diseases.\(^8\) Writing on farriery continued into the nineteenth century with two figures, William and James Carver, who advocated not only the practice of farriery, but also the establishment of veterinary medicine in institutions of higher learning as well as professional bodies to govern the activities and qualifications of those practicing veterinary science.\(^8\)

Farriers may have provided a certain degree of care for horses and other livestock, but by the nineteenth century circumstances had changed and the care of livestock and other animals required a different kind of individual. In the United States, veterinary science increased dramatically in its professional status with the establishment of veterinary education. The establishment of land grant colleges beginning in 1862 was the first step in veterinary education. By 1877, some twenty schools were offering some kind of veterinary instruction. Formal programs in veterinary science began first at Iowa State in 1879 followed by Washington State, Cornell University, and Ohio State between 1880 and 1900. In Canada, veterinary education began in 1862 when Andrew Smith, a graduate of the Dick Veterinary School in Edinburgh, Scotland, began a regular course of veterinary medicine in Toronto, Ontario. Smith’s appointment came at the urging of Adam Fergusson of the Upper Canada Board of Agriculture, who advocated for formalized veterinary education in Upper Canada.\(^8\) The first formal two-year

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\(^8\) Smithcors, *The American Veterinary Profession*, 58.


program at the Upper Canada Veterinary School (later renamed the Ontario Veterinary College) began in 1864 and in 1866 the college graduated its first class of three students.

The inclusion of animal health matters into the very early years of state intervention in agriculture was in large part made possible by veterinary education and the growing professionalization of veterinary science. As the number of trained graduates from formal veterinary colleges grew towards the end of the nineteenth century, veterinarians began organizing bodies to govern their profession. These organizations existed at both the national and state/provincial level. In the United States, the national organization would come to be known as the United States Veterinary Medical Association (USVMA), which would eventually transform into its current form, the American Veterinary Medical Association (AVMA). The formation of a national association was very difficult in this period given the varied forms of veterinary practitioners and lack of formal professional standards.84 Between 1859 and 1863, meetings were held in New York and Philadelphia to discuss the formation of a national body and, in 1863, the USVMA was officially formed in New York (which was to be the home of its headquarters) after a national convention of veterinarians from the East Coast. The USMA was renamed the AVMA in 1884. It was not solely limited to American veterinarians. Indeed, Canadian veterinarians were included in the association until the formation of the Canadian Veterinary Medical Association in 1948.85

The creation of the AVMA also reflected a shift in the focus of veterinary science away from lay practitioners towards a more regulated, formal profession in the same way the

professions like medicine were developing. The association’s main work was its involvement in research and the dissemination of information to the public and government bodies regarding animal diseases, public health, and the licensing of graduates of veterinary colleges. Some of the early work of the association included proposing and supporting government meat and milk inspection programs and involvement in the research and dissemination of work on various problematic livestock disease such as glanders, rinderpest, Texas fever, and bovine tuberculosis.86

The advocacy on the part of practicing, formally-trained veterinarians for self-government and establishing licensing and examining boards for new graduates was a significant development in the professionalization of veterinary medicine. The desire to create a system of standards and licenses for practicing veterinarians came out of the desire of a number of professional veterinarians to elevate the status of their profession in the wake of their growing relationship with medicine and also to dismiss non-professional, lay or ‘quack’ practitioners.87 Examining boards at state-accredited veterinary schools tested prospective graduates not only on their knowledge of anatomy and surgical procedures, but also their knowledge of infectious diseases and the best procedures to address them.

Veterinary organizations existed at the state and provincial levels as well. While organizations existed and provided a forum for veterinarians at the national level, there were a number of real issues that faced the profession at more local levels. The landscape of veterinary medicine across Canada and the United States varied greatly and often varied within the political

86 Bierer, American Veterinary History, 39. To note, glanders is an infectious bacterial disease that primarily affects horses but has also been known to affect donkeys, mules, and goats through contaminated food and water. The most severely infected develop growths in their lungs and airways and generally die of septicemia. Survivors of the disease carry the bacillus on. See Robert H. Dunlop and David J. Williams, Veterinary Medicine: An Illustrated History (St. Louis: Mosby, 1996), 456-457.

87 Smithcors, The Veterinary Profession, 356.
boundaries of states and provinces. This necessitated the creation of organized bodies within these smaller political boundaries to address their particular challenges and concerns.

As one of the most densely populated places in America, the State of New York contained a large number of livestock. As Ellis Leonard notes in his work on the veterinary history of the State, observers in the early nineteenth century expressed their dismay about livestock losses. The thousands of horses that traversed the City of New York died in large numbers from diseases such as influenza and glanders. On farms, pigs succumbed to hog cholera and cattle to pleuro-pneumonia and tuberculosis. New York, like most of North America, contained its fair share of farriers, but as livestock numbers swelled and traversed the State on their way to distant farms and markets, the need for qualified individuals rose. The first formal veterinarians in New York were European, mainly from Britain, including John Busteed and Alexandre Liautard, who began New York’s first veterinary college in New York City in 1857.88

In 1876, a collection of veterinarians in New York City formed a professional body and called it the New York State Veterinary Medical Society. This body primarily consisted of veterinarians from New York City and the immediate surrounding area. Their initial meetings consisted mainly of members given papers on a number of different diseases. In 1882, the Society re-organized itself to be more inclusive of veterinarians from the rest of the State. At the same time, there were two other veterinary associations in the State, the New York County Veterinary Medical Society and New York State Veterinary Society. These bodies were

88 Ellis P. Leonard, A Veterinary Centennial in New York State (New York State Veterinary Medical Society, 1989), 4.
eventually amalgamated in 1885. By 1890, in addition to presenting papers on various diseases, the Society had become involved in the debate over the legislation of qualified individuals.  

The New York Veterinary Medical Association, along with their counterparts in Ontario, were instrumental in lobbying for the professionalization of veterinary medicine. This was crucial in a time when a number of untrained individuals were practicing and the growth of the livestock industry and the threat of disease were pressing concerns. Key to their meetings were discussions of diseases like bovine tuberculosis, and it is in the records of these associations that the state of the disease for the veterinary community is best expressed.

The Ontario Veterinary Association (OVA) was created by a group of veterinarians at the Ontario Veterinary College in September of 1874. The Association’s members would work towards many of the same goals as their counterparts in New York State. Chief among their activities in the latter half of the nineteenth century was the advancement of the professional status of veterinary medicine. Following the establishment of the Ontario Veterinary College in 1862, the practice of veterinary science was enshrined in provincial legislation in 1868. In order to be granted a license to practice veterinary medicine, prospective individuals were required to provide proof of their qualifications, and pass an examination. This piece of legislation was amended a number of times in the coming decades but one of the more immediate took place in 1871. That year, the Province required that anyone claiming to be a veterinarian or practicing

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89 Leonard, 15-17. Leonard notes a meeting of the New York Veterinary Medical Society in 1890 where a major point of discussion was a call to persuade the Legislature to pass an Act to limit the practice of veterinary science to trained individuals. See Leonard, 18-25.

90 A. Margaret Evans and C.A.V. Barker, Century One: A History of the Ontario Veterinary Association (Guelph, Ontario: Publish by the Authors, 1976), 1.
veterinary science at all produce a certificate or diploma from a reputable institution or else face prosecution.91

Despite the creation of provincial legislation to limit the practice of veterinary science to those who attended reputable institutions and could provide proof of training, untrained lay practitioners and quacks continued to practice veterinary medicine generally due to lack of enforcement. Despite the risk of prosecution and fines, individuals continued to practice and the province rarely responded. This presented an interesting situation for professional veterinarians. More stringent entrance standards for the Ontario Veterinary College and more rigorous standards for the profession generally were not measures for which the provincial government, and indeed a good majority of veterinarians, were willing to press. These qualifications were not approved of by many veterinarians as it was felt that veterinary science was not on par as a profession with law, medicine, or the ministry.92 On the other hand, Evans and Barker note that the OVA expressed concern at the encroachment of untrained individuals into their growing profession and with the growth of published writing on various diseases that affected livestock; veterinarians worried that farmers might take matters into their own hands and treat their own animals.93

It was in the dissemination of information and measures to control a variety of livestock diseases that professional veterinarians made their influence and authority clear. Chief among the activities of the OVA were the discussion and dissemination of information on a variety of

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92 Evans and Barker, 53-55.
93 Evans and Barker, 55.
contagious diseases that affected livestock, including bovine tuberculosis. It was in the realm of disease control and research that veterinarians became a part of the state and it would be around disease that veterinary science as an arm of the state would be created.

Veterinarians’ participation in the state is arguably the most significant aspect of the professionalization of veterinary medicine in both Canada and the United States, and many involved in the efforts to professionalize veterinary science were also involved in the establishment of animal health infrastructure. The insertion of veterinary science into state affairs in the latter half of the nineteenth century reflected the growing importance and concern over the livestock industry, and notably diseases that threatened the health and competitiveness of those industries in both Canada and the United States. By the time that bovine tuberculosis came under the gaze of governments in the 1880s, there existed a number of diseases that each in their own way posed questions and concerns. As a result, infrastructure was created to prevent the introduction and spread of infectious diseases. In this way we see the beginnings of preventative medicine in veterinary science in this period and it was into this developing regime of preventative veterinary science that the eradication of bovine tuberculosis was first undertaken. Preventative medicine would ultimately boil down to controlling the movement of both diseased and potentially diseased livestock, and developing techniques to identify disease in livestock.

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94 Evans and Barker, 38. The authors note the heavy discussion surrounding hog cholera, a highly infectious swine disease. They note that veterinarians not only discuss the finer points of the disease, but also made recommendations regarding how veterinarians should advise livestock owners about eradicating the disease and preventing its introduction into their operations.
Conclusion: On the Cusp of Action

By the closing decades of the nineteenth century, the stage was set for the bureaucratic response to bovine tuberculosis in both Canada and the United States. The platform from which the bureaucratic response to bovine tuberculosis was launched and consisted of two parts, the origins of which were examined in this chapter. The first was a scientific understanding of the disease; the second, a body of individuals to practice that science. The basic scientific understanding of bovine tuberculosis was established in this period and would remain consistent throughout the coming decades. However, the bureaucratic structures first established in the nineteenth century would see substantial transformation throughout the coming decades, reflecting the ongoing negotiation and challenges authorities faced in eradicating this disease.

The tuberculosis bacillus was one individuals had been responding to for centuries beforehand. Indeed, tuberculosis or “consumption” in animals appears in several examples of early animal health and farriery literature such as William Taplin’s writing on the disease in the late eighteenth century. Descriptions of the disease varied. It was described as a wasting disease, one that afflicted animals with cysts and produced yellowish matter. It was also thought by some to have been the result of a metamorphosis of other diseases. Many of these ideas would be confirmed in the late nineteenth century through careful scientific experimentation such as Theobald Smith and Robert Koch.

Ultimately it was Robert Koch who identified the bacillus responsible for bovine tuberculosis in 1882. It was a watershed moment that ushered in a new way of understanding the disease and a new era of disease intervention for humans and livestock. In 1890 Koch introduced
tuberculin, heralding it as a therapeutic treatment for tuberculosis. As explored in the chapter, it was met with enthusiasm by many desperate to seek treatment for the disease for themselves or loved ones. Unfortunately it was not to be. But while tuberculin would not see success as a therapeutic agent, it would attain great success as a diagnostic agent. Still, the transition of tuberculin from a therapeutic to a diagnostic agent was controversial. Many were unconvinced of its value and it would remain a contentious substance for a vocal minority throughout the early twentieth century and a challenge for authorities to overcome. The controversy continued with Koch’s announcement in 1901 that bovine tuberculosis did not pose a significant threat to human health. Though his comments were eventually refuted by the scientific community, his words did have traction with the wider public, creating further challenges for authorities as they moved to more aggressively address the disease in Canadian and American herds.

The eradication of bovine tuberculosis would be constantly negotiated throughout the coming decades. It was not one single piece of legislation that dictated the course of intervention, but a series of policies and transformations in the administration, scope, and scale of legislation. Practicing eradication would fall to the growing professional body of veterinary medicine, and the disease did as much for the veterinary profession as the veterinary profession would do for the eradication of bovine tuberculosis. Chapter III will explore the important role that veterinarians played in the formation of animal health infrastructure and its initial incorporation of bovine tuberculosis into it. This initial response to bovine tuberculosis would follow with more substantial, separate responses to the disease in humans and livestock. In doing so, veterinarians would cement a position of authority both in the realms of both animal and public health.
Chapter III:

Animal Health Infrastructure and the Initial Response to Bovine Tuberculosis, 1862-1902

Bovine tuberculosis eradication legislation began in Canada and the United States in the 1890s. This intervention was part of a larger system of animal health infrastructure that began in the 1860s. This infrastructure developed in Canada and the United States in distinct ways and greatly influenced the course of bovine tuberculosis work. In his recent scholarship, historian Alan Olmstead argues that a number of factors complicated the development and operation of animal health infrastructure in the United States. They included such factors as transportation innovations, breeding, and growing industrialization and urbanization, which were reflected in transformations in the processing and distribution of milk and meat. Political factors too influenced animal health infrastructure. Olmstead points to overlapping and sometimes competing local, state, and federal initiatives dramatically influencing the efficacy of disease initiatives.¹ The manner in which some of these factors unfolded in Ontario and New York State will be explored.

Although Ontario and New York State possessed similar livestock populations and shared a common set of concerns about bovine tuberculosis, there were significant contrasts in

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their “first line of defense.” Responding to bovine tuberculosis involved at least three levels of government and Ontario and New York State utilized them in different ways. For example, the Canadian federal government drove the majority of bovine tuberculosis efforts in this period. In contrast, the United States left bovine tuberculosis work to state governments. This allocation of authority would significantly influence the course of eradication work in this period and the following decades. In New York State, for example, bovine tuberculosis work was initially under the jurisdiction of the State Board of Health. Although this more localized authority afforded the State Board of Health a narrower focus, its lack of experience in veterinary medicine and the structure of its intervention affected its success. On the other hand, Canada’s largely federal approach in this period gave it a broad scope to focus on the myriad of externalities that influenced the presence of bovine tuberculosis in Ontario. However, this broad scope limited resources and the ability to comprehensively address the disease in any one area. This organization of authority, established in this period, would dramatically influence the progress of eradication programs in both Canada and the United States in the coming decades.

Animal Health Infrastructure in Canada and the United States, 1862-1883

The formation of animal health infrastructure followed similar paths in Canada and the United States. Its creation within both Canada and the United States has a lengthy history, but there are some common themes that run through its creation on both sides of the border. Government authority over agriculture began in both nations in the 1860s and, over time, animal health

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issues would gradually be incorporated into these bodies. Specific intervention for animal health began in an effort to prevent the introduction of infectious diseases. These diseases existed in Europe and threatened the growing livestock economies of Canada and the United States. This attitude towards disease as an *introduced* element would inform the initial legislation for bovine tuberculosis.

In Canada, the federal Department of Agriculture was formally created at Confederation in 1867. In the years that followed the creation of the department, animal health issues such as disease control would become a prominent part of the department’s activities and veterinarians would play a key role in creating the infrastructure required to deal with the number of infectious livestock diseases that threatened Canada’s livestock interests. Although the first instance of specific veterinary concerns with live animals occurred in 1868, federal authorities had been involved in affairs related to livestock well before this time. As Thomas Dukes notes, the quality and safety of meat bound for export to Britain fell under supervision early in the nineteenth century both in Upper and Lower Canada. Examples of meat inspection legislation from this period included the Beef and Pork Inspection Act, replaced in 1805 by the Act to Regulate the Curing, Packing and Inspections of Beef and Pork. Upper Canada was not the only place to experience regulation in this period. In Lower Canada, for example, legislation in 1845 was created to confine animals suspected of carrying rabies for forty days.³

A myriad of responsibilities were placed under the Department of Agriculture’s authority upon its creation in 1867. In addition to agriculture, immigration and emigration, the census, public health and quarantine, patents, and manufacturing also fell under the department’s

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authority. The department’s responsibilities have since transformed dramatically, but nevertheless, its duties were wide and diverse in this period. In 1868, livestock health concerns in the form of a disease came to the attention of the newly-formed department. The concern was over bovine babesiosis, or Texas fever, a parasitic cattle disease transmitted by ticks, and the Canadian legislation placed inspectors at the American borders at Sarnia and Windsor to restrict the movement of American cattle through the border and into the Canadian market. This disease would prove a catalyst for more sweeping federal legislation related to animal health. In 1868, an order-in-council was created to restrict the entry of livestock into Ontario and Quebec, both busy livestock centres in Canada.  

Following the order-in-council regarding Texas fever in 1868 came more sweeping legislation in 1869 called the Animal Contagious Diseases Act, 1869. This piece of legislation was designed to authorize a small number of government-appointed veterinarians to enforce the quarantine and inspection of incoming and outgoing livestock. This authority was granted and enforced in order to protect Canadian livestock from the introduction of a number of infectious diseases. Indeed, when the Act was amended in 1879 and again in 1885, thirteen diseases were specifically identified that posed a potential threat to the Canadian livestock economy. The Act was amended and expanded over the coming decades to reflect the development of new knowledge about diseases and the concerns over them. Overall, the legislation had two goals: to protect the health of Canadian livestock and to protect Canada’s export market by ensuring to the best of the government’s abilities that Canadian stock were free of disease.

State intervention in livestock health in this period was mainly limited to import and export animals. Preventative veterinary medicine too was confined to these animals and took the form of a series of quarantine stations. The first station established in Canada was in 1876 at Point Levis, Quebec. Two overwhelming factors motivated the introduction of this facility. The first, of course, was the desire to prevent the introduction of a number of diseases, and the second was to control the introduction of breeding stock from Great Britain to improve Canada’s livestock as farmers increased production. Prior to 1876, cattle imported by Canadian breeders and farmers would come down the St. Lawrence river by boat and would be offloaded and distributed to their ultimate destinations. Cattle were rarely inspected, perhaps only in the form of a basic clinical examination by a veterinarian who would board a ship in Pointe-au-Pic and leave at Quebec City. In 1876, this changed and all cattle entering the country were required to spend a period of detention at Point Levis. In charge of this work was Duncan McEachran, Canada’s first Dominion Livestock Inspector (a body that would eventually evolve into the Health of Animals Branch in 1902). McEachran would oversee the establishment, staffing, and overall operation of the quarantine process in Canada in this period, and through this activity, place veterinarians in a considerable position of authority.  

Once animals had arrived by ship, they were first inspected by a veterinarian on-board, and those judged free of disease were then led into the quarantine facility where they were confined. As time passed, the facilities expanded to accommodate increasing numbers of animals and increased detention times. Initially, detention was voluntary and lasted around eight days but was eventually increased to ninety days because of bovine pleuropneumonia. This time was eventually reduced to 60 days in 1903, and then to thirty days in 1910. While cattle imported to  

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Canada were detained for pleuropneumonia for ninety days, they were often tested for bovine tuberculosis.⁹

Although animal health intervention was limited in this period, the form it took provided a blueprint for future domestic bovine tuberculosis intervention. As Chapter II demonstrated, the scientific understanding of bovine tuberculosis established in the nineteenth century by individuals like Koch did not result in a dramatic cure or therapy for bovine tuberculosis. It would be the exercise of isolating infected or potentially infected animals from each other that would prove the most effective method of eradicating bovine tuberculosis. This process began in the late nineteenth century and was expanded and applied domestically in the decades to come.

The potential biological and economic consequences of infectious disease were well known even before bovine tuberculosis became an object of reform. Livestock diseases such as contagious bovine pleuropneumonia had immense economic consequences for American, and later Canadian livestock owners, beginning in 1879.¹⁰ Other diseases in this period included hog cholera and foot-and-mouth disease. What unites all of these varying diseases is their connection to the movement of livestock in this period, between Canada, the United States, and Great Britain. Hog cholera, for example, was first identified in London, Ontario, in 1879 in pigs imported from the United States. Control of this disease, which was introduced through live

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⁹ Dukes and Labonte, 376-378. McEachran, a native of Scotland and graduate of the Royal Dick School of Veterinary Studies, came to Canada alongside Andrew Smith in the early 1860s to be one of the first instructors at the newly-formed Ontario Veterinary College. McEachran, who argued that more strict entry standards and a more advanced, scientific curriculum was necessary for the College, split with Smith and formed his own College in Montreal. It closed in 1903 and McEachran took his interest and research into contagious animal diseases into the Federal government where he became the first Dominion Livestock Inspector and oversaw the establishment of quarantine and worked to eradicate a number of contagious livestock diseases. See Denis Goulet and Frederic Jean, “Duncan McNab McEachran,” in Dictionary of Canadian Biography (accessed October 5, 2011), http://www.biographi.ca/009004-119.01-e.php?id_nbr=8282.

swine exports from the United States, came on a number of fronts. Preventative measures were introduced in 1880 and 1882. In 1880, hog imports were restricted and quarantine and an inspection station was set up in Point Edward on Ontario-Michigan border in 1882. Hogs with the disease were slaughtered and compensation was provided to owners for their lost profits. Much later, in 1915, regulations were passed prohibiting the feeding of garbage to pigs, a significant contributor to the spread of hog cholera. But one of the most significant steps with this particular disease, and one generally critical in all contagious diseases and particularly in this study of bovine tuberculosis, is that the eradication of hog cholera in Canada was aided significantly by the efforts to eradicate the disease in the United States. As a result of a significant eradication effort in the United States, instances of the disease in Canada decreased significantly and the last outbreak of the disease was recorded in 1962.  

11 By the 1890s, the Canadian government was poised to respond to bovine tuberculosis. The “first line of defense” for bovine tuberculosis would reflect the prevailing attitudes towards disease control at that time, namely, that disease was introduced and was best dealt through quarantine measures. The formation of animal health infrastructure in the United States would reflect similar attitudes to those found in Canada but would ultimately address the disease at the state level. 

Veterinary science came under the official gaze of the United States’ federal government in 1862 when Abraham Lincoln created the United States Department of Agriculture (USDA).  

12 The responsibility of the USDA quickly grew to include matters of veterinary concern, notably

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12 To note, New York’s State Department of Agriculture and Markets was established in 1884.
research and publications on various animal diseases. A formal veterinary division was recommended by 1869, reflecting the growing importance of America’s livestock industry, but it would take nearly two decades to establish.

The livestock industry had kept pace with the industrializing economy of the United States and by 1883, America’s livestock population was over 140 million and valued at just over $2.3 billion. Disease accompanied this growth throughout the nineteenth century, of course, and concern from government and the livestock community for protecting America’s livestock interests became more pressing. European livestock diseases and their potential implications first came on the radar of American livestock owners, like their Canadian counterparts, in the 1860s. Like Canada, the first disease to cause alarm for American stock owners was contagious bovine pleuropneumonia. The disease made its first appearance in Massachusetts in 1859 in a shipment of cattle from the Netherlands. It took nearly six years for the State to suppress the disease through quarantine and slaughter, during which time calls were made to the USDA to fund some kind of national agency to oversee and provide structures to prevent the introduction of European epizootics. Myers notes that the House Committee on Agriculture considered this request, but refrained from committing to the creation of any kind of official body, while acknowledging the seriousness that European epizootics presented. In 1865, the Commissioner of Agriculture lent his voice to urge congressional action against the introduction of foreign livestock diseases. As a result, in that year an act was passed to prohibit the entry of diseased cattle into the United States with the Secretary of the Treasury in charge of its enforcement. This act was limited to neat, or

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14 Myers, *Man’s Greatest Victory Over Tuberculosis*, 60.
largely domesticated, beef cattle, and did not include provisions for ferreting out the source of diseases.  

The realization of how quickly diseases could move and engulf large parts of what was increasingly becoming a critical component of America’s agricultural economy eventually spurred the federal government to act. Various diseases introduced into American livestock continued to be investigated throughout the latter 1860s through the 1870s. For example, in 1867, the State of Kansas called on Congress to investigate the growing threat of Texas Cattle Fever, a parasitic disease transmitted by ticks commonly associated with Texas cattle. This led to the Commissioner of Agriculture in 1868 appointing a veterinarian to study the problem. In his report, he recommended a veterinary body be created to engage with the problem of disease. The following year, in 1869, Congress created a special appropriation to continue the investigation of Texas Fever and a variety of diseases, the result of which was a large report published in 1869 called Report on the Diseases of Cattle. This report was built on in subsequent years with reports on other diseases. This interest at the federal level continued through the 1870s with correspondents appointed to investigate and report on diseases in the West. In addition, a veterinarian was stationed at the stockyards in Chicago to examine and report on any disease in cattle. 

By the early 1880s, the need for an organized body within the federal government to address livestock health and disease was clear. However, there were some members of the federal government hesitant to support the creation of such a body. Though a variety of diseases

17 Powell, 3.
and their potential implications were known by the 1860s, there was a real reluctance to create a federal body to govern over animal diseases. Federal legislators expressed misgivings over how a federal body would affect individual states’ rights to govern the livestock interests within their borders. Furthermore, some considered the creation of a federal body a waste of money and a bureaucratic machine that would be ineffectual. Finally, veterinary medicine as a professional body was still relatively new in this period and, according to Myers, some legislators were opposition to a “horse doctor” becoming the head of a federal body.  

Despite any misgivings, the federal Commissioner of Agriculture created a veterinary division within the USDA in 1883 and named Daniel Salmon as its head. This was followed in May of 1884 when the Bureau of Animal Industry was created under Chester Arthur, with Daniel Salmon again as its head. A great deal has been written about Salmon and although one is cautious to attribute too much to any one individual, it was under the leadership and vision of Salmon that the Bureau of Animal Industry took shape and the infrastructure within the USDA to combat livestock disease was established. As Olmstead notes, “…Salmon set in motion the institutional machinery that by the 1940s had saved hundreds of thousands of American lives …” Under Salmon, a number of divisions were created within the BAI, the first of which was a microbiological laboratory in 1884. Over time, this body would contribute greatly to research and knowledge on a variety of diseases. For example, after Koch’s announcement in 1901 that

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18 Myers, Man’s Greatest Victory Over Tuberculosis, 60.
19 Olmstead, “The First Line of Defense”, 334-335. See also Associates of the National Agricultural Library, Vivian Wiser, 100 Years of Animal Health, 1884-1984 (Beltsville: Associates of the National Agricultural Library, 1986). 4. Salmon was granted the first Doctor of Veterinary Medicine degree (DVM) in the United States, from Cornell University in 1876. Salmon was a prolific bacteriological researcher (the Salmonella strain of bacteria is named for him and his work on it) and was America’s first veterinarian within the federal government, working on a number of diseases such as contagious bovine pleura-pneumonia, Texas Cattle Fever, several diseases of swine, as well as establishing federal meat inspection and quarantine procedures. See Wiser, 100 Years of Animal Health, 1884-1984 IX.
bovine tuberculosis posed little threat to human health, it was through the BAI’s microbiological laboratory that Theobald Smith did his research that proved the contrary. Indeed, as Olmstead notes, Smith was one of a handful of talented, forward-thinking researchers that Salmon surrounded himself with in the early years of the BAI. Aside from Smith, others included E.C. Schroeder and Veranus Moore. Moore would be instrumental in the tuberculosis eradication campaign in New York State.21

Following the microbiological laboratory, Salmon organized four divisions beginning in 1891. First was the Inspection Division, which was in charge of the inspection of live imports and exports, and the ships they travelled on to prevent the introduction or export of contagious diseases, as well as meat products both domestically and for export. The second division was the Division of Animal Pathology, charged with scientifically investigating all aspects of animal disease. Thirdly was the Division of Quarantine, dealing with the detainment, observation, and control of animals coming in and out of the United States. Finally, Salmon created the Division of Field Investigations, which was charged with researching the cause and extent of various outbreaks of contagious animal diseases.22

Although animal health infrastructure gained permanence within the USDA in the early 1880s, in reality the United States government began practicing preventative health to protect its livestock interests decades earlier. The practice of preventative health began in the 1860s, and, as in Canada, it was through quarantine. Since infectious animal diseases were largely introduced from abroad, a logical way to protect the health of American livestock was to restrict the entry of potentially diseased livestock.

22 Myers, Man’s Greatest Victory, 62-63.
The first act to restrict the entry of livestock into the United States was passed in 1865. Passed by the 29th Congress, the act prohibited the importation of neat cattle (domesticated cattle) from foreign nations. The Secretary of the Treasury was placed in charge of making regulations under this act. The act was amended in 1866 to include the hides of these neat cattle as well. It was in the 1870s, however, when specific contagious livestock diseases from Europe met with this preventative barrier. In 1875, an order was enacted prohibiting cattle from Great Britain and Ireland due to the prevalence of foot-and-mouth disease. This remained in effect until 1876, when some live breeding stock was permitted into the country. In 1879, the Treasury Department learned of the existence of contagious pleuropneumonia in Great Britain and again the importation of cattle was prohibited. This was suspended the same year so long as cattle were kept in ninety-day detention. Of course this meant little as Britain eventually scheduled American cattle over the disease.23

Formal quarantine stations in the United States began in 1883. That year, the Secretary of the Treasury ordered that cattle from any part of the world be subjected to a ninety-day quarantine. Stations were provided in Portland, Maine, Boston, Massachusetts, Baltimore, Maryland, and New York, New York. In 1884, a bill appropriating money for the establishment and maintenance of these quarantine stations was created, but was to be expended by the Commissioner of Agriculture, under the supervision of the Secretary of the Treasury. This is when authority over the health of imported animals came under the control of the Department of Agriculture. In August of 1884, the Commissioner of Agriculture issued an order specifying that any cattle arriving from any part of the world aside from North or South America were required

to arrive at designated ports along the eastern seaboard. These quarantine stations were to be controlled by the Department of Agriculture. Not long after, the authority of quarantine stations was transferred entirely to the Department of Agriculture.\footnote{Houck, 125-126.}

**Addressing Bovine Tuberculosis in Cattle: 1892-1905**

Beginning in the 1890s, authorities in Canada and the United States began to actively engage in the eradication of bovine tuberculosis. These initial eradication efforts in New York State and Ontario would have their own distinctive shape and reveal the very different ways that bureaucracies could ultimately arrive at the same goal: eradication. Although these initial efforts would not be the ultimate solutions for bovine tuberculosis, they nevertheless reflected what were thought to be the most appropriate solutions within the particular political, economic, and social climates of these two political jurisdictions. A notable feature of the first eradication initiatives in Canada and the United States, for example, is how differently each nation assigned authority over eradication. In New York State, and indeed the United States as a whole, eradication in this early period was placed under the authority of individual states. Although the federal government was involved in restricting the entry of tubercular livestock through quarantine stations at various American ports, eradicating bovine tuberculosis within the United States fell to the States themselves. What resulted was a hodgepodge of eradication programmes that persisted for many years.
In a study on bovine tuberculosis, Henry Cantwell Wallace, an agriculturist and activist who served as Secretary of Agriculture under Warren G. Harding and Calvin Coolidge, characterized the eradication of bovine tuberculosis as “…an impossible undertaking.” It certainly seemed that way when efforts to address the disease began in the 1890s, despite the experience of the American government in the management and eradication of various other animal diseases since the early 1880s. The creation of the Bureau of Animal Industry in 1884, as Olmstead and Rhode note, resulted in the creation of a variety of disease eradication programs for bovine pleuropneumonia and foot-and-mouth disease. Bovine tuberculosis would present new and formidable challenges. The nature of the disease would make it a challenging one to address. While foot-and-mouth disease and bovine pleuropneumonia presented dramatic, clinical symptoms in the cattle they affected, bovine tuberculosis often did not produce any symptoms at all, allowing it to become firmly endemic in the national herd by the 1890s.

Despite the BAI’s experience in dealing with infectious disease, the authority for the eradication of bovine tuberculosis until 1917 lay within the jurisdiction of individual states and communities, many of which possessed a variety of laws related to animal health. Several states began eradication efforts for bovine tuberculosis in the 1890s and the work of individual states reflected the diversity of responsibility and authority for infectious animal diseases. While New York State would initially place bovine tuberculosis eradication under its State Board of Health, other states pursued different authority structures. Massachusetts, for example, began a very aggressive intervention campaign for bovine tuberculosis in 1894. The program consisted of

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tuberculin testing with a modest compensation of up to $60.00 per animal provided for reactors whose immediate destruction was required under the plan. The program allowed municipal officials to appoint livestock inspectors. In total, the state appointed 394 inspectors of various professions including veterinarians, farmers, doctors, and even a few butchers.28

The Massachusetts plan met with considerable opposition. Firstly, it was very costly. Over 11,000 cattle were found to be tubercular and compensation costs ran over $500,000 between 1896 and 1897. Secondly, the livestock and dairy community expressed a distrust of tuberculin as a diagnostic agent and felt that bovine tuberculosis as a menace to animal and especially public health was grossly over-exaggerated. Although the livestock community protested the law, a number took advantage of it, using public money rather than their own to improve their herds by removing old or unproductive animals.29

Largely as a result of the opposition it experienced, Massachusetts amended its bovine tuberculosis legislation in 1897. The aggressive legislation of 1894 was replaced with a voluntary program that largely relied on the visual examination of cattle. The transformation of such an aggressive policy into a relatively benign one was disappointing, especially given that in 1895, the Massachusetts Legislature had appointed a committee to determine whether or not tuberculin was a suitable and reliable substance to test for bovine tuberculosis. The committee, which included Theobald Smith, determined that indeed tuberculin was the most reliable substance. Although Massachusetts would embrace a less aggressive plan, historians such as

28 Myers, Man’s Greatest Victory Over Tuberculosis, 272-273.
Michael Teller, Olmstead and Rhode point to the earlier experience being a tremendous learning experience for future legislation.\textsuperscript{30}

Compared to Massachusetts’ initial program, Pennsylvania began a much less aggressive eradication program under its Livestock Sanitary Board in 1896. Livestock owners were not required to participate but any who desired to test their herd could voluntarily call upon the state for assistance. Once they did, however, and their application was approved, they were required to abide by certain procedures. After livestock owners applied to the state for assistance with their herds, the Livestock Sanitary Board, under whose jurisdiction this work was placed, appointed an inspector to investigate. Visual inspections of cattle were applied first and foremost and any animals showing obvious clinical symptoms of the disease were destroyed immediately. Compensation was awarded at $25.00 for grade cattle and $50.00 for registered purebred cattle.\textsuperscript{31} Tuberculin was applied to suspected animals and, if reactors were identified, owners had a number of options for what to do with them. They could choose to have them destroyed and be provided with compensation, but they were also allowed to keep their tubercular cattle. If owners chose the latter, they were required to keep them separate from non-reacting cattle, essentially creating two herds on their farms.\textsuperscript{32} Furthermore, reactors could not be bought or sold, nor could their milk, unless it was first heated to 185 degrees Fahrenheit.\textsuperscript{33} Myers notes that many farmers


\textsuperscript{31} See Myers, \textit{Man’s Greatest Victory Over Tuberculosis}, 275. Myers also noted that livestock owners also received the profits from the sale of any bi-products of condemned cattle such as fertilizer or hides. See also Olmstead and Rhode, “An Impossible Undertaking: The Eradication of Bovine Tuberculosis in the United States,” 749.

\textsuperscript{32} This method was known largely as the Bang Method, after Danish veterinarian Bernhard Bang, and will be explored more closely in later chapters.

\textsuperscript{33} A summary here, Myers provides a more thorough explanation of Pennsylvania’s bovine tuberculosis plan. See \textit{Man’s Greatest Victory Over Tuberculosis}, 275-279.
chose not to pursue keeping their tubercular cattle, citing the expense and effort required to manage two separate herds and the limited consumer demand for heat-treated milk.  

One of the most interesting features of Pennsylvania’s bovine tuberculosis work in the 1890s was its emphasis on public engagement. The nature of bovine tuberculosis and the use of tuberculin as a diagnostic agent were debated. In an effort to address this debate and move forward with what they thought was necessary and essential disease eradication work, the veterinarians of the Livestock Sanitary Board actively engaged with the public. They did so, dramatically, through public demonstrations. Myers, for example, notes that veterinarians in Pennsylvania felt that the best way to educate the livestock community in the state about the disease and the importance of eradicating it was to show it to them:

…it was only when a man had seen a herd of tuberculin reactors alive, had seen them killed, and had actually observed the areas of disease in their carcasses that he was willing to admit that an animal can have tuberculosis to a dangerous degree and still appear normal in every respect.  

From all appearances, physical demonstrations met with success in Pennsylvania. Despite opposition, the livestock community was generally positive about bovine tuberculosis testing, so much so that the state became overwhelmed with requests for their services. Some livestock owners, due to the backlog, went as far as having their herds testing privately at their own expense. Between the start of the work in 1896 and 1901, for example, nearly 6,000 cattle in the state were condemned and all indications pointed to bovine tuberculosis rates declining in the

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34 Myers, *Man’s Greatest Victory Over Tuberculosis*, 275. Myers notes a law passed in 1897 provided the only compulsory measure in Pennsylvania, requiring that any dairy cow or breeding animal imported into the state successfully pass a tuberculin test or provide proof of a positive test from a respectable tester.

state. At the same time, livestock owners became more accepting of eradication programs during this period. This growing acceptance, and how it was achieved, would be invaluable for future initiatives.

In comparison to Massachusetts, Pennsylvania’s response to bovine tuberculosis in the 1890s was perhaps more organized. This was in large part due to the work of the state’s Livestock Sanitary Board, under whose authority bovine tuberculosis, as well as a host of other infectious animal diseases, was placed. Several other states in the United States created Livestock Sanitary Boards at this time and a national Livestock Sanitary Association, whose creation was recommended by the Bureau of Animal Industry, was first created in 1897. For Pennsylvania, its Livestock Sanitary Board was first formed in 1895 and consisted of the Governor, Secretary of Agriculture, State Veterinarian, and Dairy and Food Commissioner. It was free to create its own regulations and was given a budget initially of $40,000 per year to address bovine tuberculosis as well as other diseases such as anthrax, glanders and rabies. Of note within the membership of the Livestock Sanitary Board was a veterinarian named Leonard Pearson. He would be a significant figure in the response to bovine tuberculosis not just in Pennsylvania, but in the United States as a whole.

Leonard Pearson’s interest in veterinary medicine began while he was a student at Cornell University, where he graduated with from the agricultural program in 1888. He was hired before his graduation by the United States Department of Agriculture to work under James Law where he assisted him in working on the eradication of various animal diseases such as contagious

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36 See Palmer Waters, 9.
bovine pleuropneumonia.\textsuperscript{37} Pearson obtained his veterinary degree from the University of Pennsylvania in 1890 and after a period of study in Europe, including the laboratory of Robert Koch, he was appointed as an assistant professor of veterinary medicine at the University of Pennsylvania, where he also served as dean from 1897 to 1909. In 1895, Pearson was instrumental in organizing the Pennsylvania Livestock Sanitary Board and was named state veterinarian by then-Governor Daniel Hastings. He served as state veterinarian from 1895 to 1909.\textsuperscript{38} Pearson became a well-known authority on bovine tuberculosis. For example, in 1891 he became the first person to test a herd with tuberculin in the United States. He produced a large volume of work on the disease throughout his career and was instrumental not only in the response to bovine tuberculosis in Pennsylvania, but in the larger federal response to come in the 1910s.\textsuperscript{39}

Pennsylvania and Massachusetts present a practice of bovine tuberculosis eradication beginning in the nineteenth century that involved veterinary medicine and the livestock community from the outset. New York State would respond to bovine tuberculosis in a very different way in this period. New York State, with its large domestic dairy population and its considerable traffic of import and export cattle, was actually the first state in the United States to begin a formal program for the eradication of bovine tuberculosis. The experience of New York throughout the 1890s and early 1900s reflected the strong connection between the disease in cattle and the threat it posed to public health. This relationship was most noticeable in the body under whose authority the eradication of the disease was initially placed.


\textsuperscript{38} Marshall, 5-7.

\textsuperscript{39} Marshall, 6-7.
New York State’s eradication efforts began in 1892 under the authority of the State Board of Health. That year, a piece of legislation known as the Tuberculosis Act was passed in the state granting authority to the Board of Health to address the problem of bovine tuberculosis. The board was given two substantial tasks to accomplish: Firstly, to determine whether milch cows (dairy cows) and other cattle in the state were a source of tuberculosis and a danger to public health; and secondly, to devise some means for identifying these animals and preventing the spread of the disease to healthy cattle. A substantial amount of authority was given to the board by the State to carry out its work. It was given the authority to hire a number of veterinary inspectors, determine and set their salaries, lay out regulations and enforcement measures, and destroy any cattle deemed to be tubercular. Furthermore, inspectors were implored to create strong connections with local boards of health regarding the disease, requiring them to communicate with the Board of Health about instances of diseased cattle and their suggestions of possible methods of dealing with the disease.40

There were five parts to the rules and regulations the Board of Health enforced. Firstly, the rules required inspectors, veterinarians, or anyone else the board employed to use “all reasonable means” to uncover bovine tuberculosis in cattle and to report at least once a month to the board or more frequently if so requested.41 Second, livestock owners were required to allow inspectors on to their property to examine their cattle and, if deemed necessary, comply with any orders to test, isolate and if deemed necessary, destroy any infected with tuberculosis. Inspectors employed by the State were not given direct authority to destroy cattle. The third provision of the

law stated that when cattle were suspected and identified, inspectors were required to notify either the president or secretary of the board, reporting the numbers, location, and owners of the affected livestock, and their justification for isolation, destruction, etc. The board then granted the authority for the inspector to act. A fourth provision under the law again concerned livestock owners. While their co-operation was required under the law, according to the fourth provision so too was their assistance. Owners were required to assist inspectors with collecting, restraining, and testing their cattle for however long the examination of the herd took place. The final provision of the law concerned safeguarding the spread of bovine tuberculosis from herds identified as containing tubercular cattle. Recall that the board authorized the ultimate fate of diseased cattle, and destruction was not the only option. For high grade/purebred cattle, there was an option to keep and isolate the animals, an option that would become a common component of many bovine tuberculosis policies in the years to come. Inspectors were permitted to isolate or mark cattle (the law suggested a chain and lock around the neck or permanent marking on the skin) and owners were required not to tamper with them or face being reported to the Board, the consequences of which were not stated.  

The first report of the board’s work appeared in 1894 and extensively detailed two years of eradication work with New York State’s cattle, covering several hundred pages of text. Their work, admittedly, was not extensive:

The appropriations made, though incommensurate with the magnitude of the undertaking, have been sufficient to show, to some extent, the vast proportions of this menace to life and health, and the need of adequate resources to intelligently meet and overcome it.

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The committee’s modest budget may have prevented it from pursuing a systematic, state-wide investigation of bovine tuberculosis, but it provided enough means to provide a shape and a scope of the problem:

…There can no longer be a reasonable doubt, that tuberculous cattle are extensively distributed through the dairies of the State, forming centers of infection in the respective herds; that the milk from such cattle is bad, and in many cases contains the germs of the disease, which, though not acting perniciously upon all who partake of it, is still sufficiently dangerous to warrant as earnest precautions and as effective prophylactic measures as in the case of small-pox, typhoid and cholera.44

A close reading of the 1894 review of the board’s work to that date reveals that New York’s first foray into bovine tuberculosis work was less a matter of instituting “…effective measures against the spread of bovine tuberculosis...” than an investigation of the existence and scope of the disease. The 1894 report reveals a wide distribution of bovine tuberculosis investigations throughout the state. However, in many counties visits by inspectors were minor, with only a few farms, a single farm in a one case, visited and disease investigated.45 While investigations were carried out, substantial intervention was not.

Two counties in New York received more specific, in-depth attention from the Board of Health. They were Westchester and Orange counties, located in the southern portion of the State

and part of the large dairy shed that supplied New York City.\textsuperscript{46} In total, over the course of the two years that this report of the Department of Health covered, several thousand cattle in the State were examined for tuberculosis.\textsuperscript{47} The law governing the inspection of livestock for bovine tuberculosis aids in explaining how the work the Board of Health undertook over nearly two years unfolded. Livestock owners, whether they owned a large herd or kept one or two, were required to allow inspectors on to their property and to assist in restraining and isolating suspected tubercular animals. Herds were given physical examinations by the inspectors and, if they suspected a case of tuberculosis, tuberculin tests were administered.\textsuperscript{48}

The way in which bovine tuberculosis intervention work was defined under this law in many ways calls into question how accurately the extent or scope of the disease in the state was determined. Bovine tuberculosis was a disease that in many cases did not exhibit clinical or physical symptoms. Given that the first action of inspectors was to determine which animals to test based on a physical examination, it is reasonable to pose that a number of tuberculous cattle were overlooked. Nevertheless, despite its limited budget and manpower, the Board was able, albeit in a limited manner, to give a shape to the problem of bovine tuberculosis in the state.

Westchester County in 1892 was the first county to undergo a thorough examination for bovine tuberculosis. In total, roughly 5500 cattle were examined. A wide variety of herds were examined, including owners who possessed one or two cows for personal consumption, to larger herds of 50 to 100 head. In total, the number of tubercular cattle identified from the 5500 significance.

\textsuperscript{46} The third large centre to be examined was Dutchess County, also located in the southern part of the State. By the time Dutchess County came under examination, testing had begun in several other counties within the State, albeit in a very limited capacity.

\textsuperscript{47} Although not all counties did this, some inspectors specified the particular breeds, gender, and age of the cattle they tested. Overwhelmingly adult cows were tested although it is interesting to note the number of bulls tested, as they were often a vessel by which bovine tuberculosis was spread between farms through breeding.

examined was 38, or 0.7% of the total examined. Most of these cattle came from larger dairy herds of roughly 20 to 80 cattle. Quite likely the number of tubercular cattle was higher as these identified individuals were only based on obvious clinical symptoms.\textsuperscript{49} The majority of carcasses examined upon a diagnosis of tuberculosis via the tuberculin test noted the overwhelming presence of tuberculosis in the lungs. This is not surprising given the aerosol exchange of droplets was the most common way cattle passed the disease to each other. Inspectors did note, however, a number of more extensive clinical cases of tuberculosis in several herds, with the extensive presence of tuberculosis in udders and intestinal tracts.\textsuperscript{50} This indicates that the disease was likely well-established in many herds in the county.

A number of reliable observations can be made regarding New York State’s initial two years of bovine tuberculosis intervention. It is reasonable to conclude that while the eradication of bovine tuberculosis may have been the initial goal or exercise of the Board of Health, it quickly discovered that the scale of the disease was much larger and complicated than other diseases facing livestock in the past. The first two years of testing in a number of counties and a more substantial examination of cattle in three counties gave the Board an idea of the scope of the problem they were facing. By 1894, this initial investigative work had been completed and the Board decided to appoint a committee to more systematically investigate the problem of the disease in the state.\textsuperscript{51}

\textsuperscript{49} State Board of Health of New York, “Tuberculosis,” \textit{14th Annual Report of the State Board of Health of New York, Vol. II}, 60-90. Calculations were based on the tables of reported examinations by inspectors and tabulations of the herds they tested.
\textsuperscript{51} State Board of Health of New York, “Tuberculosis,” \textit{15th Annual Report of the State Board of Health of New York, Vol. II} (Albany: James B. Lyon, State Printer, 1895), 618-620. This committee was made up mostly of members of the Department of Health but also included members of the veterinary community such as James Law of Cornell University.
In May of 1894, based on the data gathered for the previous two years, the Board of Health decided to appoint a tuberculosis commission to more systematically investigate the problem of bovine tuberculosis in the state. The commission initially had two working goals: first, it performed a thorough examination of the cattle contained in a specific county to provide a better idea of the likely extent of bovine tuberculosis in the entire state; and, second, it began to place New York State in a broader national and indeed, international, context. In total over the course of the year, 22,000 cattle in the state were tested, with 800 condemned and slaughtered for tuberculosis.\(^{52}\)

Of the 22,000 cattle tested over the course of 1894, 947 were part of a specific study Schenectady County. Of that number 66, or around seven percent were deemed condemned and necropsies were performed.\(^{53}\) It seems in many ways appropriate and forward-thinking that the Board of Health undertook such a study. This was just 1894 and bovine tuberculosis as a known-infectious disease of cattle was relatively new. There were a lot of unknowns about the disease and this study by the board in many ways not only provided a window into the potential extent of the disease in the state’s herds, but also contributed to the growing body of scientific knowledge about bovine tuberculosis. The board chose Schenectady specifically because it “…was thought to be comparatively free from general infection from other sources.”\(^{54}\)

Of those condemned and slaughtered in Schenectady County, between 96 to 100% of those necropsies revealed acute cases of bovine tuberculosis, with the board noting that these findings

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\(^{54}\) State Board of Health of New York, “Tuberculosis,” 15\(^{th}\) Annual Report of the State Board of Health of New York, Vol. II, 618. It is somewhat unclear what the Board meant by this, but it is reasonable to assume that they felt that the Board felt the county’s cattle population was relatively stable and not subject to the amount of movement of cattle experienced in other counties.
would be a fair average for the State as a whole.\textsuperscript{55} In addition to the necropsies performed and what they indicated about the extent of the infection in the cattle of the county, the board made a number of observations regarding the larger issues surrounding bovine tuberculosis. Many of these observations would be confirmed and indeed echoed by other states undertaking parallel eradication work. One of these observations concerned the types of cattle prone to bovine tuberculosis. In a period where a number of individuals felt that the locus of bovine tuberculosis infection was solely contained in purebred breeding animals, board members noted that a number of tubercular cattle were “common stock” and that bovine tuberculosis was not “…a respecter of breeds.”\textsuperscript{56} A number of connections were made by the Board of Health between infection and sanitation, and there was expressed support for tuberculin, with a number of references made to BAI experiments supporting its effectiveness as a diagnostic tool.\textsuperscript{57} Thinking ahead to eradication work in the state, board members advocated the regular inspection of the cattle, supervision of meat and milk supplies, and disseminating information to the livestock community advocating that they have their animals tested, even going so far as to say that livestock owners could do the examinations themselves.\textsuperscript{58}

The Board of Health continued to test cattle and provide compensation to owners for their diseased stock until 1902, when the work was taken over by the State Department of Agriculture. Little explanation was given by the State for the transfer in authority, but it was reasonable to have happened when it did. By 1902, the problem of bovine tuberculosis for livestock and their

\textsuperscript{57} State Board of Health of New York, “Tuberculosis,” 15\textsuperscript{th} Annual Report of the State Board of Health of New York, Vol. II, 619-620. No doubt many of these strong assertions came from Dr. James Law of Cornell University, an early bovine tuberculosis researcher and member of the Tuberculosis Committee.
influence on human health through infected meat and milk was clear. The Board of Health was ill-equipped to address the disease in New York’s livestock population as they did not possess the expertise, knowledge of the industry, or connection to farmers that the Department of Agriculture did. The department moved ahead with eradication work immediately, undertaking their own investigative work into the state of the disease in both New York as well as the rest of the nation and abroad.

A number of conclusions can be drawn from New York State’s foray into bovine tuberculosis eradication work. The public health implications of bovine tuberculosis were underscored by the authority placed with the State Board of Health, and public health heavily influenced the shape of what little eradication the board accomplished in the 1890s. The counties in which bovine tuberculosis was most closely investigated were those that were major dairy areas. Although authority for bovine tuberculosis work in cattle would transfer to the state Department of Agriculture in 1902 and the “first line of defense” was somewhat limited in this period, the Board of Health made a number of important observations about the disease and incorporated veterinary medicine very early on in its efforts. The presence of bovine tuberculosis in dairy cattle was clear, reinforcing concerns about public health. Secondly, the Board of Health quickly recognized that bovine tuberculosis was present in significant quantities. Though accepting the prominent role of breeding animals in the existence and distribution of the disease, there was growing acknowledgment that bovine tuberculosis was present in all types of cattle. The placement of authority in the hands of the state allowed for a more specific examination of the disease and revealed a number of issues about local conditions that larger, more centralized bodies would take longer to internalize. This, in turn, would influence future intervention with the disease.
Bovine Tuberculosis Eradication Work in Ontario, 1890-1905

Canadian authorities began their own bovine tuberculosis intervention in Canadian cattle in the 1890s. Their work added to a growing body of research on bovine tuberculosis and gave some insight into the situation the disease presented for Canada. However, despite the discourse circulating surrounding bovine tuberculosis and active scientific investigations into the disease in Canadian cattle, active eradication work in the 1890s was underwhelming.

Investigations into bovine tuberculosis began in the 1890s at several of Canada’s experimental farms. Supervised by William Saunders, director of Canada’s Experimental Farms, this research would see the first use of tuberculin in Canada. Reporting in 1894, Saunders recounted the investigation of bovine tuberculosis across Canada at experimental farms in Brandon, Manitoba, Indian Head, Saskatchewan, Nappan, Nova Scotia, and Agassiz, British Columbia. In total 119 animals were tested at these four farms, with forty-nine (41% of the total) testing positive for bovine tuberculosis.

59 Beginning in the 1890s, several research bodies began producing reports about bovine tuberculosis. See, for example, Bovine Tuberculosis, Vermont Agricultural Experimental Station, Bulletin No. 42 (Burlington: Free Press Association, 1894), Bovine Tuberculosis in Indiana, Agricultural Experiment Station, Purdue University, Bulletin No. 63, Vol. VII (Lafayette, 1896), Paul Fisher, Bovine Tuberculosis, Experiment Station of the Kansas State Agricultural College, Veterinary Department, Bulletin No. 79 (Manhattan, 1898), and James Law, Tuberculosis in Cattle and Its Control, Cornell University Agricultural Experiment Station, Veterinary Division, Bulletin 150 (Ithaca, 1898).

60 Briefly, Saunders was a celebrated Canadian civil servant and agricultural researcher. A well-known entomologist and horticultural researcher, he established the Central Experimental Farm as well as a number of regional and experimental stations throughout the country. For further reading on Saunders, see Ian M. Stewart, “William Saunders,” Dictionary of Canadian Biography Volume XIV, April 28, 2013, http://www.biographi.ca/009004-119.01-e.php?id_nbr=7688

61 William Saunders, “Report on Tuberculosis at the Experimental Farms,” in Report of the Minister of Agriculture for the Dominion of Canada for the Calendar Year 1894 (Ottawa: S.E. Dawson, 1895), 103-107. For further reading on the development of Canada’s Experimental Farms system, see Thomas H. Anstey, One Hundred Harvests:
Confident in the reliability of the tuberculin test, a number of interesting observations were made about bovine tuberculosis in Canada, which could be applied to the disease more generally. First, Saunders and the veterinarians working alongside him were surprised by the level of infection in cattle that appeared “…healthy and vigorous.”\(^\text{62}\) He went on to say that without the aid of tuberculin as a diagnostic agent, it would “…have been impossible in the large majority of the cases, to have detected the slightest evidence of the disease.”\(^\text{63}\) This observation indicates the beginning in a shift of attitudes towards this particular disease. In prior writing, bovine tuberculosis had been reported occasionally without any indication of the methods of detection or the clinical symptoms of the disease. These investigations indicate that the problem of bovine tuberculosis in Canada was likely worse than previously assumed.\(^\text{64}\)

A second observation of this research work was the amount of movement that the herds undergoing testing had experienced. As Saunders notes, a number of the animals in the herds of the experimental farms had come from all over Canada. In Nappan, Nova Scotia, for example, thirty-nine animals were tested, consisting of animals bred in the province as well as a number sent from Western Ontario and New Brunswick. Saunders also notes that two of the five purebred cattle slaughtered were from Ontario and New Brunswick.\(^\text{65}\) This gave some indication of the distribution and potential of the disease to move, an issue that would influence not only how bovine tuberculosis was ultimately addressed in Canada, but how the movement of potentially tubercular animals was governed between Canada and other countries.

\(^\text{63}\) Saunders, “Report on Tuberculosis at the Experimental Farms,” 103.
\(^\text{64}\) Saunders, “Report on Tuberculosis at the Experimental Farms,” 103.
A final observation that came of this research came in the form of the type of cattle bovine tuberculosis was found to affect. It seems counterintuitive to assume that only certain types of cattle were affected by a disease, but in this period a strong attitude existed that bovine tuberculosis primarily affected purebred breeding animals that were either improperly bred or came from nations (particularly Great Britain) that were known to have high rates of bovine tuberculosis. While these particularly mobile livestock did often test positive for bovine tuberculosis, so too did grade cattle, revealing that these animals (that represented a much larger portion of Canadian cattle, and thus a much larger undertaking) were just as susceptible to bovine tuberculosis as more intensively bred, mobile cattle.\textsuperscript{66}

Despite some investigatory work on bovine tuberculosis, there was little work in testing and eradicating the disease in Canadian herds. Not only were the numbers of cattle tuberculin tested in Ontario and other regions small compared to the overall number of cattle, but the reporting of those numbers was not consistent and on occasion, non-existent.\textsuperscript{67} There was also an acute lack of overall reporting for bovine tuberculosis in Canada in this period. One can only speculate, but bovine tuberculosis was not the most pressing infectious livestock disease in this period. Veterinary authorities were more concerned with other diseases, such as contagious bovine pleura-pneumonia, hog cholera, and glanders. Furthermore, for the veterinary community at this time, bovine tuberculosis was considered a more minor disease of imported livestock.

\textsuperscript{66} Saunders, “Report on Tuberculosis at the Experimental Farms,” 107. It is worth noting that a significant number of tubercular cattle were discovered at Canada’s Central Experimental Farm outside of Ottawa in 1897. It was widely reported and of the 55 on the farm, 26 reacted positively to tuberculin, including the herd’s bull which had been deemed healthy after undergoing tuberculin testing four years prior. Unaware of how the disease was introduced, the decision was made to apply the tuberculin test to any further cattle brought on to the farm. See “Outbreak of Tuberculosis,” \textit{The Daily Mail and Empire}, October 28, 1897, http://news.google.com/newspapers?nid=36&dat=18971028&id=Y0M1AAAAIBAJ&sjid=tygDAAAAIBAJ&pg=6 527,5793830. See also “Tuberculosis at the Experimental Farm,” \textit{Farming}, vol.15 (November 16, 1897): 82.

\textsuperscript{67} This is even more apparent when tuberculosis in Ontario and Canada are compared to those of New York State, examined earlier in the chapter. In New York, tuberculosis numbers are far more consistent and comprehensive.
With the advent of changes to quarantine regulations in the early 1890s, the years that followed produced more comprehensive numbers on bovine tuberculosis and give a better sense of how the disease was being addressed by the Canadian government. However, significant official reporting on bovine tuberculosis did not begin until 1896. In prior years, only very general descriptions of bovine tuberculosis appear. When more revealing numbers were produced, they came in two forms. First, there were the independent investigations of bovine tuberculosis by scientists and veterinarians. Again, reporting for these investigations was uneven from year to year. The second set of numbers produced was by the federal government for cattle bound for export or those imported that, for a variety of reasons, required a tuberculin test. What is revealed in these numbers is addressing bovine tuberculosis on separate two fronts, domestic and international. It would be several years before a united effort would be undertaken in Ontario and the rest of Canada.

The majority of official writing on bovine tuberculosis in the mid to late 1890s revolved around import and export cattle. It involved uneven reporting from year to year regarding tuberculosis testing for incoming and outgoing cattle, discussions related to changes in quarantine procedures and how they affected bovine tuberculosis, and recommendations for changes to current legislation. In terms of reporting, it is unclear exactly how many cattle were suspected of having bovine tuberculosis. For example, in 1894, an accounting of the number of tubercular cattle was not stated, only that at Ontario’s quarantine station in Sarnia, “several cases were reported.” This vague accounting continued in the years that followed. In 1895, for example, Minister of Agriculture Walter Humphries Montague noted that with the change in quarantine procedures in 1894, requiring that all cattle imported into Canada be tested with

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68 Augute-Real Angers, Report of the Minister of Agriculture for the Dominion of Canada for the Calendar Year 1894 (Ottawa: S.E. Dawson, 1895), 43.
tuberculin at quarantine, a number of tubercular cattle had been identified and indeed, “…a larger proportion that was expected of animals imported for the improvement of stock has been found to be tubercular and rejected.” 69 Unfortunately, no numbers were stated. In 1897, following an amendment to quarantine procedures between Canada and the United States, the number of tuberculin tests needed to be performed at quarantine was drastically reduced (though it is likely there were not many to begin with). In the mid-1890s, the quarantine procedures for bovine tuberculosis between Canada and the United States were brought more into line with Canada’s laws with Great Britain. So long as imported cattle were accompanied with a certificate verifying that they had been tested for tuberculosis and had passed, they would not be detained for testing at quarantine. As a result, by 1899, Minister of Agriculture Sydney Fischer proclaimed that tuberculosis was rapidly decreasing in Canada. 70

While quarantine measures were, by the turn of the twentieth century, stemming the flow of tubercular cattle from leaving or entering the country, efforts had not really begun to address bovine tuberculosis in Canada’s domestic herds. Recall that bovine tuberculosis eradication was not compulsory for Canadian livestock owners, excepting those who were involved in the importation or export of livestock internationally. There existed in this period, however, a growing body of opinions in publications such as the farm press that aimed to educate livestock

69 Walter Humphries Montague, in Report of the Minister of Agriculture for the Dominion of Canada for the Calendar Year 1895 (Ottawa: S.E. Dawson, 1896), xii. This trend continued in 1896, with Andrew Smith commenting for example on the state of Ontario’s cattle and imports, that only a few cases of the disease had been reported. See Andrew Smith, “Report on Ontario Quarantine,” in Report of the Minister of Agriculture for the Dominion of Canada for the Calendar Year 1896 (Ottawa: S.E. Dawson, 1897), 58.
70 Sydney Fischer, Report of the Minister of Agriculture for the Dominion of Canada for the Calendar Year 1899 (Ottawa: S.E. Dawson, 1900), 107.
owners about what bovine tuberculosis was, why it was a threatening disease to their operations, and why they should voluntarily test their herds.71

Given that testing was not compulsory, it is fair to assume that the number of livestock owners in Ontario and the rest of Canada that chose to voluntarily test their animals was relatively low, and reporting on those who did chose to voluntarily test their animals was inconsistent. However, although somewhat inconsistent, it is clear that a small number of livestock owners in Canada were actively testing their herds for bovine tuberculosis. In 1895, for example, bovine tuberculosis was reported to be in decline, particularly in Quebec and the Maritimes, owing to livestock owners voluntarily participating in preventative measures and testing their herds. In addition, the Department of Agriculture reported that requests for tuberculin were being made and that the Central Experimental Farm filled those orders accordingly.72 For example, in 1898, 5698 cattle were tested across Canada for bovine tuberculosis by veterinarians, with 508 (or approximately ten percent) testing positive for the disease. The report furthers that the testing “…has not been as generally taken advantage of by stock breeders as it ought to have been; want of knowledge of the test and the fear of pecuniary loss has debarred many from applying to have their herds tested.”73 In 1899, travelling veterinary

71 See, for example, “Tuberculosis and the Tuberculin Test,” Farmer’s Advocate, vol. 32 (June, 1, 1897): 239. See also J.H. Gardiner, “Air Space and Bovine Tuberculosis,” Farmer’s Advocate, vol. 32 (July 15, 1897): 316, and John Spencer, “Experience with the Tuberculin Test,” Farmer’s Advocate Farmer’s Advocate, vol. 32 (July 15, 1897): 316-317. These pieces in the farm press began much earlier, it is worth noting, in the 1880s. See for example, “Tuberculosis in Cattle,” Farmer’s Advocate, vol. 16 (March 1881): 54., and C.H. Sweetapple, “Tuberculosis in Cattle,” Farmer’s Advocate vol. 23 (September 1888): 272. Sweetapple was a veterinary obstetrics instructor at the Ontario Veterinary College and served as its first librarian.

72 See Report of the Minister of Agriculture for the Dominion of Canada for the Calendar Year 1895 (Ottawa: S.E. Dawson, 1896), xii.

inspector A.E. Moore noted that over the course of the year he had tested 542 cattle, 464 in Quebec and 78 in Ontario, of which 56 were infected with bovine tuberculosis. 74

Little had changed by the first decade of the twentieth century in regards to bovine tuberculosis testing, either for domestic cattle or those bound for international trade by the turn of the century. In reality, very little could change at this point with regards to Canada in how bovine tuberculosis was addressed. As John Rutherford explained: “The burden of this work falls almost entirely on the officers stationed in Ontario and Quebec, few animals being exported from the other provinces…” 75 Despite calls from public health advocates for a more comprehensive approach to the disease, it is clear that a lack of funds and manpower prevented it from happening, though a more comprehensive plan was desired by the veterinary community:

Very little testing of grade or dairy cattle has been done this year; 389 head were tested in all, of which 83 reacted. As the results of this work in former years had not been found at all satisfactory, a circular on the subject, issued by the Department in December, 1901, contained a notice that no testing of cattle, except for export, would be done between March 1, and October 1. Since the latter date a few applications have been received…I would, however, strongly recommend the adoption, as soon as possible, of a system of permanently marking animals reacting to the tuberculin test. 76

The first response to bovine tuberculosis in Ontario and Canada more broadly was modest. In all, the Canadian government did not gain a tremendous amount of detailed information about the scale and scope of the disease through the initiatives they pursued in the 1890s. Although some knowledge was gained about the threat of imported tubercular cattle and infrastructure was

75 See John G. Rutherford, “Tuberculosis,” in Report of the Minister of Agriculture for the Dominion of Canada for the Calendar Year 1903 (Ottawa: S.E. Dawson, 1904), 78.
76 See Rutherford, “Tuberculosis,” in Report of the Minister of Agriculture for the Dominion of Canada for the Calendar Year 1903, 78.
created to prevent their introduction, little was learned about the domestic distribution of the disease. Indeed, the response to bovine tuberculosis in Canada until the late 1910s tended to focus more on the international dimensions of protecting livestock from tubercular imported cattle and ensuring optimal health for those being exported. A more considerable domestic effort was several years down the road.

**Conclusion: Transforming the “first line of defense”:**

Given the arguably underwhelming response to bovine tuberculosis in the 1890s, there is a temptation to conclude that by the turn of the twentieth century, little was being done to actively address the disease in Canada and the United States. In truth, the actions of the 1890s reflect the application of scientific knowledge that had radically transformed over the previous decade. Moreover, the 1890s also reflected a period of tremendous growth in the power of states that were not only in a position to create the necessary infrastructure, but also realized the tremendous influence disease and contagion could have on their growing livestock markets both domestically and internationally. By the time New York State began its first program to actively study and eradicate bovine tuberculosis, it had been only ten years since the tubercle bacillus had been identified.
Koch’s identification of the tubercle bacillus and the introduction of tuberculin were transformative moments not only in the history of tuberculosis, but in the history of science generally. Koch and the broader scientific community who investigated tuberculosis in the nineteenth century transformed not only knowledge and attitudes towards tuberculosis, but also the practice of disease intervention. Institutional innovations were equally critical to the practice of disease control. For bovine tuberculosis, the scientific innovations related to the disease largely ended with Koch in the late nineteenth century. It would be the institutional innovations that would ultimately play the most significant role in the eradication of bovine tuberculosis and these institutional innovations began in the 1890s.

In both Canada and the United States, bovine tuberculosis would be incorporated into an animal health infrastructure whose origins lay in the 1860s. Ultimately the animal health infrastructure of Canada and the United States would be organized differently. This would profoundly influence the eradication of bovine tuberculosis. In Canada, authority would largely rest in the hands of the federal government. In the United States, individual states were largely given the authority to deal with infectious diseases like bovine tuberculosis in the way they saw fit. Each would have advantages and disadvantages as bovine tuberculosis intervention got underway. Institutional innovation, however, was ongoing. Over the next two decades, New York State and Ontario would undergo a number of bureaucratic transformations shaped by the ultimate goal of eradicating bovine tuberculosis. The first decade of the twentieth century would see bovine tuberculosis addressed as two separate diseases, one affecting cattle and one affecting humans. The nineteenth century was less distinct in this division. The programs that began in the early nineteenth century would see the zoonotic dimension of bovine tuberculosis fade from the
problem it presented in livestock. As a result, a more intensive, veterinary approach was taken with the disease.
Chapter IV:

A Disease on Two Fronts: Addressing Bovine Tuberculosis in Livestock and Human Populations, 1902 – 1908

The first decade of the twentieth century saw some significant changes to the bovine tuberculosis programs for livestock in Ontario and New York State. Key differences would still characterize the structure of Canadian and American the programs in this period much as they did in the 1890s. Some parallels did exist though they unfolded in different ways on either side of the border. New York State and especially Ontario in this period began to address bovine tuberculosis in their domestic herds with more zeal than they had before. These programs were not compulsory and incentives were created for livestock owners to participate in bovine tuberculosis eradication, an act that might dramatically affect their herds and livelihoods. Different incentives were introduced in Ontario and New York and reflected distinct approaches each jurisdiction had to the disease. More broadly, this period would see intervention in bovine tuberculosis in human and animal populations form into more distinct programs. Bovine tuberculosis as a zoonotic disease would largely be eliminated as a result of these programs.

For the United States in this period, authority of bovine tuberculosis eradication would remain in the hands of individual states. Within New York State, the first decade of the twentieth century would see authority for bovine tuberculosis work transfer from the state Board of Health to the Department of Agriculture. While the legislation employed as a result was not radically
different from what that preceded it, some important transformations occurred. First was the introduction of monetary compensation for tubercular cattle in 1905, a process that would become a central part of future eradication initiatives. In providing compensation, the state provided a powerful incentive for owners to “clean up” their herds. State veterinarians, too, would become more visible in the planning and execution of bovine tuberculosis policy and programs in this period. Their involvement included more intensive investigations of the distribution of the disease throughout the state, ensuring their involvement in the recommendations and decisions for appropriate actions to take with the disease, and executing testing and eradication measures. In doing so, their central role and authority in the eradication of the disease increased. Moreover, their increased visibility in eradication work would influence the efficiency of future work involving the Bureau of Animal Industry. Beginning in the late 1910s, the established presence of state veterinarians greatly aided in the smooth and efficient implementation of the State-Federal Cooperative Program.

Ontario’s response to bovine tuberculosis would remain under the jurisdiction of the federal government in this period. This structure of authority, compared to that of New York State, hampered the pace at which eradication work unfolded. Nevertheless, Ontario would experience a shift in eradication programs in this period. Addressing the disease more directly in domestic herds began in this period as well as what livestock owners could choose to do with their animals. A process of marking cattle to prevent their sale but allow owners to keep them for breeding and other purposes was introduced in Canada. In this way, Canada provided its own distinct incentive for livestock owners instead of monetary compensation, which the federal government was unable to provide.
Alongside new bovine tuberculosis eradication programs for cattle in this period were new methods for addressing the disease in human populations. New programs of meat inspection and milk inspection (including pasteurization) essentially eliminated bovine tuberculosis as a public health problem for people. These campaigns did bring a considerable amount of public attention to the problem of bovine tuberculosis in cattle, but the problem could essentially be addressed in people without addressing it in livestock. As these campaigns grew, bovine tuberculosis gradually became an exclusive problem of livestock, and legislation and policies reflected this development.

**Bovine Tuberculosis Eradication in Ontario, 1902-1908**

Ontario in the early 1900s would see the introduction of incentives into bovine tuberculosis eradication work as well as increased attention on the domestic dimension of the disease. This increase in attention can be directly linked to institutional and personnel transformations in Canada in these years. The transformations, particularly with personnel, would dramatically influence the shape of bovine tuberculosis eradication over the next several years. Indeed, the first Veterinary Director General in this period, John G. Rutherford, would not only play an influential role in shaping the eradication policy of Canada, but of the United States as well.

Rutherford was named as Canada’s first Veterinary Director General (VDG) in 1902.¹ Bovine tuberculosis was immediately on his agenda. Rutherford’s successful tenure as Canada’s

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¹ The Veterinary Director General’s Office was created in 1902 as part of a reorganization of the Department of Agriculture and was part of the newly-formed Health of Animals Branch. The former role of Chief Livestock
first VDG in part was due to his cordial relationship with the livestock community. Rutherford, the son of a Scottish farmer who graduated from the Ontario Veterinary College in 1879, had a much more congenial relationship with the livestock community than Duncan McEachran, Rutherford’s predecessor. One of his first activities as VDG was to meet with various livestock associations, most notably the Dominion Shorthorn Breeders Association, to discuss the current state of quarantine regulations and the tuberculin test, with the aim of informing them of the goals of the Health of Animals Branch and its participation: “…such meetings, if conducted in a proper spirit, cannot but improve the relations between owners of live-stock and officers engaged in a service specially organized to further and protect live-stock interests.”

Rutherford implemented two significant policies during his time as VDG. The first was an Order in 1903 allowing owners to keep their tubercular cattle so long as they were marked and not sold. The second was the Supervised Herds Plan in 1905, a voluntary program which placed whole herds under the surveillance of the state. The passing of these two pieces of legislation, in particular the 1903 Order, was looked upon as a success by Rutherford and the Health of Animals Branch. The policy made some successful inroads in gaining the cooperation

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2 Like many of Canada’s first veterinarians, John Gunion Rutherford came to Canada from Scotland. After graduating from the Ontario Veterinary College in 1879, he began a practice in Woodstock, Ontario, before moving on to Portage la Prairie, Manitoba. Rutherford was named Manitoba’s veterinary inspector in 1885 and helped established the Veterinary Association of Manitoba in 1890. Rutherford oversaw a number of required standards for the province’s veterinarians and this led him to be a vocal critic of the curriculum standards of the Ontario Veterinary College, eventually culminating in the provincial takeover of the college in 1908. For more information see, Margaret Derry, “John Gunion Rutherford,” Dictionary of Canadian Biography, accessed January 10, 2011, http://www.biographi.ca/en/bio/rutherford_john_gunion_15E.html.


of the livestock community. Commenting in 1905, Rutherford noted, “...our present policy with regard to tuberculosis appears to be giving satisfaction. It is to be hoped that the investigations now in progress in various countries will shortly result in the development of an intelligent policy of dealing with this serious malady.”

Overall, Canada appeared to be moving into a promising phase of bovine tuberculosis eradication in the first decade of the twentieth century. Domestic herds, albeit those primarily involved in international trade and breeding, were beginning to be addressed. A level of flexibility was also being achieved through the 1903 Order, creating an eradication scheme that worked more ideally for all involved. In addition, the Supervised Herd Plan provided an opportunity to more directly address domestic herds. The first eradication efforts in Canada were tried out on individual animals and small herds bound for export to either Britain or the United States. While this remained a significant focus for the Supervised Herd Plan, the policy was also open to other owners of domestic herds who wished to clean up their herds, presumably to sell them at a later date.

The larger national infrastructure of quarantine and the prevention of the introduction of infectious livestock disease into the country as a whole was becoming better organized and more efficiently run by this period. As Rutherford noted in 1907:

The past two years...have been marked by one or two important forward steps in the perfecting of our organization for preventing the introduction of diseased animals and dealing with those already in the country, and I trust that I am not too sanguine when I venture the prediction that even in the face of the adverse conditions...we will, in the near future, be able to show a clean bill of health from ocean to ocean.

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Although there was an indication that progress was being made, it was more-or-less a stop-gap measure, especially in the opinion of Rutherford. Again, commenting in 1907:

The slaughtering of large numbers of valuable cattle on the strength of the tuberculin test, which, though fairly reliable in detecting the presence of the disease, affords absolutely no indication of the extent to which it prevails in the individual, is, in my opinion, neither practical nor justifiable, involving as it does, a most serious economic waste without, under ordinary circumstances, providing any guarantee of future safety.\(^7\)

Bovine tuberculosis was being addressed; however Rutherford and the Health of Animals Branch continued to communicate the futility of proceeding with addressing the disease in this manner:

It is evident, however, that it will, in the near future, be necessary to take some definite action with a view to bringing this treacherous malady under effective control. The fact that, although many attempts have been made, no country has, as yet, been able to formulate a practical and successful policy with this object in view is, of course, very discouraging, but I am inclined to think that public opinion has now reached such a point as to render definite official action not only advisable but absolutely necessary.\(^8\)

A breaking point of such was reached in 1909. That year at the annual meeting of the American Veterinary Medical Association, the association was decided to appoint a commission to examine the problem of bovine tuberculosis in Canada and the United States. At its conclusion, the International Commission on the Control of Bovine Tuberculosis (ICCBT) crafted a set of


resolutions and legislative recommendations as well as educational directives. The ICCBT would be a tremendously influential body on the Canadian and American governments. Their recommendations would become a major part of the ultimate eradication legislation initiatives in both Canada and the United States that would see the disease successfully eradicated.

**Bovine Tuberculosis Work in New York State, 1902-1909**

Beginning in 1902, bovine tuberculosis eradication in New York came under the authority of the State’s Department of Agriculture. This transition of authority now meant the disease fell under the State’s *Diseases of Domestic Animals* legislation. This legislation placed authority for its eradication under the Department’s Commissioner (in 1902 this was Charles Wieting) who, when prompted, could publish notice of disease in any county, quarantine and inspect the premises of suspected herds, and set rates for compensation for tubercular cattle. Overall, this change in authority was not radically different than what was experienced under the State Board of Health. In fact, the regulations that the two bodies operated under were very similar, with one major exception. Under the Board of Health, compensation was provided for tubercular cattle. Although compensation was written into the Department of Agriculture’s legislation, compensation was provided at the discretion of the Commissioner and tuberculosis was not included when the disease was taken over by the department.

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Immediately following the transition of authority from the Board of Health to the Department of Agriculture, the latter undertook its own study of the status of bovine tuberculosis in New York State. This study was undertaken by Veranus Moore of Cornell University’s College of Veterinary Medicine. Borrowing from the state Board of Health’s research, Moore estimated that the proportion of the state’s cattle afflicted with bovine tuberculosis was around four percent.¹⁰ His review of the tuberculin tests performed to that date showed that of the few herds the Board of Health was able to test, the rates of infection in those herds were quite high. Those high rates, he argued, were the result of the ways in which the disease spread in the state. He argued that a critical component in the spread of the disease in New York State was the traffic of cattle moving between farms. Moore noted that the sometimes rapid exchange of cattle between farms provided the means for bovine tuberculosis to spread rapidly from herd to herd. This was furthered by Moore’s highlighting the frequent housing of tubercular cattle with healthy cattle in confining conditions. This, he argued, largely explained how a herd could produce such a large percentage of tubercular cattle so consistently.¹¹

Veranus Moore is a central figure in the story of bovine tuberculosis in New York State. A New York native and authority on bovine tuberculosis, he was appointed to work for the BAI before he had even graduated from Cornell University in 1887. After a period working for the BAI and obtaining his medical degree from George Washington University, he returned to Cornell in 1896 to join the first faculty of the New York State Veterinary College. He became the second Dean of the college in 1908 and served in that role until his retirement in 1929.

Moore would publish a significant amount of research on bovine tuberculosis throughout his career and become a major architect of its eradication both in New York State and the United States.\textsuperscript{12}

The transition of authority from the State Board of Health to the Department of Agriculture, while not making dramatic and immediate changes to the eradication of bovine tuberculosis in the state, did begin to place New York’s bovine tuberculosis problem in a wider American context. Moore publicized the wide distribution of the disease in American cattle generally, with the exception of certain areas of the West, which in his opinion were practically free of the disease. Moore commented that western cattle processed in the slaughter facilities in Chicago, Illinois, and Omaha, Nebraska, were virtually free of tuberculosis.\textsuperscript{13} The same could not be said of eastern states, including New York State, where bovine tuberculosis was firmly endemic. Moore analyzed testing data provided by a report made by a colleague at the University of Pennsylvania, Dr. Leonard Pearson. Comparing New York with the study of Pennsylvania done by Pearson, Moore noted the rate of infection in the state was approximately thirteen percent, higher compared to New York, but the result of testing under a different set of criteria. Of those animals tested, Moore noted a number of similarities, namely the high rate of infection in individual herds and the similar conditions under which the spread of infection occurred.\textsuperscript{14}

Moore’s most interesting remarks came in his commentary about the place of New York State in the American East and indeed the rest of the United States. He commented that New

\textsuperscript{12} For further reading on Moore, see “Biography,” Veranus A. Moore papers, #24-1-119. Division of Rare and Manuscript Collections, Cornell University Library. Moore’s son also wrote an extensive biography on his father upon his death. See Norman S. Moore, Helena H. Haight, and Simon Henry Gage, \textit{Veranus Alva Moore, A Biography}, (Ithaca, N.Y., 1931).


\textsuperscript{14} Veranus Moore, “Bovine Tuberculosis: A Discussion of Its Nature and Economic Importance Together with a Report of an Experiment With Air and Oxygen and Checking the Disease in Infected Cattle,” 204-205.
York was placed in a precarious position given its geographic location and the laws regarding bovine tuberculosis of other eastern states. “The cattle shipped to the Eastern States, where they will not allow tuberculous animals,” Moore observed, “are often tested in this State where all the reacting animals are left. These are sold largely to local livestock owners, thus augmenting the source and often increasing the centres of infection. The influence of this procedure is being felt very keenly.”15 This was not the first time an issue like this was raised in New York, the State Board of Health voiced concern over diseased cattle in transit, identifying Canada as a source of tubercular cattle. Where Moore differed was that the livestock community by this point had a clear idea of the consequences these cattle and the laws of other states would ultimately have on the viability of the New York livestock industry. Veterinary associations too became more vocal about the disease in the state. Moore, for example, quoted a major resolution passed in 1900 by the Genesee Valley Veterinary Medical Association, calling for the State Legislature to pass laws to protect the cattle of New York. While the Board of Health raised the issue, the Department of Agriculture was more poised to press for substantial legislative action.16

The Department of Agriculture did not take a dramatically different approach to bovine tuberculosis after taking over from the Board of Health. However, as members of the Department of Agriculture put a few years of experience behind them, a number of questions were raised about the effectiveness of eradication work, some of which picked up on concerns expressed by the Board of Health and some expressed anew. These concerns included: the implications of the experiences of other states for New York, the relationship between public health and the livestock industry, and lastly, the relationship between the State and the livestock community. A

summary of these concerns was compiled by Veranus Moore and published in 1907. Titled *Bovine Tuberculosis in New York State*, the report was prepared for a joint committee of the Committee on the Prevention of Tuberculosis of the New York Charity Organization Society and the Milk Committee of the New York Association for Improving the Condition of the Poor. Although relatively brief at around one hundred pages, Moore presented a dense report covering the extent of bovine tuberculosis in New York State and the nation more generally, a summation of New York’s legislation in addition to other eastern states, recommendations for reforms to existing laws, and the relationship of the disease to the poor. What is most noteworthy about this report is that it takes bovine tuberculosis, now classified as a matter for an agricultural/veterinary jurisdiction, and connects this now-agricultural responsibility to the larger public health framework which it directly affected.  

To gain a better sense of the extent of bovine tuberculosis in New York State, Moore sent out letters to veterinarians around the state. Cornell had sent large quantities of tuberculin to these individuals and Moore asked them to send him data on the testing they performed on behalf of the state as any they were hired to do privately. Based on this collection of rough statistics, Moore estimated the rate of bovine tuberculosis infection in New York’s herds at about forty-one percent. This number was higher than previous estimates, reflecting increased reliability in the tuberculin test.

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18 Moore pointedly discussed a lack of reliable data for the State from the Tuberculosis Committee of the Board of Health. Moore notes that the herds tested by the Board were all under suspicion of containing the disease in the first place and so the high percentage of around 43% was likely inaccurate for the State as a whole. See Moore, *Bovine Tuberculosis in New York State*, 7-8.
19 See Moore, *Bovine Tuberculosis in New York State*, 9-11. Moore noted that the percentage of bovine tuberculosis in other Eastern States was roughly 10-15%.
Moore made strong connections between public health and the economic implications of bovine tuberculosis for the livestock industry in his report: “…While the crusade against tuberculosis was waged from the purely sanitary side, little thought was given the disease as a destroyer of animals. It was considered a menace to humanity, and not a disease of cattle. However, a careful survey of the agricultural side showed that the cattle owners were suffering often severely from its presence.” Moore then went into extensive detail about how bovine tuberculosis spread between cattle and from farm to farm. He then tied this directly to milk consumers. As livestock owners were keen to meet the large demand for fresh milk in the state, the disease not only meant losses for an owner in terms of his original herd, but tremendous risk in an often hurried attempt to replace tubercular cattle to maintain efficiency. This hurried exchange of livestock often resulted in the transmission of tuberculosis between cattle and, in turn, risking the public’s health. In order for the public’s health to be assured, real and genuine attention had to be invested in the state’s livestock industry to rid it of bovine tuberculosis.

A closer and more successful relationship between the state and the livestock industry was necessary in order to move forward into a lasting and successful eradication of bovine tuberculosis. Again, writing in 1907, Moore admitted that opinions within the livestock community “…as would be expected…they entertain many opinions…there are those who do not want their herds tested, as they prefer to continue in ignorance relative to the infection of their cattle…this, however, is not the case with the enterprising, progressive farmer. These

20 Moore, Bovine Tuberculosis in New York State, 15.
21 Moore, Bovine Tuberculosis in New York State, 14-18.
leaders in the dairy industry appreciate its great economic significance and they are anxious to have this plague of cattle eliminated.”

An early and necessary step in the strengthening of ties between the state and the livestock industry was in their mutual understanding of the disease. This was not unique to New York State by any means. Indeed across the board throughout the history of bovine tuberculosis eradication, there existed a number of conflicting opinions about the nature and severity of the disease, and a great effort on the part of the veterinary community over this period was education. Moore noted that New York’s veterinary community had made a number of strides over the last number of years through the state and Cornell University’s Agricultural Experiment Stations in the form of publications to educate livestock owners on the disease. This outreach in terms of publicity had borne fruit, for example, as the number of independent applications by livestock owners for tuberculin to have their herds tested had doubled in the between 1905 and 1906.

While a shared understanding about the nature and severity of bovine tuberculosis was essential for its eradication, Moore advocated that an acceptable and palatable climate for bovine tuberculosis policy was equally necessary. In his opinion, revisions were required if substantial gains were to be made in reducing the number of tubercular cattle and his publication outlined a number of recommendations. These recommendations were directed towards both the motivations towards and execution of bovine tuberculosis eradication. Firstly, it was recommended that “.the effect of the desired legislation should be to permanently reduce the amount of tuberculosis in the cattle of the state; to prevent its spread; to protect the healthy

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herds; and to eventually eradicate it...” The eradication of bovine tuberculosis was encouraged and expressed in legislation up to that point, however it was not necessarily practiced in full. Recall that in the numbers stated regarding bovine tuberculosis work covered to this point in New York, a number of cattle were examined in herds, but not all were actually tested. Only a certain percentage (which varied depending on the discretion of the attending veterinarian) were tested, not the entire herd. This left the herd open not only to latent cases already existing in the herd, but in any additional cattle added later on. Moore recommended that when called upon to examine a herd, not only should the entire herd be tested, but that the testing should be repeated in about three months to a year.25

Moore’s 1907 report called for continued outreach work for the livestock community as well strengthening state authority to intervene in the disease. Not only would continued investment in education provide the most accurate information to a broad spectrum of livestock owners, but it would also build closer co-operation between them and veterinarians.26 Furthermore, the report advocated for all tuberculosis work (testing, evaluation, destruction) to be done by qualified, accredited veterinarians. Experience had shown, notably in Wisconsin, Pennsylvania, and Massachusetts, that the most effective bovine tuberculosis eradication work had been done by those with formal and competent veterinary training, particularly given that the knowledge of this particular disease had changed and been debated so much since its identification.27

Major transformations in the execution of bovine tuberculosis eradication were recommended for New York State. Firstly, the issue of bovine tuberculosis in other political

jurisdictions, an issue raised in previous years, had to be addressed. It was well known to those working in the state that New York had been a dumping ground for cattle in transit that had been barred from other states because of their laws governing bovine tuberculosis. Ontario, for example, had been a known source of tubercular cattle in New York.28 Its recommendations for strengthening laws to protect the introduction of untested, potentially tubercular cattle also foreshadowed future transformations in the approach to bovine tuberculosis in the United States more broadly. This was the encouraging of the establishment of formal relationships between individual states and the BAI. The report encouraged the BAI to oversee the testing of any cattle bound for interstate travel.29

A final significant transformation required for eradication work to move forward revolved around compensation. New York’s Board of Health had provided a modest compensation for those livestock owners whose cattle were destroyed upon positive tuberculin reactions. This compensation was not carried on when the Department of Agriculture took over in 1902. Moore argued that compensation was essential, as “..it seem[ed] right that all concerned should unite in bearing the burden of the immediate loss of the cattle destroyed.”30 This call for compensation, as well as the various other recommendations made to the Department of Agriculture, came at a cost, as thus necessarily the appropriation given to the Department by the state for bovine tuberculosis eradication necessarily would have to be increased. This appropriation was not solely earmarked for compensation, but in order that the much larger and thorough set of structures and procedures for eradication the disease could function effectively. They included, among others: the inspection of cattle entering the state (though the shipper was expected to bear

the cost of testing), the physical examination of all cattle in the State and retesting herds appropriately, the compensation of owners for their lost stock, and the educational work necessary to inform livestock owners about the disease and the appropriate procedures for its eradication from their herds.31

In 1905, the state made a major revision to its modest tuberculosis eradication program. Compensation was introduced for cattle destroyed as a result of positive tuberculin tests. In order to claim compensation, tuberculosis had to be identified not only by the tuberculin test, but also a post-mortem examination, and the amount of compensation mainly rested on the severity of the tuberculosis in the animal. For localized cases of tuberculosis, owners were compensated 60% of the appraised value of the animal. For generalized cases, 40%. Canada would not introduce this incentive until 1914. The topic of compensation was rarely visited in Canada before it was introduced. One of the few times the issue was raised was in 1908. Rutherford, speaking before the International Congress on Tuberculosis in Washington, D.C., said that compensation would be appropriate for owners of pure-bred cattle. He questioned its overall value, however, as cattle not in the advanced stages of the disease might hold more value alive as breeding stock.32

The first years of the New York Department of Agriculture’s administration of bovine tuberculosis eradication are revealing in a couple of ways. Firstly, the importance of compensation was quickly realized and embraced. Indeed, compensation for owners would be the cornerstone of future eradication programs. Of equal significance in this early period was the Department’s realization, fairly early on, of just how vulnerable New York State’s cattle populations were to bovine tuberculosis. These concerns are peppered throughout the

31 Moore, Bovine Tuberculosis in New York State, 45-46.
Commissioner’s reports in this first decade. Commissioner Charles Wieting described an early encounter with an uncooperative livestock owner. Having destroyed one of the man’s cows that year, veterinarians ventured out to investigate the conditions of the farm and found that likely many cattle in the herd were infected with tuberculosis. Of the thirty cattle in the herd, Wieting noted, ten showed clear physical symptoms of the disease. After the owner’s (named W.H. Baker of Osetgo County) insistence that any affected animals be removed from his farm, the cattle were removed to another farm, who happened to be owned by Baker’s son. Returning to the farm after their initial examination to appraise and prepare to destroy the affected animals, veterinarians W. H. Kelly and Veranus Moore discovered the affected cattle were nowhere to be found. Baker refused to assist in locating them and asked them to leave his property. Moore would later return to the farm and find that the affected cattle had been roaming free with another herd, likely making vulnerable and infecting the other cattle with tuberculosis.\(^{33}\)

While the spread of bovine tuberculosis within the state between herds was articulated above, in 1906, Wieting wrote of the threat from outside New York’s borders. Records from the office of the Department reflected that a number of cattle which were tested in an adjoining (unnamed) jurisdiction by a veterinarian and declared free of tuberculosis were re-tested after their arrival and found to be tubercular. “It is my opinion…,” Wieting wrote, “…that we can eradicate tuberculosis from this State, but the State will have to be first guarded against the bringing of tubercular cattle…”\(^{34}\)

\(^{33}\) Thirteenth Annual Report of the Commissioner of Agriculture for the Year 1902, 80.
\(^{34}\) Fourteenth Annual Report of the Commissioner of Agriculture for the Year 1906, 62-63.
By the Numbers: Bovine Tuberculosis Testing in Ontario and New York State, 1902 – 1908

It is worth considering the actual testing and eradication numbers for Ontario and New York State side-by-side in this period. It is clear that bovine tuberculosis eradication thought and practice transformed on both sides of the border. New York State tested substantially more cattle than Canada as a whole did in this period.

Reporting for bovine tuberculosis in Canada in the early 1900s was uneven, however based on the numbers that followed, the number of cattle tested was small. For New York State, in 1903 seventy-five herds were examined in the state consisting of 613 cattle. A total of 151 of these animals (around 25%) reacted positively to the tuberculin and were slaughtered, and their owners compensated. 35 There was no systematic examination of cattle in the state, as the Department simply responded to requests for testing and responded as best they could with the nine veterinary inspectors it employed. 36 These seventy-five herds were scattered across twenty-one counties and represented an incredibly small fraction of the total number of cattle in the State. The same pattern continued on to the next year. The Department was able to conduct a larger more extensive testing of 1272 cattle. Of those cattle, 267 reacted positively (21%) to the tuberculin test and were destroyed. 37

35 State of New York, Department of Agriculture, Eleventh Annual Report of the Commissioner of Agriculture for the Year 1903 (Albany: Olivar A. Quayle, 1904), 77. No mention of the amount of compensation paid out is mentioned in the report.
36 To note, the inspectors employed by the State were H.B. Ambler, W.H. Kelly, C.R. Perkins, M. Quigley, W.J. Wadsworth, H.D. Gill, A.B. Kelly, John T. Claris, and Anderson Crowforth. Veranus Moore was the State’s veterinary pathologist who ultimately judged if those cattle who tested positive were tubercular. See State of New York, Department of Agriculture, Eleventh Annual Report of the Commissioner of Agriculture for the Year 1903, 11.
The numbers for in the latter half of the decade are more revealing. For example, in 1905, New York State oversaw the slaughter of 270 reactors out of 844 tested, which resulted in the Department paying out $2593.80 in compensation.\(^{38}\) The compensation provision within the Department’s program was amended a few years later in 1908. That year, compensation amounts were raised to 80% of the appraised value for localized cases and 50% for general cases. As a result, the amount of testing the Department undertook rose significantly that year to 3520 animals, of which 1229 were condemned. In all, the Department provided $22,268.90 in compensation.\(^{39}\) For Canada, in 1907 and 1908, for example, 1527 and 1978 cattle were tested for bovine tuberculosis domestically by private veterinary practitioners who obtained tuberculin for free from the Health of Animals Branch.\(^{40}\) In 1907, 183 of those 1527 cattle reacted. This did not include those cattle that were imported or exported into Canada. That year, 435 cattle were tested for export (39 reacted), and 386 were tested on import (23 reacted).\(^{41}\) In 1908, in addition to the 1978 tested domestically, 502 cattle were tested for export (11 reacted), and 366 were tested in import (27 reacted). Those cattle that did react were either destroyed voluntarily by their owners or permanently marked to prevent their sale.\(^{42}\)

These numbers are staggering. In 1908, New York, a single state within the United States tested over 3500 cattle in one year. The entire nation of Canada only managed just under 2000. What accounts for this drastic difference? Although the programs each jurisdiction pursued


would transform in this period, what arguably accounts the most for this discrepancy is the way in which the programs were carried out. Bovine tuberculosis eradication had operated under state authority up to and including that period and was thus more equipped and more organized to carry out systematic examinations in small geographic area. On the other hand, the Health of Animals Branch was tasked with carrying out eradication across the whole country. Their resources and manpower, therefore, were stretched thinner and thus individual provinces like Ontario received less intensive intervention, compared with New York State. This assignment of authority reflected the federal Department of Agriculture’s long history of involvement in issues related to importation, to which bovine tuberculosis was directly related to in terms of how it was initially framed. In general, any activities related to movement, whether people or livestock, was the domain of the federal government and the reliance on this authority structure would persist for decades.

**Meat Inspection in Canada and the United States, 1906-1907: A Brief Overview**

The eradication of bovine tuberculosis from human populations operated alongside the intervention for the disease in cattle in this period. Indeed, protecting human populations from the disease was a central motivation for eradicating the disease in cattle. While the goals of eliminating the disease in human and livestock populations were somewhat intertwined in the nineteenth century, the twentieth century would see the paths of the two separate. While a veneer of public health rhetoric would continue to coat livestock legislation, eradicating bovine
tuberculosis in human populations would focus primarily on preventing the disease from reaching consumers in meat and milk.

The presence of bovine tuberculosis in meat was the result of the convergence of a number of factors. Most prominently, bovine tuberculosis in meat was the result of the presence of diseased or sick animals in the food system as well as changing patterns of meat distribution. These factors were amplified by a lack of standards or safety measures to prevent consumers from purchasing meat free of disease. Bovine tuberculosis would eventually be incorporated into discussions of and advocacy towards better hygiene practices for meat processors and distributors, echoing a larger set of concerns beginning in the late nineteenth century regarding urban public health.  

The presence of diseased animals in public food supplies has a long history, particularly in Britain. Keir Waddington notes, for example, that records from the medieval period in Britain demonstrate the regular presence and sale of diseased animals in London. It was in the nineteenth century, when urban areas experienced the tremendous growth associated with industrialization, that diseased animals became a more recognized part of the urban landscape.

Throughout the latter half of the nineteenth diseased meat came under increasing attention and was the subject of formal investigations by the state. Waddington notes, for

43 It is worthwhile to note that milk was by far the more common source of bovine tuberculosis infection in humans than meat, especially in Canada and the United States. Meat tends to be treated in a much more limited manner in the historiography of bovine tuberculosis and tuberculosis generally than milk. Whether this is due to lower rates of infection or that historians have not examined it more systematically in these locations, is unknown. Regardless, bovine tuberculosis and meat has been examined by some historians and is an important component of the landscape of the disease. Most notable is Keir Waddington’s study of bovine tuberculosis and meat in Great Britain. Many of the concerns he examines about bovine tuberculosis and the sale and consumption of diseased meat more generally were echoed in Canada and the United States. See Keir Waddington, The Bovine Scourge: Meat, Tuberculosis, and Public Health, 1850-1914.

example, that during 1850s and 1860s, several committees were formed and reports were authored about diseased meat and livestock. They included the Select Committee appointed to consider the Operation of the Acts for the Prevention of Infectious Diseases in Cattle (1850) and the Report from the Select Committee on the Adulteration of Food, Drink and Drugs (1856). Attention from the state was accompanied by a growing body of scientific literature devoted to the study, identification, and prevention of diseased animals in the food system. Among the many scientific studies that emerged during the period were those by Joseph Sampson Gamgee and George Fleming. Fleming’s extensive work, for example, traces several different “animal plagues” from antiquity through to the 1870s, such as rabies and foot-and-mouth disease. Fleming encouraged their study as “…some of the animal plagues are readily transmissible to man, and often induce deadly maladies in him…”

Gamgee’s observations about diseased animals were more specific than Fleming’s broad writing. Focusing on specific aspects of London’s meat distribution system, he argued that diseased meat and its implications for public health were the result of a number of intersecting factors. They included the sale of diseased (often visibly so) animals alongside healthy ones;

45 See House of Lords, “Select Committee appointed to consider the Operation of the Acts for the Prevention of Infectious Diseases in Cattle,” Sessional Papers, 1850, June 21, 1850, p.xxxii., and House of Lords, “Report from the Select Committee on the Adulteration of Food, Drink and Drugs,” Sessional Papers, 1856, p.viii. The British government commissioned several reports of this nature in this period in regards to emerging infectious diseases in livestock. Although some, such as rinderpest, were later found not to have health implications for humans, they received their share of attention. See, for example, House of Lords, The Royal Commission on the Cattle Plague, 1866.


47 Fleming, Animal Plagues, xxxii.

48 Gamgee was a British surgeon and son of Joseph Gamgee Sr., a veterinary surgeon who trained at the Edinburgh Veterinary School (now the Royal Dick School of Veterinary Medicine). Initially training as a veterinarian at the Royal Veterinary College in London, Gamgee turned to studying medicine. Well known as a surgeon, he wrote
the inadequate inspection of public markets, stables, and other holding facilities; and the general ignorance that prevailed regarding disease distribution.\textsuperscript{49} One of his observations sums up the intersection of these factors:

\begin{quote}
...I several times visited the Islington market, and found in it many diseased beasts. The most remarkable example was a row of twenty-one very small and very old emaciated cows; several of them bore unmistakable signs of old disease; one of them was moribund; it was standing in the throng, leaning almost its whole weight on the beast near it, striking out its head, panting for breath at the ratio of forty times per minute, emitting large volumes of hot vapour from the lungs; its eyes were fixed in the lean and deepened sockets...which seemed artificially stretched over and bound to a lifeless skeleton.\textsuperscript{50}
\end{quote}

Gamgee noted that, while shocking, after inquiring around the market, the conditions he observed were not uncommon or infrequent. Told by an administrator: “It is notorious about diseased beasts in the market: never a market without them; often beasts are disgraceful to look at, certainly unfit for human food: could not say why the inspector did not seize them.”\textsuperscript{51}

Furthermore, the meat and milk from these obviously diseased animals was knowingly and willingly sold.\textsuperscript{52}

\textsuperscript{49} Gamgee, \textit{The Cattle Plague and Diseased Meat}, 5. He notes that the general ignorance of farmers, dealers, and butchers prevailed despite the Royal Veterinary College’s
\textsuperscript{50} Gamgee, \textit{The Cattle Plague and Diseased Meat}, 6-7.
\textsuperscript{51} Gamgee, \textit{The Cattle Plague and Diseased Meat}, 7.
\textsuperscript{52} Gamgee, \textit{The Cattle Plague and Diseased Meat}, 8-10. Gamgee notes, for example, observing cattle carcasses being trimmed at a public market. Many of the cattle he observed undergoing this process were obviously diseased and the diseased portions were simply being cut away. Furthermore, when he sought out an official, none could be
A clearly prominent issue in Britain, diseased meat was also a major source of concern for physicians, public health advocates, and veterinarians in Canada and the United States. For example, Samuel L. Percy, a physician and professor with the New York Medical College, expressed his concerns over the presence of diseased meat and its implications for public health in 1866. Percy firstly noted that it was difficult to gauge the quantities of diseased meat that people were consuming because it had never been thoroughly studied in New York.\textsuperscript{53} Percy, after making a number of remarks on the mechanism of sickness from meat, paid significant attention to the possible sources of diseased meat in the cases he examined. Chief among them were cattle bought from distilleries and sold at public markets, in addition to old and diseased meat making its way into sausage.\textsuperscript{54} This presence of disease was often noted in newspapers as well. Writing in 1867, the \textit{New York Tribune} promoted the construction of three new abattoirs that were to supply the city with most of its meat. The \textit{Tribune} promoted the new powers granted to the State Board of Health the year before in 1866 that saw the banning of slaughterhouses from inside densely populated areas. Despite this, the newspaper reported the presence of diseased animals and poor sanitation still existed amongst many of the public markets.\textsuperscript{55}

Along with the presence of diseased animals in the food system, towards the end of the nineteenth century there was a marked change in the distribution of livestock. Meat processing and distribution had rapidly industrialized throughout the nineteenth century before its federal


\textsuperscript{54} Percy, 9, 48. Numbers of cattle were often kept at distilleries and breweries in cities, including New York and Toronto, in arrangements known as slop dairies. These stables were a common site in these facilities and were force-fed the by-products of the distilling and brewing processes (forced as it was not their natural diet and the by-products were often very hot). Consequently, they supplied meat and milk often to the poor living within cities. As will be demonstrated, slop dairies were a target of reformers in New York in the case of tubercular milk as the cattle were often in very poor health, not well cared for, and suffering from any number of infectious diseases.

\textsuperscript{55} “The New Abattoirs,” and “Public Markets and the Board of Health,” \textit{New York Tribune}, April 2, 1867. 4. The role of markets, changing authority, and meat inspection will be dealt with in Chapter II.
regulation in the United States in 1906 and Canada in 1907. For the United States, industrial meat processing and distribution began in the 1840s with Canada following in the 1890s. Before this, meat was mostly locally produced and consumed. In urban areas, cattle were slaughtered, processed and distributed in small quantities and by a relatively small number of people due to lack of adequate refrigeration. In rural areas, meat was often smoked or canned, and, again, was produced in fairly small quantities.\(^{56}\)

Railways and especially refrigeration dramatically altered the landscape of meat processing and distribution beginning in the 1860s. With refrigerated rail cars, the slaughter, processing and distribution of meat became more concentrated in large centres such as Chicago and Toronto. Once slaughtered, dressed, and refrigerated, meat could be shipped all over Canada and the United States as well as overseas more quickly and efficiently.\(^{57}\) With this centralization, however, came serious concerns about the cleanliness and adulteration of meat, as well as the sanitation of those facilities.\(^{58}\) Nowhere were these expressed more dramatically than with the publication in 1904 of Upton Sinclair’s work, *The Jungle*. His work, chronicling a Lithuanian immigrant’s struggles in a Chicago meatpacking plant, exposed a corrupt, filthy and disease-ridden meatpacking industry.\(^{59}\) The influence of Sinclair’s book was immediate. The United States Department of Agriculture commissioned two inquiries into meatpacking practices. One of these inquiries strongly disagreed with Sinclair and accused him of misrepresenting the


\(^{57}\) For a thorough treatment of the development of Chicago as a major centre of meat-packing, see William Cronon, *Nature’s Metropolis: Chicago and the Great West*. See also MacLachlan, 125-126. For a more extensive discussion of refrigeration, see Freidberg, 18-85.


industry. The second, commissioned by Theodore Roosevelt, rejected the first report and appointed individual investigators. That report, titled the Neill-Reynolds Report, largely confirmed the atrocious conditions outlined in Sinclair’s work. Ultimately, in 1906 the United States would pass the Meat Inspection and Food and Drugs Act, placing new and stricter regulations on meat inspection and for the first time inspecting meats for interstate commerce in addition to exports.  

In Canada, concern over the state of meatpacking and meat inspection also began receiving attention in the first decade of the twentieth century. The establishment of federal meat inspection in Canada lies with Dr. John G. Rutherford, Canada’s first Veterinary Director General. In 1904 he commissioned a survey of meat inspection regulations and found enormous inconsistencies between municipalities. In 1906, reacting to the publication of The Jungle, the Canadian Ministry of Agriculture furthered Rutherford’s 1904 study by commissioning a subsequent examination, consisting of a number of surprise inspection visits to meatpacking and slaughter facilities across Canada. The surprise inspections revealed various levels of sanitation. The facilities of the William Davies Company of Toronto and Montreal were both found to be clean and sanitary, as was the Harris Abattoir in Toronto. The Fowler’s Canadian Company of Hamilton, however, was found to be dirty and lacking in hygienic standards for both animals and workers. Despite the shortcomings of some meat processing facilities, Canada’s meatpacking industry was found by inspectors to be relatively sanitary. Nevertheless, federal legislation was

60 MacLachlan, 129, and Cronon, 253.
61 MacLachlan, 127. MacLachlan notes that Rutherford’s findings indicated that aside from Montreal and Toronto, no systematic inspection standards existed in Canada. Even in Montreal, he notes, inspection was irregular. In Toronto, cattle were inspected in stockyards but little inspection existed at packinghouses. For a more detailed description of Canada’s packing establishments, see W.W. Moore, Report on the Conditions of Canadian Meat Packing Houses (1906).
Addressing Bovine Tuberculosis in Human and Livestock Populations

passed in 1907 that mandated ante and post mortem inspection of meat for domestic consumption as well as the appointment of inspectors.62

**Protecting Public Health: Pasteurization and Milk Reform in Ontario and New York State**

Milk too found itself under scrutiny beginning in the late nineteenth century. Calls for its reform reflected growing concerns about disease in food supplies, urban public health, and the relationship between rural and urban environments. As the main vessel through which humans contracted bovine tuberculosis, the reform of milk practices and the protection of public health also became a part of the discussions about the eradication of the disease in cattle. Diseased milk and the threat it posed was used by those pushing for aggressive eradication in cattle. Milk reform has been the subject of a number of studies by historians such as Heather MacDougall, E. Melanie Dupuis, and Susanne Friedberg.63 For bovine tuberculosis and its relationship to milk, Jane Jenkins’ study on the politics of pasteurization in St. John, New Brunswick, provides insight. In St. John, for example, milk reform was a perilous action, threatening the positions of some elected officials. In addition, the merits of milk reform, as Jenkins demonstrates, raised considerable debate regarding the process of treating milk and how, if anything, its nutritional value was affected. Milk was a substance loaded with meaning, a pure, nourishing substance but

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one that could also be fraught with danger. Tampering with that substance, even in the interests of the health and well-being of its consumers, was a contentious issue.\textsuperscript{64}

Tuberculosis generally was a leading cause of death throughout the late nineteenth and early twentieth centuries. Bovine tuberculosis, as a form of tuberculosis that was largely consumed in infected meat and milk, presented another frightening dimension to an already frightening disease. The demographic bovine tuberculosis typically affected made it especially concerning. As the largest consumers of fresh milk, children were particularly susceptible to contracting bovine tuberculosis. Indeed the infection of children with bovine tuberculosis and a host of other diseases became an important part of the calls for the reform of milk processing and distribution in this period. The numbers of children afflicted with bovine tuberculosis has never been entirely clear; however there were a few studies that addressed the issue on both sides of the border. In Canada, a study of bovine tuberculosis in children in the city of Toronto determined that fifteen percent of tuberculosis cases in children were bovine tuberculosis.\textsuperscript{65} A further study completed in the 1910s in the United States estimated the number of bovine tuberculosis cases in children to be around twenty-seven percent.\textsuperscript{66}

Bovine tuberculosis, once ingested, often affected the intestines, bones and especially the lymph glands. Lesions would often erupt on the skin, sometimes causing permanent disfigurement.\textsuperscript{67} It is questionable though whether children with these dramatic, disfiguring injuries represented typical cases of bovine tuberculosis infection. It is much more likely that

\textsuperscript{67} See Myers, \textit{Bovine Tuberculosis Control in Man and Animals}, 57-72. p. 61 provides an illustration of skin lesions in children caused by bovine tuberculosis.
these were the most extreme cases of infection. This is not altogether uncommon in the history of disease. Often the most extreme cases of a disease, especially ones that affected children, were used to frighten people into supporting eradication efforts. This certainly seems to have been a factor in bovine tuberculosis but was also the case in a number of other diseases. For example, the March of Dimes often used individuals in iron lungs or individuals permanently disfigured by polio in its ad campaigns. These individuals certainly did exist, but as David Oshinsky points out, they represented a small proportion of those affected by the disease.\textsuperscript{68}

Pasteurization emerged as the most effective way of eliminating bovine tuberculosis from milk. Pasteurization involves heating a substance to just below its boiling point, eliminating or substantially slowing the growth of different microbial organisms. Pasteurization was named for Louis Pasteur, the French chemist and microbiologist who first developed the process. In 1864, Pasteur and Claude Bernard, a French physiologist, first tested the process. Pasteurization was first proposed for use on milk in the 1880s by Franz von Soxhlet, a German chemist. Pasteurization advocates noted that the process improved milk in two ways: first, it ensured the safety of milk for consumers by eliminating or slowing the growth of harmful bacteria. Secondly, by slowing the growth of bacteria and eliminating certain enzymes, pasteurization lengthened the shelf-life of milk, increasing its value.\textsuperscript{69}

Although pasteurization was employed as a treatment for fluid milk beginning in the nineteenth century in many Ontario communities, the process would not be mandated until 1938 under Premier Mitchell Hepburn, and even later still as a nationwide practice in Canada. The

\textsuperscript{68} See David Oshinsky, \textit{Polio: An American Story: The Crusade that Mobilized a Nation Against the 20\textsuperscript{th} Century’s Most Feared Disease} (Oxford: Oxford University Press, 2005), 64-67.

\textsuperscript{69} An example of such material used to advocate for pasteurization was J.H. Monrad’s \textit{Pasteurization and Milk Preservation, with a Chapter on Selling Milk} (Winnetka: J.H. Monrad, 1895). For more extensive information on Pasteur, see Gerald Geison, \textit{The Private Science of Louis Pasteur} (Princeton: Princeton University Press, 1995).
regulation of milk was left largely to the discretion of individual municipalities. That said, the practice varied greatly between communities. Some commonalities did exist between them, however. Toronto and Hamilton offer a window into how pasteurization was achieved.

Toronto’s movement towards pasteurization found its genesis in key individuals within its health department. By the 1880s, Toronto’s population had swelled considerably, growing by 30,000 in the 1870s alone to reach a population of 86,000. This made Toronto second only to Montreal in terms of population. With this considerable increase in population, the public health issues facing the city, such as sanitation and infectious diseases, were amplified. In response, the City appointed its first public health officer, William Canniff, in 1883.70

Canniff, and those who followed after him, paid particular attention to milk in their public health reforms. One of the first reforms involved expanding personnel. For example, prior to Canniff’s installation as Health Inspector, Toronto had only one food inspector, Robert Awde. When the Department of Health was created in 1883, Canniff assumed Awde’s responsibilities for the inspection of meat and milk. In addition to performing inspection work himself, Canniff hired additional inspectors. They were tasked with inspecting dairies and abattoirs that supplied the city. According to MacDougall, these standards employed by Canniff were derived from practices in Great Britain and the United States.71

Not surprisingly, early milk reforms in Toronto were met with opposition from producers and some citizens. As MacDougall notes, as the germ theory of disease was more commonly

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71 MacDougall, *Activists and Advocates*, 93.
understood by society, there was growing pressure for food to have scientific standards for safety. Many producers opposed these standards and inspectors often negotiated as much as they inspected in order for by-laws to be followed. The living conditions for cattle were often emphasized. Toronto’s cattle throughout the 1880s were often housed in cramped, dirty stalls and fed swill from distilleries instead of proper amounts of hay and other grasses. In order to obtain a city license to supply milk, producers had to receive a cleanliness certificate from inspectors or their milk was destroyed.

Despite the imposition of standards on Toronto’s milk supply, the personal judgments of the inspectors were still heavily relied on. Not surprisingly, some legal action occurred as a result. In 1893, this changed with the introduction of bacteriological standards under the leadership of Charles Sheard. Under Sheard, the Department of Health not only inspected farms and processing facilities that supplied Toronto’s milk, but also collected samples of milk for bacteriological analysis. Under Sheard, the bacteriological laboratory for the City of Toronto concluded that a large percentage of Toronto’s milk contained tuberculosis bacteria and/or was adulterated with water, chalk, etc. By 1909, Sheard’s department was convinced that the current standards were not enough and that more stringent measures were needed, chief among them pasteurization. These sentiments echoed those of the first Milk Commission organized by the Canadian Medical Association in 1908. The federal government was pressured to pass federal pasteurization legislation.

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72 MacDougall, *Activists and Advocates*, 93.
Pasteurization in Toronto found its most vocal supporter in Charles Hastings, who became medical officer after Sheard’s resignation in 1910. Although federal legislation was not passed, the Ontario Government did pass the Milk Act in 1911. Hastings expanded his staff and appointed a number of veterinary inspectors to oversee the nearly 2500 farms that supplied Toronto’s milk. Hastings also capitalized on public education by beginning the Health Bulletin in 1911 that educated the public on the finer points of pasteurization and the cleanest, most sanitary dairies from which to buy milk in the city.

Despite the opposition to pasteurization from a number of milk producers, citing the increase in costs and potential loss of nutritional value of milk from pasteurization, compulsory pasteurization was passed in Toronto beginning in 1914. Toronto would be the first city to make pasteurization of milk compulsory but a number of other Canadian cities were also pursuing the practice. Hamilton, Ontario, for example, followed closely behind Toronto in making pasteurization compulsory.

In 1890, Toronto was the first city in North America to establish a provincial laboratory in which milk testing began in 1913. In addition to testing milk, it also performed tuberculin tests for cattle supplying milk to the city. Although the Milk Act of 1911 contained within it guidelines for the cleanliness of cattle and their stalls, tuberculin tests were not required. Toronto officials, on the other hand, was performing these tests on their own initiative. Hamilton, the

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76 It is worth noting that Hastings, like Veterinary Director General John G. Rutherford, had a deeply personal stake in the elimination of disease from food as his daughter had died from typhoid contracted from contaminated milk. See MacDougall, *Activists and Advocates*, 97.


79 MacDougall, *Activists and Advocates*, 102-104. MacDougall notes that the chief complaint of Toronto’s milk producers was the cost associated with integrating pasteurization equipment into their operations. Hastings met with producers and agreed on a suspension of prosecutions for a period of six months to allow producers to install new equipment. The protests subsided. See MacDougall, *Activists and Advocates*, 104.
second city in Ontario to mandate pasteurization, did not have facilities or provisions like these. Nevertheless, over the course of a number of years, Hamilton achieved the goal of mandating pasteurization. 80

As in Toronto, public health concerns drove pasteurization in Hamilton. In 1905, bovine tuberculosis and pasteurization became an object of discussion for the city’s Board of Health by its Medical Officer, James Roberts. He noted the inadequacies in dairy quality generally, and advocated for more stringent regulations regarding sanitary conditions for cattle and the distribution of milk. He emphasized that whatever improvements were made must be done so in a way that were enforceable. 81

With the 1910 Ontario Public Health Act, inspectors were given greater authority for inspecting milk to ensure it was free of tuberculosis. In Hamilton at this time, according to Jessica Campbell, the city Board of Health began to enforce more stringent standards on dairy production and distribution. This culminated in 1916 when the Board of Health called for all milk in the city of Hamilton to be pasteurized. However, despite its advocacy for pasteurization, Hamilton City Council did not implement or even consider the Board’s request. Finally, in 1923, the Hamilton’s Board of Health ruled that all milk sold within the City of Hamilton had to be pasteurized. The Board of Health had to wait five more years, however, to be granted the authority to enforce this rule, as Hamilton’s City Council did not create the by-law making it an enforceable measure until 1928. 82

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81 Campbell, 131-132.
82 Campbell, 132.
Communities in New York State experienced a number of similar challenges to Canada in ensuring safe milk supplies and implementing pasteurization. As was the case with Ontario, public health was at the centre of pasteurization efforts in New York State. As America’s largest city, New York experienced not only tremendous population growth in the late nineteenth and early twentieth centuries, but it also experienced the accompanying challenges of the growth of the industrial food system. The argument could be made that New York City is too exceptional and not representative of how communities overall dealt with disease in milk, however in exploring New York, arguably the challenges faced in addressing disease in milk are made clearer given the magnitude of the problem as well as the magnitude of the response.

Throughout the nineteenth and early twentieth centuries, New York City experienced a terrific surge in population growth. As a result of this growth, New York City then faced a number of challenges in feeding its population. As DuPuis points out, this was a challenge that faced a number of America’s larger, densely urban cities in this period such as Boston and Philadelphia, in addition to New York. Over time, with development in rail and road transportation, New York City developed a large network of dairy farms (both in and out of state), dairies, and wagons. For much of the nineteenth century, however, the city relied on dairy production within its confines to supply the public with milk. These dairies would decrease over time because of developments in rail and road transportation, but these operations persisted well into the early 1900s and would be a focal point in milk reform and pasteurization.

Overall it was the conditions under which milk was produced and the embrace of bacteriology that would motivate milk reforms and pasteurization. By the 1850s, roughly seventy percent of the milk consumed in the City of New York was produced within its limits. The most

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notorious of this milk came from distilleries. Like abattoirs and meat packing facilities, distilleries looked for ways to maximize profits by finding uses for the by-products of their processes. For distilleries, large amounts of grain were used to produce alcohol, the remains of which were expensive to transport and dispose of outside of the city. A use for spent grain or “swill” was to feed it to cattle. Thus, the “swill” dairy was born. These dairies were often attached to distilleries and the milk produced in these facilities was sold to people in the community, particularly in the case of New York, to the poor.\(^84\)

The conditions in swill dairies were often extremely unsanitary. These were unregulated facilities that contained often cramped, derelict stalls. The cattle within these dairies often did not receive regular veterinary care and many suffered from a host of diseases. Furthermore, these cattle were not accustomed to consuming leftover grain from the distilling process, which was often quite hot. The animals, more accustomed to consuming grass and other grains, were often starved until they were forced to eat the spent grain or hops out of hunger.\(^85\) Swill dairies were very visible and when reformers began to look at milk as a cause of disease in cities, particularly as they affected children, these dairies were held up as examples of disease and unscrupulous practices. This notion of diseased environments also extended to rural farm environments. DuPuis notes that unsanitary barns were often cited in literature about diseased milk and the need for improved rural farm production environments, along with the urban production and processing and distribution of milk.\(^86\)

Calls for state intervention in the production, processing and distribution of milk in New York’s cities were eventually answered. For example, a 1905/06 survey of the milk supplies of

\(^{84}\) DuPuis, 67.
\(^{85}\) Dupuis, 67.
\(^{86}\) DuPuis, 71-73.
two hundred American cities and towns noted that the approximately 333,856 gallons of milk consumed daily in the city were supplied by approximately 12,000 stores and 4000 wagons.\textsuperscript{87} By the first decade of the twentieth century, most New York cities had some kind of milk supply legislation. They followed a general pattern, as noted by the Commissioner of Agriculture, Charles Wieting. Firstly, the quality of milk was strictly supervised. The sale of adulterated milk was prohibited and was defined as any milk over fifteen days old, from swill dairies, or from cattle kept in unsanitary, crowded or unhealthy conditions. The milk was not to be watered down, have any additives, or preservatives, and the vessels in which they were kept were required to be clean and kept in sanitary rooms. These provisions of course required enforcement and, by 1906, the State, which had been divided into ten districts for agricultural administration, had an assistant commissioner named to each division. Among their tasks was to enforce milk regulations, though Wieting notes that this enforcement was often irregular.\textsuperscript{88}

While milk in New York was subject to a number of laws, it is unclear how much of it was pasteurized. The biggest advocate for the pasteurization of milk in New York was Nathan Straus, the owner of Macy’s department store. Straus’ interest in pasteurization beginning in the 1890s stemmed from his philanthropic work with New York’s poor. He observed the conditions of the swill dairies within the city and argued in favour of pasteurizing all milk for sale in the city in order to protect public health. New York ultimately mandated pasteurization in 1912.\textsuperscript{89} Pasteurization would become a widespread practice in the United States by the 1950s.

\textsuperscript{88} Alvord and Pearson, 123-124.
\textsuperscript{89} DuPuis, 74.
Milk reform did not go without criticism. Milk producers/dealers protested pasteurization due to the costs added to their operations, and others questioned whether or not the pasteurization process affected the nutritional value of milk. These concerns and objections were met with a wave of material on the merits of pasteurization and represented a concerted effort to reassure and educate concerned individuals. For example, where the influence of pasteurization on the nutritional value of milk was concerned, the United States Department of Agriculture (USDA) produced literature detailing the pasteurization process and the chemical changes to milk brought about during the process.\textsuperscript{90} Based on a series of experiments designed to measure the changing chemical composition of milk as it was pasteurized, the USDA concluded that no significant changes in the nutritional value of milk occurred.\textsuperscript{91}

There were a number of concerns expressed about pasteurization, however. In his landmark tome, \textit{The Milk Question}, the noted epidemiologist Milton Rosneau questioned a number of aspects of pasteurized milk. His concerns and criticisms fall broadly into two categories: Firstly, the effect of pasteurization on milk and the health of consumers; and, second, what treatment solely for milk meant for the rest of the system that produced it. Rosneau raised concerns about what the pasteurization process did to the milk itself, noting that while the process did not change the nutritional value of milk, there existed some debate about the temperatures at which certain bacteria were eliminated and whether the process actually safeguarded the milk in the way it was promoted to. Furthermore, he noted that milk dealers and farmers whose primary concern when pasteurizing was to prolong the longevity of the milk (a beneficial property of the process) were often imprecise about monitoring and ensuring that certain temperatures and

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\item \textsuperscript{91} Rupp, 15.
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procedures were followed. In terms of consumers, in particular children, he noted that cases of scurvy and rickets had been observed in infants fed with pasteurized cow’s milk, and that children fed on pasteurized milk as opposed to breast milk typically lost weight.\textsuperscript{92}

Rosneau’s most interesting observations of pasteurization revolved around the influence of process on the entire system of milk production. By focusing attention and treatment entirely on milk itself, he asserted that authorities ran the risk of ignoring other critical aspects of disease:

One of the chief objections to pasteurization is that it promotes carelessness and discourages the efforts to produce clean milk. It is believed that the general adoption of pasteurization will set back the clean milk movement at the source of supply and even encourage dirty habits. It will cause the farmer and those who handle the milk to believe that it is unnecessary to be quite so particular, for the dirt that gets into the milk is going to be cooked and made harmless.\textsuperscript{93}

Rosneau’s writing highlights the immense logistical challenges that came with attempting to ensure milk safety. Not only was milk diseased, but consequently the animals supplying that milk were diseased too. Ensuring the safety of milk in the eyes of individuals like Rosneau meant addressing disease at all levels of production. Treating the final product did not address the larger problem of disease. To broadly address the issues of disease in milk supplies, another technique was pursued at the same time as pasteurization to prevent bovine tuberculosis and other diseases from reaching consumers. It focused less on the milk itself but more on the control of the production and handling of milk. This was known as the “certified milk” movement.

\textsuperscript{92} Milton J. Rosneau, \textit{The Milk Question} (Boston: Houghton Mifflin Co., 1912), 180-228. Rosneau extensively discusses his arguments on the merits and criticisms of pasteurization and cites a number of studies from within the United States and Europe. Friedberg briefly highlights these debates in her book \textit{Fresh: A Perishable History}. See pp.208-218.

\textsuperscript{93} Rosneau, 226.
The origins of the certified milk movement lay with a New Jersey physician named Henry Coit. Certified milk was raw milk, often argued to be purer and more healthful, whose production, processing and distribution was closely supervised and so prevented diseased, manipulated milk from entering the consumer market. Several publications outlined the shape and function of this supervision. At the heart of the operation were medical milk commissions, the bodies tasked with overseeing and approving certified milk. These bodies varied somewhat in their composition, but there were some commonalities.

Medical milk commissions were made up primarily of physicians. The first medical milk commission in the United States, formed by Coit in New Jersey in 1893, was made up of three physicians who “…themselves supervise the production of milk and thus be perfectly sure of its purity.” After locating a dairy in Essex County, New Jersey, that already adhered to high standards of hygiene, the commission obtained the services of three specialists. The first was a chemist to examine the milk for required solids and to ensure it was free of foreign matter. The second was a bacteriologist to ensure that disease-causing bacteria were not present in the milk. Finally, the commission obtained the services of a veterinarian to ensure that the cows supplying milk to the dairy were in good health. Each of these three submitted reports to the commission and, when satisfied, the commission then granted a certification for the milk. That certification could be advertised by the dairy and was sometimes even stamped on bottles.

Canada’s medical milk commission looked much the same as the first American commission in New Jersey. Its beginnings in 1908 reflected a desire on the part of the medical community to

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95 Clarence E. Lane, *Medical Milk Commissions and the Production of Certified Milk in the United States*, 8.
investigate the conditions under which milk was produced and the quality and safety of the milk available for consumers. Shortly after the creation of the Canadian Medical Milk Commission in 1908, an Ontario Milk Commission was appointed by the Ontario Legislature in 1909 to investigate the safety and quality of milk in the province. The Commission was tasked with investigating the current safety and sanitary conditions of milk production, processing, and distribution in the province. They were then asked to study how other Canadian communities as well as other nations ensured safety and sanitation in their milk supplies and to make recommendations for improvements in Ontario.

The implications of the disease for the dairy industry in Ontario were significant. By 1909, Ontario’s dairy industry was a significant contributor to the provincial economy. In their first report, the commission noted that the milk produced from the roughly 1.2 million cattle in Ontario was valued at roughly $40,000,000, and the products products of milk, butter and cheese contributed just over $15 million to Ontario’s economy. The Ontario Medical Milk Commission attempted to address the patchwork of regulations that governed the wide landscape of milk production and distribution. To give a sense of this wide landscape, it is worth briefly considering Ontario in general. Ontario’s dairy industry, like most political jurisdictions, was provincially controlled and the Province granted authority to local Boards of Health to regulate milk supplies. Under the power given to these Boards of Health, “…all milch cows and cow byres and all dairies or other places in which milk is sold or kept for general use, and all cheese factories or creameries shall be subject to regular inspection under the direction of the Board.” In addition, Boards of Health were granted the authority to require and conduct tuberculin tests

96 Report of the Milk Commission, Appointed to Enquire into the Production, Care and Distribution of Milk, (Toronto: L.K. Cameron, 1910), 5-7.
97 Report of the Milk Commission, Appointed to Enquire into the Production, Care and Distribution of Milk, 9.
on cattle. Provisions for safety also extended to the prosecution of those who adulterated milk. Although no regulations existed in Ontario by 1908 denoting minimum fat content in milk and butter, those who purposely adulterated milk by diluting it with water or introducing additives like chalk could be prosecuted by the Board of Health.  

Although laws and authority were given by the province to local Boards of Health in regard to the safety of their milk supplies, it was ultimately up to those communities to pass by-laws related to milk and enforce them. Not surprisingly, many communities, large and small, found this difficult. The commission, over the course of a year after its formation, visited a number of Ontario communities and reported on their milk regulatory and safety plans. Although farms, cattle, distribution centres, and even the vessels containing milk were examined, they were done so fairly sparsely given the lack of manpower needed to undertake such a large task. Furthermore, not all milk made it to consumers through inspected milk dealers. For example, milk was often sold in bulk out of wagons and in corner stores, the sanitary conditions and cold storage of which was not always ideal. In addition, hospitals often had their milk delivered to their doors straight from a producer, meaning it did not always pass through “…the usual channels of distribution,” and therefore, inspection.  

Alongside the Ontario Medical Milk Commission came the establishment of a number of local medical milk commissions within cities. The first to establish their own commissions were Toronto, Hamilton and Ottawa in 1908. In addition the Ontario Milk Commission stepped in to help identify the inadequacies and challenges in municipal and community management of milk

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98 Report of the Milk Commission, Appointed to Enquire into the Production, Care and Distribution of Milk, 9-11.
99 Report of the Milk Commission, Appointed to Enquire into the Production, Care and Distribution of Milk, 17.
supplies and recommended how the Province might move forward in ensuring milk safety for certified milk. At the end of its report in 1910, for example, a number of recommendations were made to enhance the safety of certified milk. They fit broadly into two categories. The first were aimed at achieving consistency in standards and certification across the province including the creation of one piece of provincial legislation to govern certified milk instead relying on the discretion of individual communities. Furthermore, the Commission, noting that by the time of its reports’ publication only a few municipalities had adopted a certified milk plan, proposed the creation of a scorecard system to evaluate the cleanliness, storage conditions, etc, for farms as well as dairy facilities. In addition, the commission proposed a consistent set of inspection and cleanliness standards for distributors and stores who sold milk.¹⁰¹ In all, these proposals would serve as a guide for municipalities who had yet to begin certified milk programs.

“The Tuberculous Cow Must Go”¹⁰² was a striking component of the commissioner’s recommendations. Not limiting their recommendations to the inspection and safety standards of fluid milk, they provided a set of recommendations for addressing bovine tuberculosis in cattle. These recommendations were not necessarily new, but they did emphasize the connection between tubercular cattle and disease in humans. It was the belief of the commission that if milk supplies and the milk-drinking public were going to be protected, the disease in domestic cattle herds needed to be more systematically addressed. The creation and implementation of inspection, standards for cleanliness, etc, did not fully address the problem if the source of the disease, tubercular cattle, went unchecked. Moreover, it created a false sense of security that tuberculosis could not make it to consumers. Although noting that veterinarians posited that

¹⁰¹ See Report of the Milk Commission, Appointed to Enquire into the Production, Care and Distribution of Milk, pp. 116-120, 128-129.
¹⁰² See Report of the Milk Commission, Appointed to Enquire into the Production, Care and Distribution of Milk, 122.
perhaps 1-2% of tubercular cattle had the disease in their udders, it was impossible to predict how the disease would progress in cattle with lesions in other parts of their body. In all, systematically addressing the disease from source to product made good financial sense. The commissioners noted that financial losses from tubercular cattle were unclear and some uncertainty still existed about the nature of bovine tuberculosis and its ability to infect humans in milk; however they argued that the time had come to address the disease and protect public health as well as Ontario’s herds.  

The commission was quite cautious in its recommendations for moving forward with policy. Believing that municipalities were the best and most appropriate authority to undertake this work, the commission suggested a plan of cattle testing in addition to thorough inspection and supervision of fluid milk. Noting the opposition many communities experienced in testing dairy herds from 1896 onwards, it suggested a modest program of cattle inspection that focused on the most diseased in herds supplying milk. Those who had obvious tubercular udders or showed the most obvious clinical symptoms of the disease should be removed from the herd and destroyed. This system of supervision, in their opinion, would result in “…reasonably clean milk…” The other option was for municipalities to pursue pasteurization, but they noted a lack of sentiment in communities for it and it being not an effective alternative to the inspection of farms and the handling of milk in general on its path to consumers.

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103 See Report of the Milk Commission, Appointed to Enquire into the Production, Care and Distribution of Milk, 122-125.
104 See Report of the Milk Commission, Appointed to Enquire into the Production, Care and Distribution of Milk, 127.
105 See Report of the Milk Commission, Appointed to Enquire into the Production, Care and Distribution of Milk, 132.
106 See Report of the Milk Commission, Appointed to Enquire into the Production, Care and Distribution of Milk, 131-132.
Much more could be said regarding the ongoing process of milk reform and pasteurization in this period, but for the purposes of this examination, it is worth turning more specifically to the reform of dairy cattle. It is clear that by the early 1910s there was a clear and largely accepted connection between tuberculosis in cattle and the disease in humans through the ingestion of infected milk. The report of the Ontario’s Milk Commission in 1910 highlighted the provincial and municipal authority over testing herds supplying milk, but that testing was up to their discretion as to the form and execution of that testing and, as a result, it was done somewhat unevenly and to varying degree of success. Furthermore, the suggestions by the Ontario Milk Commission for the supervision of dairy herds were modest at best, suggesting that municipalities focus on the most obviously diseased cattle in order to ensure a relatively safe milk supply.

**Conclusion: A Disease Divided**

Bovine tuberculosis in the nineteenth century was generally treated as one disease, with study and intervention considering both its human and agricultural presence simultaneously. The first decade of the twentieth century saw bovine tuberculosis transform more clearly into two distinguishable diseases with their own distinct interventions. For livestock, this period saw some attention turn towards addressing bovine tuberculosis in domestic cattle in addition to cattle involved in the international livestock trade. For public health, intervention would come in the form of treating the products through which the disease was contracted, meat and milk, as well as controlling the manner in which both commodities were processed and distributed. For both
‘versions’ of the disease, this period further reflected the marriage of the science of bacteriology and the growing power of the state in the areas of public health and the livestock health.

The establishment of meat and milk inspection practices, including pasteurization, beginning in the late nineteenth century essentially eliminated the zoonotic threat of bovine tuberculosis to humans. In establishing these practices, not only was the public increasingly protected from exposure to infectious diseases like bovine tuberculosis, but these practices also reflected a tremendous growth in the power of the state. The late nineteenth and early twentieth centuries witnessed a tremendous expansion and industrialization of the food system in Canada, the United States, and abroad. This system grew with little oversight to ensure health and sanitation and the emergence of diseases like bovine tuberculosis in meat and milk were a direct consequence. To address this circumstance, both sides of the border instituted legislation that not only scientifically identified disease, but laid out the responsibilities and accountability for the state, producers, and distributors to ensure the public’s health. These practices unfolded at roughly the same time and in a very similar manner in both Ontario and New York State, reflecting a common scientific understanding of the disease and common bureaucratic structures.

For meat, given its centralized processing and distribution by the early twentieth century, instituting quality and safety standards was straightforward. For milk, the process took different forms. Although pasteurization would ultimately serve as the most efficient method to prevent bovine tuberculosis from infecting humans, its adoption was gradual. Many communities that did not institute pasteurization implemented safety and sanitation measures in other ways, such as certified milk. The public health concerns of tubercular meat and milk would continue to be held up as a critical motivation for the eradication of the disease in cattle, but its role in the actual intervention with cattle would be minimal, if at all.
For livestock, this period of bovine tuberculosis eradication work reflected distinct approaches taken in Ontario and New York State. The authority for bovine tuberculosis eradication continued to rest with the state in New York. The transfer of bovine tuberculosis work from the Board of Health to the Department of Agriculture was arguably the most significant development of the period. Although the policy pursued by the department was not radically different than what preceded it, the transfer of authority to the department in 1902 reinforced the position of bovine tuberculosis as a livestock disease. The transfer of authority saw the expansion of veterinary authority in the state. Veterinarians would be built in this period into an established body of authority within the state through the hundreds of tuberculin tests they were appointed to perform. Their work in this period at the state level would have a significant influence on future eradication programs, particularly the State-Federal Cooperative Program in 1917.

For Ontario, eradication work remained a federal activity. While the existence of bovine tuberculosis in domestic herds received more attention in this period, the federal government remained primarily focused on preventing the introduction of the disease from abroad by focusing on imported livestock, and preventing the disease from leaving Canada through the testing of exports. With authority and resources more centralized in this period than that in the United States, far less eradication work was done in Ontario compared to New York State. This way that eradication work was done not just in Ontario, but the rest of Canada, clearly by this period meant that the disease was addressed far more slowly. This would ultimately result in Canada taking far longer to eradicate the disease than other countries, notably the United States.

The 1910s would see yet another set of transformations in the eradication of bovine tuberculosis. The distinct eradication efforts in both Canada and the United States in the
nineteenth and first decade of the twentieth century had very clear benefits and drawbacks. The 1910s would see a rethinking of eradication work generally. A significant contribution to this rethinking was a commission first held in 1910 called the International Commission on the Control of Bovine Tuberculosis. The commission would compare and contrast the eradication programs of Canada and the United States to that date and formulate a set of practices that, if adopted, would set a roadmap for the ultimate eradication of the disease. The commission would also help to redefine what eradication meant, an idea that had already begun to germinate in the first decade of the twentieth century. There is a good reason why the commission was titled the International Commission on the Control of Bovine Tuberculosis. Eradication would come to be redefined with greater clarity in the 1910s as reducing the level of disease to a level where it could be effectively managed, rather than eradicated.
Chapter V:

Practicing Disease Control, Transnational Thought, and New Directions in Bovine Tuberculosis Eradication, 1909-1917

Confidence and optimism abounded when bovine tuberculosis eradication work got underway in both Canada and the United States in the 1890s. In 1892, for example, University of Pennsylvania veterinary researcher Dr. Leonard Pearson wrote: “The disease can be checked, and some day measures for its suppression will surely be inaugurated. By commencing now, much expense, much misery and suffering can be avoided.”¹ In Canada in 1899, physician Dr. J. George Adami proclaimed: “…I believe that this [eradication] can be done and can be done at a cost so small as to be incommensurate with the accruing benefit.”² The confidence and optimism expressed by Pearson and Adami was, however, tempered by a growing realization by their contemporaries that bovine tuberculosis was a disease that would take a considerable amount of time, effort and expense to eradicate. In 1894, Vermont tuberculosis researchers J.L. Hills and F.A. Rich wrote: “The complete eradication of tuberculosis, its ‘stamping out’ is not a work of

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¹ See Myers, *Man’s Greatest Victory Over Tuberculosis*, 261. Pearson, who taught and researched at the University of Pennsylvania, was the first to use tuberculin in North America, beginning testing in the State in 1891.

years, but of decades, perhaps centuries…if we cannot eradicate tuberculosis in the near future, let us do what we can in that direction.”

Hills and Rich’s words would prove particularly insightful, for by the first decade of the twentieth century attitudes towards eradication had shifted. Veranus Moore wrote in 1907 that the goal of legislation should be to reduce the level of bovine tuberculosis rather than eradicate it. This shift in thinking would be reflected in new approaches to legislation on both sides of the border. The International Commission for the Control of Bovine Tuberculosis (ICCBT) was central to this shift. The ICCBT, a collection of government and public health officials, veterinarians, and members of the livestock industry met several times over the course of 1908 to discuss and draft plans for a new and final vision of bovine tuberculosis eradication for both Canada and the United States. This body was influential and indeed, in the late 1910s, a new vision of eradication was formulated in both Canada and the United States, embracing many of the recommendations of the ICCBT.

The ICCBT and the legislation it influenced was a pivotal moment in the history of bovine tuberculosis in North America. The ICCBT defined a set of best policies and practices, which did not reflect a radical re-imagining of disease practices, but did re-imagine the role of the state. For the United States, the federal government found a way to collaborate with individual states through compensation and strong economic incentives. This happened more swiftly in the United States than in Canada, where the role of the state changed very little. Indeed, although Canada would implement new legislation in the years that followed the ICCBT, the federal government would continue to operate its existing programs. The result was a hodgepodge of new and old

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programs and they collectively took longer to carry out than the newer, streamlined American programs.

The story of the ICCBT also reveals a tremendous story of power and professionalization. The growth of the veterinary profession and its increasing role in the service of the state have been illustrated throughout this examination. However, it is the ICCBT that truly illustrates the tremendous power and influence of the veterinary profession in the management of animal disease in this period. Here, through the ICCBT and in its wake, was a non-governmental professional association – the American Veterinary Medical Association (AVMA) – that developed a set of policies and practices that were broadly adopted as state policy. Furthermore, the state conferred tremendous power on the veterinary profession by giving it the sole power to test herds and provide accreditation. This power went beyond veterinarians who were employed by the state, and included many veterinarians in private practice. This was a tremendous boost to the profession’s civil authority and furthered the profession’s cause to marginalize the unlicensed untrained individuals practicing in this period.

*New Directions in the Eradication of Bovine Tuberculosis: The International Commission for the Control of Bovine Tuberculosis*

By 1909 bovine tuberculosis remained an endemic disease in the national herds of both Canada and the United States, despite nearly twenty years of intervention. While these various initiatives had made some headway with the disease, it was increasingly clear to veterinary, state, and federal authorities on both sides of the border that much more complex, comprehensive
initiatives would have to be formulated and implemented in order for bovine tuberculosis to be eradicated with the same success as pleuropneumonia, rinderpest, or hog cholera.

Bovine tuberculosis remained a disease largely defined as a livestock disease with serious public health implications, not a serious disease of livestock alone. By 1909, this way of defining the disease would give way to different thinking. With the introduction of pasteurization for dairy products and the inspection of meat for disease, the zoonotic element of bovine tuberculosis was essentially eliminated. Attention was then turned more fully to the seriousness of the disease to the livestock industry and within the next thirty years the disease was slowly eliminated through the cull of infected animals and various control programs were put in place to identify any new infections. The International Commission on the Control of Bovine Tuberculosis (ICCBT) would define the final eradication efforts of both Canada and the United States.

The ICCBT demonstrated, particularly in the case of the United States, that the role of the state needed to operate in a more centralized fashion. The ICCBT also demonstrated the increasing micromanagement of disease control by the state. In addition to overseeing the testing of herds, the state became increasingly involved in the sanitation of facilities from farms to factories, the transit of cattle, the events at which cattle were congregated, and the sale of cattle.

In 1909 the American Veterinary Medical Association (AVMA) appointed the International Commission on Bovine Tuberculosis to study the problem of bovine tuberculosis in Canada and the United States. The membership of the ICCBT included prominent figures in federal and state/provincial government, veterinary scientists, public health officials, and members of the
meat packing industry.\textsuperscript{5} They were given one year to study the problem of bovine tuberculosis and provide the AVMA with a set of policy recommendations for the Canadian and American governments. These recommendations were based on a careful comparative study of the policy history of both Canada and the United States as well as the identification of locations or situations where tubercular cattle had the opportunity to pass the disease to other animals not previously legislated or even considered.\textsuperscript{6} In doing this work, the ICCBT created a potential guide for the eradication of bovine tuberculosis. In the years that followed the ICCBT, both nations created new policy that was more harmonized and reflected many of the recommendations made by the ICCBT. The disease was ultimately declared eradicated in both nations in the 1940s.

In order to keep the work of the ICCBT manageable and keep within the one-year time frame, it was decided to split the work up and create four committees, each with a specific aspect of the disease to study and recommend legislation for. The committees were: Legislation and Education; Location of Tuberculosis; Dissemination of Tuberculosis; and Disposition of Tuberculous Animals. Committee members sifted through years of eradication work on both sides of the border, communicated regularly with each other, and reported their progress and discussed their findings at each of the four meetings held between the initial formation of the ICCBT and the submission of their final report to the AVMA in 1910.

\textsuperscript{5} The membership of the ICCBT included: Dr. J.G. Rutherford, Dr. M.H. Reynolds, Sen. W.C. Edwards, J.J. Ferguson, J.W. Flavelle, Hon. W.D. Hoard, Dr. C.A. Hodgetts, Dr. J.N. Hurty, Dr. J.R. Mohler, Dr. V.A. Moore, Dr. M.P. Ravenel, Dr. E.C. Schroeder, T.W. Tomlinson, Dr. F. Torrance.

\textsuperscript{6} International Commission on the Control of Bovine Tuberculosis. \textit{International Commission on the Control of Bovine Tuberculosis First Meeting at Buffalo, New York, Dec 13-14, 1909.} Veranus A Moore Paper, #24-1-119. Division of Rare and Manuscript Collections, Cornell University Library.
The American Veterinary Medical Association

The ICCBT was appointed by the American Veterinary Medical Association in 1909. That the AVMA, a private, non-governmental professional organization developed a set of policies and practices that were adopted as state policy reflects the significant authority of that body. The AVMA was founded as the United States Veterinary Medical Association (USVMA) in 1863 by a group of self-taught and European-trained veterinarians. Initially the association encompassed a cluster of states in the American east but over time expanded to the rest of the country. The group was rechristened the AVMA in 1898. The AVMA was founded as a professional organization to govern the veterinary profession and to provide guidance to individual states that licensed veterinarians. In doing so, the AVMA worked to separate trained veterinarians from unlicensed practitioners or “quacks” who practiced throughout the nineteenth century and well into the twentieth. Along the way, their mandate widened to include reporting on research, professional matters such as the standards and licensing of veterinary colleges, and increasing attention on infectious diseases from across the United States as well as internationally.

The membership of the AVMA was international in nature from very early in its history. Canadians were involved in the AVMA as early as the 1870s, and which reflected the close connection of the veterinary professions of both nations. Several Canadians have served in positions of leadership in the AVMA. For example, John G. Rutherford served as president of

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7 Robert H. Dunlop and David J. Williams, *Veterinary Medicine: An Illustrated History* (Mosby, 1995), 656-657. The initial states the AVMA encompassed were New York, Massachusetts, Pennsylvania, New Jersey, Delaware, Maine, and Ohio.

the AVMA in 1908-09, during which time he served as Chairman of the ICCBT.\(^9\) Canada, whose veterinary profession was comparatively small, was organized on a provincial level for most of its history and began its own national organization, the Canadian Veterinary Medical Association in 1948. However, the AVMA continues to exert its influence on the shape of veterinary medicine internationally. For example, the AVMA is tasked with accrediting veterinary colleges in the United States as well as Canada, Australia, Ireland, England, and Mexico.

Rutherford’s tenure as President of the AVMA and Chairman of the ICCBT reflected the close relationship between the Canadian and American veterinary professions. For bovine tuberculosis, more importantly, Rutherford’s position provided the opportunity for collaboration and intervention on an \textit{international} level. This was a pivotal moment in the history of the bovine tuberculosis in North America. As a result of this commission and the collaboration that occurred through it, the shape of bovine tuberculosis intervention shifted in the years that followed for both Canada and the United States. A selection of key resolutions or insights from the ICCBT’s final report sheds light on how the veterinary community envisioned the effective control and management of the disease:

\begin{quote}
\textbf{The Tuberculin Test}
\end{quote}

One of the most significant recommendations or insights that came out of the ICCBT was the importance the commission placed on the tuberculin test as a diagnostic tool for bovine tuberculosis.

tuberculosis. Their insights served more to solidify and clarify the opinion of the veterinary community about the substance rather than produce new or novel information about it. In total, three of the fifteen resolutions produced by the commission specifically focused on tuberculin and fall broadly into three categories: the strengths of tuberculin and its diagnostic authority, the limitations of tuberculin, and the control of its use.

Despite praise for tuberculin, its limitations were well-documented in the commission’s final report. Tuberculosis in a period of incubation or in an arrested state of progress might not produce a reaction to tuberculin, or even when the disease was generalized (in such a rare case, the commission noted, a physical examination would suffice).\(^\text{10}\) In outlining the limitations of tuberculin, however, the commission was not proclaiming that it had shortcomings. In fact it was doing quite the opposite. Tuberculin was a substance that worked best under a certain set of circumstances. Should those ideal circumstances not be met and the test be affected by them, the veterinary community could look to the commission’s recommendations as a source of support for re-testing or communicating with livestock owners.

Tuberculin may have had limitations, but they were heavily outweighed by its benefits. Of its use, the ICCBT proclaimed: “…tuberculin, properly used, is an accurate and reliable diagnostic agent for the detection of active tuberculosis.”\(^\text{11}\) The Disposition Committee, the sub-committee of the ICCBT primarily focused on tuberculin, put forth this view. Some held the opinion that regardless of value or the severity of infection, once an animal was identified as having bovine tuberculosis it should be immediately destroyed, ensuring the complete

\(^{10}\) International Commission on the Control of Bovine Tuberculosis, Report of the International Commission on the Control of Bovine Tuberculosis, American Veterinary Medical Association, 47\textsuperscript{th} Annual Report (September, 1910) 7-8.

\(^{11}\) Report of the International Commission on the Control of Bovine Tuberculosis, 7.
destruction of the disease. However, to destroy every animal with bovine tuberculosis would have been logistically impossible, not to mention greatly diminish the livestock populations of both Canada and the United States. The destruction of an owner's livestock was a delicate political issue in this period, especially given the outright hostility many had towards the tuberculin test as well as the intervention of government to destroy a disease for which many of their animals seemingly presented no symptoms.

With the logistical and political issues of eradication keenly in mind, the commission supported the use of tuberculin as the best means of identifying suspect animals, but that the methods adopted by either nation for eradicating the disease should be guided almost on a case-by-case basis. Eradication should take into account, it argued, the extent of tuberculosis in the herd, the condition of the infected animals, the hygienic conditions of the farm, and the owner's knowledge of the disease and his willingness to co-operate.

A final insight about tuberculin focused on who should be qualified to administer it. In their final report, the ICCBT recommended: “…the passage of legislation that will prevent the sale of, distribution or use of tuberculin by any persons other than those acting with the full knowledge, or under the direction, of official authorities.” This was in no doubt connected to tuberculin’s problematic history. It has been well-documented throughout this dissertation that the transformation of tuberculin into a diagnostic agent was less than straightforward. When first released, it was promoted as a therapeutic agent and restrictions on its sale and use were uneven. State authorities had some obstacles, therefore, to overcome as tuberculin was the most effective

12 International Commission on the Control of Bovine Tuberculosis, Second Meeting at Detroit, Michigan, March 1-2, 1910.
way to test for bovine tuberculosis. Canada by the ICCBT in 1909 had restricted the manufacture and sale of tuberculin and accepted tests performed only by official veterinarians. In advocating for the restriction of tuberculin sales and use to official veterinarians, the ICCBT was doing more than advocating for exclusive control of a serum. Through tuberculin, the ICCBT proclaimed that any intervention for bovine tuberculosis should be the sole domain of veterinary science and the state. This idea carried through its recommendations for education initiatives, preventative medicine, and centralization of legislation and authority.

Centralization of Legislation and Authority

The ICCBT recommended new approaches to bovine tuberculosis legislation. Bovine tuberculosis legislation would be most effective if governments took into consideration both the international and domestic aspects of the disease. Furthermore, the ICCBT recommended that the authority over how legislation was practiced be centralized.

Arriving at these recommendations was the Legislation and Education Committee, one of the sub-committees of the ICCBT. The committee analyzed how Canada and the United States envisioned and practiced eradication from the 1890s into the first decade of the twentieth century. In the United States, for example, authority for bovine tuberculosis eradication rested in the hands of individual states. As a result, a variety of unique eradication efforts were pursued, with mixed results. Throughout the meetings of the ICCBT these state initiatives were discussed and debated, the main focus being on why they failed to eliminate the disease entirely. Two of the most prominent issues raised were a lack of standards and funding. The committee spent a
great deal of time discussing the experience of Massachusetts, the state that was the first to develop an eradication program. In discussing Massachusetts, the ICCBT highlighted a number of the legislative challenges in eradicating the disease. Funding and tuberculin testing practices were chief among their concerns. In Massachusetts the State Cattle Commission (the body in charge of controlling contagious livestock diseases) was provided funding by the State Legislature when its systematic state-wide program began in 1894. The Commission was allotted $100,000 for eradication work which was spent on testing roughly 5400 animals, a small fraction of the state's total, and provided compensation for an unknown number of tubercular cattle at $38/head. Not surprisingly, the funds ran out quickly. The commission asked the following year for additional funds but was kept limited to $100,000. It quickly ran out and had to suspend bovine tuberculosis work early in 1895. The State was simply overwhelmed by the volume of requests for testing. By 1897, appropriations had risen to $250,000 but again, given the volume of testing required for the entire State, the funding soon ran out.

The chronic lack of money in Massachusetts was not uncommon. Indeed a number of other states examined by the Legislation and Education Committee experienced similar issues with finances. With limited funding, some states allowed owners to have their herds tested privately at their own expense. Massachusetts, again for example, was so overwhelmed by requests for tuberculin testing that by 1897 it permitted private testing. Claims for compensation increased dramatically and fraud was suspected. The committee felt that in the wake of the


difficulties experienced by Massachusetts there needed to be a more formalized system in place to officially oversee veterinarians testing for the disease.\textsuperscript{18}

The eradication initiatives in Canada presented the committee with a different approach to the disease. Certain facets of Canadian policy included the nation’s federal approach from the beginning of its efforts in the 1890s and the more recent initiatives of the government, including the 1903 Order in response to quarantine regulations for livestock bound for the United States.\textsuperscript{19} Rutherford, the Veterinary Director General of Canada and chair of the committee, acknowledged that this policy, and the subsequent Supervised Herd Plan in 1905, addressed tuberculosis only in the fraction of the national herd bound for export. Little substantial effort had been made to address the disease in domestic herds. Rutherford admitted to the committee that his department had been waiting for a body such as the ICCBT to provide guidance before it created any new national eradication policy that addressed domestic cattle.\textsuperscript{20}

After a thorough examination of bovine tuberculosis eradication programs to date, the committee made a number of recommendations that were reflected in the commission’s final report. Firstly, the commission recommended that “…legislation regarding the control and eradication of tuberculosis among domestic animals be made uniform.”\textsuperscript{21} This uniformity was recommended not only domestically, but internationally as well. The commission recommended that the laws of Canada and the United States “… be made stringent and alike as much as

\textsuperscript{18} International Commission on the Control of Bovine Tuberculosis, Second Meeting at Detroit, Michigan, March 1-2, 1910.
\textsuperscript{20} International Commission on the Control of Bovine Tuberculosis, First Meeting at Buffalo, New York, Dec 13-14, 1909.
\textsuperscript{21} Report of the International Commission on the Control of Bovine Tuberculosis, 11-12.
possible…”\textsuperscript{22} and that “…the laws governing the interstate and inter-provincial movement of cattle and that between different American counties be harmonized.”\textsuperscript{23}

The international and interstate/inter-provincial cooperation for the management for bovine tuberculosis was a relatively new concept. Recall that the scheduling imposed by Great Britain on both Canada and the United States for bovine pleuropneumonia did not imbue either nation with a spirit of cooperation to eliminate the disease. In fact, both Canada and the United States became more isolationist with their cattle to protect the trade with Great Britain. This was especially true for Canada. The United States was scheduled in 1879 and Canada distanced its cattle herds considerably from those across the border until it was scheduled in 1892. With bovine tuberculosis, however, it is clear that the endemic state of the disease was understood as was the porous nature of both international and domestic borders. Rather than isolate themselves, the commission makes clear that cooperation between the Canadian and American governments as well as state/provincial and local governments was mutually beneficial and necessary.

\textit{Education}

Education was a key recommendation of the ICCBT. In its final report, the commission wrote that if the disease was to be successfully managed, an agreed-upon set of principles should be presented and adhered to by all involved parties, including the medical and veterinary communities, livestock owners, and the general public. Education was not originally a mandate

\textsuperscript{22} Report of the International Commission on the Control of Bovine Tuberculosis, 12.  
\textsuperscript{23} Report of the International Commission on the Control of Bovine Tuberculosis, 12.
of the commission’s activities, but it became increasingly clear to its members that it was essential.

Bovine tuberculosis had a controversial past. This included livestock owners and members of the wider public who did not believe in the science of bovine tuberculosis or the accuracy of tuberculin. Hoping to present a united front from the veterinary community, the commission created educational literature to be distributed to the wider public along with its policy recommendations. What resulted was a publication titled *Tuberculosis: A Plain Statement of Facts*. It focused on a number of aspects of the disease with the intention of providing clear, straightforward information to livestock owners and other interested individuals on the necessity of actively participating in eradication. Items in the booklet included the history of the introduction of bovine tuberculosis into North America, as well as symptoms and diagnosis. Photos were provided showing live cattle in various states of infection, but it was clearly acknowledged that outward symptoms were difficult to detect. In place of a tuberculin test, the most common clinical symptoms the commission listed included “unthriftiness” (skin tone), weight loss, coughing, gland enlargement, poor appetite, bloating, diarrhoea, and lumpiness in the udders.²⁴ Bovine tuberculosis, they argued, was a disease that primarily affected the lungs, and, to a lesser extent, other internal organs, but without a tuberculin test it was difficult to determine given the physiology of the cow and the difficulty therefore in listening for infection.²⁵

*Tuberculosis: A Plain Statement of Facts* emphasized that a livestock owner was not ruined if tuberculosis was discovered in his herd. Tuberculin testing, the removal of reactors, and the

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²⁵ *Tuberculosis: A Plain Statement of Facts Prepared Especially for Farmers and Others Interested in Livestock*, 16.
gradual building of the herd with the tuberculosis-free cattle left, would ensure an owner would incur fewer costs than if he had not tested his animals at all.\textsuperscript{26} Indeed the committee emphasized that it was in the best interests of livestock owners to comply with whatever policies were enforced or offered in their area given the costs they would inevitably incur if they did not. These ‘costs’ that the committee referred to included the costs to human life, notably children who drank raw milk, but more strenuously emphasized were the financial losses that would result from indifference. This included the loss of revenue from decreased milk production, and the slaughter, or the sale value of the animal itself.\textsuperscript{27}

By promoting education, the ICCBT achieved a number of ends. On the surface, it provided a singular vision of the disease from the veterinary community, putting to rest any controversy that had affected bovine tuberculosis throughout its past. Beyond the practical purposes they served, though, educational initiatives say more about power and authority in this period. The veterinary community, and the state by extension, held the monopoly on knowledge as a result of initiatives such as \textit{Tuberculosis: A Plain Statement of Facts}. They provided education, but, by doing so, they dictated what that knowledge would be. The insights of the ICCBT in regards to education extended to the final key recommendation the commission produced: prevention. While the ICCBT through its various recommendations advocated for the centralization of authority in the management of the disease, the commission also made it clear that livestock owners had their own role to play in implementing preventative measures in their animals and in their operations to prevent the disease from gaining a foothold. The element of control and authority prevailed as the veterinary community and the state dictated the shape those preventative measures would

\textsuperscript{26} \textit{Tuberculosis: A Plain Statement of Facts Prepared Especially for Farmers and Others Interested in Livestock}, 24.
\textsuperscript{27} \textit{Tuberculosis: A Plain Statement of Facts Prepared Especially for Farmers and Others Interested in Livestock}, 10.
take. Chapter VI will illustrate that the state was often present to see that these preventative measures were carried out on farms.

**Prevention**

Preventative measures for bovine tuberculosis were a major component of the ICCBT’s final report. They encompassed both measures to prevent the introduction of the disease into healthy herds and re-introduction of the disease into a livestock owner’s operation after a herd had been cleared. Their recommendations also promoted preventative measures for public health. The ICCBT expressed strong support for pasteurization and meat inspection measures underway and encouraged their expansion to safeguard public health.\(^{28}\) However, the majority of the preventative discourse the ICCBT expressed was specific to cattle.

Prevention could only be built on a solid foundation of knowledge of the various ways bovine tuberculosis spread. The commission promoted that the most predominant cause of the spread of tuberculosis in livestock was the introduction of tubercular animals into a healthy herd. They concluded there were three kinds of tubercular livestock that spread the disease. The first suffered from open cases of the disease. These animals were visibly diseased and knowingly and willingly introduced into a herd. The second were animals in which the disease was knowingly in a period of incubation and the animal appeared otherwise healthy (overwhelmingly the result of fraudulent sellers). The third were animals in which the disease was so insignificant the tuberculin test would have failed to register a reaction but over time would have progressed.

Every effort, they argued, should be made to prevent these three classes of diseased cattle from coming into contact with healthy animals. In identifying the most common ways in which livestock were exposed to bovine tuberculosis, the commission also deemed it necessary to dispel false beliefs about how livestock became infected with the disease. They agreed that livestock rarely contracted tuberculosis from humans, wild animals, or from scavenger bird excrement (the bird having fed on the carcass of a tubercular animal).

Preventative measures were necessary at all levels of cattle production, distribution, and consumption. Significant sites of infection for cattle and ones that needed monitoring and regulation according to the ICCBT were fairs and auctions. Neither of these events subscribed to any kind of infectious disease control to the knowledge of the commission members and it was agreed that these were situations in which large numbers of potentially tubercular cattle met for short periods of time and were then dispersed over great distances. Any kind of legislation needed to take these situations into account.

Preventative measures on the farm were a critical insight of the ICCBT. The testing and slaughter of infected cattle in an effort to clean up a herd was limited by cattle living in an environment that encouraged the growth and spread of disease. Here the ICCBT recommended that the surveillance and intervention of the state extend beyond the cattle themselves and encompass the farms they lived on as well. Firstly, separating healthy from diseased cattle on a farm was essential. Testing and eliminating large numbers of cattle, whole herds in some cases, was a delicate political issue. The ICCBT was aware of this, and in order to garner the co-

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31 International Commission on the Control of Bovine Tuberculosis, Second Meeting at Detroit, Michigan, March 1-2, 1910.
operation of livestock owners and quicken the pace of eradication, any policy had to be voluntary and responsive to individual operations. The committee proposed a number of solutions: Firstly, any obviously diseased animals should be destroyed immediately. Livestock who tested positive for the disease but were otherwise in relative good health should be allowed to remain on farms but kept isolated in either a Bang or Ostertag herd arrangement. In the former, tubercular livestock were kept isolated from healthy stock. Any calves born to those infected animals were immediately removed and fed with milk from healthy members of the herd or from the pasteurized milk of infected cows. The infected members of the herd would, over time, be systematically destroyed, thus creating a clean herd. The Ostertag method was similar to the Bang method except that all adult cattle in the herd, regardless of disease, would be destroyed over time, essentially building a brand new herd from the new calves born.\(^{32}\)

The sanitation of the farm environment to prevent the spread of bovine tuberculosis was a final key preventative insight of the ICCBT. The commission recommended clean food and water be provided daily, pasturing in open air, as well as “…the daily removal of manure from stables, and water tight floors and good drainage in stables is urgently recommended.”\(^{33}\) The sanitation of the farm environment would prove to be one of the commission’s most visible legacies as the Canadian and American governments went forward with new disease management plans for bovine tuberculosis in the coming decades. As Chapter VI will demonstrate, state-monitored and enforced sanitation would become a major component of managing bovine tuberculosis, providing a clean environment to prevent the spread of the


\(^{33}\) *Report of the International Commission on the Control of Bovine Tuberculosis,* 12.
disease, but moreover to bring the influence of the state on to the farms of Canadian and American livestock owners.

The Post-ICCBT Period: New Bureaucratic Structures and Programs for Bovine Tuberculosis Eradication, 1917-1922

The influence of the ICCBT was not immediate and one might question whether or not bodies like it had substantial influence at all. In truth, conferences devoted to bovine tuberculosis and tuberculosis more broadly were a regular feature of the landscape, both internationally and domestically, from the late nineteenth century well into the twentieth century. These conferences have surfaced already in this examination. It was at the International Congress on Tuberculosis in 1901, for example, that Robert Koch made his famous claim that bovine tuberculosis was rarely passed to humans. Conferences on tuberculosis were held consistently, presenting research and reports on the extent of the disease in different segments of populations and geographic locations, and the progress of various treatment programs. While they served intellectual and collaborative purposes similar to academic conferences of any hue, these conferences influenced how the scientific and regulatory communities perceived and addressed the disease. The ICCBT was no exception to this and its recommendations arguably did significantly influence the eradication programs of the late 1910s and early 1920s in Canada and the United States.

Hope and impatience might best characterize the years immediately following the conclusion of the ICCBT and the publication of its recommendations and educational literature. John Rutherford, the VDG of Canada and Chair of the ICCBT, was optimistic about the
influence the ICCBT would have, writing to the Minister of Agriculture in 1910 after its conclusion “…I understand that it is your intention to adopt in the near future a policy either identical with or closely following the lines of that recommended by the Commission. The wide distribution of the report by your Department has unquestionably paved the way for such action, and I feel satisfied that official measures, if reasonable and considerate, will receive the hearty support of the intelligent stock owners of the Dominion.” After the conclusion, however, Rutherford’s frustration with the slow progress of eradication work was palpable:

The attitude of the Department with reference to Bovine Tuberculosis has not undergone any serious change during the year just past. I had hoped that, after the publication in 1910, of the report of the International Commission on Bovine Tuberculosis and the subsequent wide distribution of the special farmers’ bulletin…warranted the Department in adopting a definite and comprehensive policy…so far, however…it has not been possible to either officially formulate or put in operation the policy recommended by the Commission, against which, it is encouraging to note, no hostile criticism has been at any time directed.

Despite frustration, a sense of optimism was evident that the ICCBT’s recommendations would bear fruit. Writing in 1911, optimistic sentiments were expressed by Alonzo Melvin, Chief of the American Bureau of Animal Industry. Melvin wrote that with the publication of the ICCBT’s report and information pamphlet on the disease, “…it is believed that the widespread distribution

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34 Government of Canada, Department of Agriculture, J.G. Rutherford, “Tuberculosis,” Report of the Veterinary Director General For the Year ending March 31, 1911 (Ottawa, 1911), 20.
35 Government of Canada, Department of Agriculture, J.G. Rutherford, “Tuberculosis,” Report of the Veterinary Director General For the Year ending March 31, 1912 (Ottawa: C.H. Parmelee, 1912), 6. It is interesting to note that this is the last report submitted by John Rutherford as Veterinary Director General. Rutherford resigned his post in May of 1911 but remained in the role, at the request of the Department, until March of 1912. Rutherford did not provide a reason for his resignation in any of the official records of his office and his surviving correspondence does not reveal much either. One wonders whether the inaction of the Department on the matter of bovine tuberculosis contributed to Rutherford’s resignation. After resigning, Frederick Torrance took over the office of the VDG.
of this literature will accomplish great good.”

Additionally, in his first report as VDG in 1912, Frederick Torrance wrote that a “…moderate, fair and reasonable regulation would meet with comparatively little opposition.”

**The Municipal Tuberculosis Order, 1914-1923**

Canada’s first piece of legislation after the ICCBT concluded in some ways ran counter to it. Rather than a broad legislation recommended by the ICCBT, the Municipal Tuberculosis Order (MTO), introduced in 1914, reflected the municipal focus of dairy legislation. Specifically, the MTO was aimed at dairy cattle in communities that were not otherwise engaged in bovine tuberculosis work. The goal of the legislation was to provide safe milk to communities, much in the fashion of the certified milk approach outlined in Chapter IV. The MTO operated for less than ten years before it was cancelled in 1923.

Although the program operated for less than a decade and seems out of place with the direction bovine tuberculosis work appeared to be going in this period, the MTO reflects an important episode in the bureaucratic response to bovine tuberculosis. Here was legislation that reflected the uneven collection of programs Canada had in place by that point. It also reflected the uneven adoption of pasteurization throughout the country. Not every community, particularly those with small populations, was suited for one of the many bovine tuberculosis programs the


Canadian government had to offer. Wanting to ensure some measure of safe dairy supplies for their citizens, the MTO was an option municipalities could choose to pursue.

Although a number of communities had employed tuberculin testing in dairy herds supplying milk for their citizens, it was clear that municipalities were not necessarily equipped to oversee the licensing and supervision of both milk and the cattle that supplied it. As it turns out, the expertise in identifying and eliminating cattle with bovine tuberculosis already existed, but not at the municipal level. For years veterinarians employed by the federal Department of Agriculture identified and eliminated tubercular cattle bound for export as well as those entering the country. Additionally, federal support was offered for owners of domestic herds who wished to test and eradicate any trace of the disease. For all the good that federal bovine tuberculosis programs promoted, however, the number of domestic cattle under supervision by 1914 was quite small. The frustration was evident:

Although this offer has been available for several years, and one might expect hundreds of stock owners to have taken advantage of it, it is disappointing to state that there are at the present time less than fifty herds under this control.  

With concern over bovine tuberculosis and public health in this period being so fervent and widely articulated, the federal government widened its involvement in the eradication of bovine tuberculosis in 1914 with the MTO:

After much careful consideration of the whole subject, it was decided to attack the disease at the point where it is most dangerous to the human race. An attempt would be made to prevent the sale of tuberculous milk in cities and towns and to ensure that the milk supply should be derived solely from cows that had passed the tuberculin test. In order to secure the co-operation and goodwill of the citizens to this work it was

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decided to apply it only to such cities and towns as made a request for it and were already licensing dairies and keeping them up to a certain standard of cleanliness and sanitation. Provision was made for dealing with reactors in a liberal way, so as to minimize the loss to the owner as much as possible.\(^{39}\)

The MTO was not designed to replace existing efforts to address bovine tuberculosis in dairy herds, but largely to augment programs already in place as well as offer support to municipalities who had yet to undertake any supervision of their dairy herds. What it provided was a structure and support for addressing bovine tuberculosis in dairy herds.

The MTO was offered to municipalities of no less than five thousand residents. The program came with several conditions for municipalities to comply with in order to participate. They included, for example, licensing and inspecting dairies if municipalities were not already doing so, as well as the installation of an inspector(s) to ensure that dairy cattle under supervision were clean, well-fed and cared for, and that stables were clean and well-ventilated.\(^{40}\) Once accepted into the program, the office of the Veterinary Director General would send a veterinary inspector to begin the work.

There are too many provisions within the MTO to detail here but it is worth briefly exploring what the role of federal authorities was in this traditionally local issue, and the compensation provided to owners of dairy herds. Veterinary inspectors were dispatched to the community and performed tuberculin tests as well as careful physical examinations of the herds. Cattle showing obvious clinical symptoms were sent immediately to abattoirs for slaughter with the inspector present to ensure its proper disposal. Reactors identified with the tuberculin test


could either be immediately slaughtered or kept in the herd so long as any milk produced was pasteurized. After two consecutive successful tests failing to identify tuberculosis in a herd, the inspector issued a certificate deeming the herd clean.\textsuperscript{41}

Owners were compensated for the destruction of their tubercular cattle. Owners of cattle with ‘open’ cases of tuberculosis (obvious clinical symptoms) were compensated one-half of the appraised value of the animal, as determined by the veterinary inspector. Tubercular cattle identified by the tuberculin test were compensated at one-third of their appraised value plus any money made off the sale of any slaughtered meat.\textsuperscript{42}

The first municipality to participate in the MTO was Saskatoon, Saskatchewan. A resolution, passed by the municipality after the first round of tuberculin tests, reflected its enthusiasm: “…that this city very much appreciates the prompt and effective response to their application to have all the cattle in the vicinity of Saskatoon tested for tuberculosis, and the excellent work carried out by the assistance of the Veterinary Director General’s Department.”\textsuperscript{43}

In its first round, veterinarians tested 2,232 dairy cattle in Saskatoon with 6\% (136) reactors. The number of reactors declined to 4.8\% with the second test, and no reactors were reported on the third test. The amount of compensation provided totaled $3,144.59. This amount did not reflect the destruction of every reactor, however, as a few were kept by their owners who chose to


\textsuperscript{42} F. Torrance, “Tuberculosis,” \textit{Report of the Veterinary Director General, for the Year Ending March 31, 1915}, 15. To note, if the amount of money received from the salvaged carcass as well as the one-third appraisal exceeded the appraised value of the animal, the different was paid to the Receiver General. Funding for compensation was provided by the federal government.

pasteurize their milk (the ears of those cows marked with a “T” in accordance with the 1903 Order), and some owners were able to recoup some loss from the salvage of the meat.\textsuperscript{44}

By 1916, Regina had joined Saskatoon in the MTO. That only two municipalities had requested assistance under the program was frustrating for Frederick Torrance, the Veterinary Director General. In an effort largely to attract more municipalities to participate in the program, the MTO was amended. First, the MTO’s scope was extended to all municipalities, regardless of population size in an effort to attract smaller centres.\textsuperscript{45} Second, the amount of compensation available for reactors to the tuberculin test was raised from one-third to two-thirds of the appraised value of the animal. Owners could now expect to receive around $166.66 for a purebred cow, and $53.33 for a grade cow. The amendments bore fruit as two additional municipalities, North Battleford, Saskatchewan, and Ottawa, Ontario, signed on shortly after the amendments were made.\textsuperscript{46}

The MTO slowly expanded over the next few years. When the program was discontinued in 1923 there were thirty communities still actively involved, with the Ontario communities of Brantford, Ottawa, Collingwood, Smith’s Falls, Brockville, and Guelph among them.\textsuperscript{47} It is worth noting the unexpected difficulty in carrying out this program even within individual herds, given that the herds themselves seldom remained static. Writing in 1917, for example, Torrance

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44 F. Torrance, “Tuberculosis,” \textit{Report of the Veterinary Director General, for the Year Ending March 31, 1916}, 10. Torrance noted that one farmer traded a tubercular cow for a horse. Although somewhat unusual, it did not violate any regulations as the cow was not sold for money.
45 F. Torrance, “Tuberculosis,” \textit{Report of the Veterinary Director General, for the Year Ending March 31, 1918}, 12. Recall that the MTO was offered initially to municipalities with at least 5000 residents.
47 F. Torrance, “Tuberculosis,” \textit{Report of the Veterinary Director General, for the Year Ending March 31, 1924}, 34. Other communities included in Quebec – Granby, in Manitoba – Brandon, Manitou, Minnedosa, Portage la Prairie, Virden, Dauphin, Selkirk, Oak Lake, Souris, and Winnipeg. In Saskatchewan – Moose Jaw, North Battleford, Regina, Saskatoon, Weyburn, Yorkton, Saltcoats, Ogeml, and Estevan. Finally, in Alberta – Banff, Calgary, and Edmonton.
\end{flushright}
noted that it was common practice to sell cows that had finished their lactation period and replace them with cows that were just beginning one. These cows, known as “springers,” made “…the work of testing almost a continuous performance.” In essence, the work of the Department with any particular herd was never done once it commenced and made the program expensive to operate. Indeed, cost was a major factor in the MTO’s cancellation. “The expenditure involved in compensation payments for reacting cattle showed a marked tendency to increase yearly instead of decreasing…”

Despite the involvement of a number of communities, the level of participation fell far short of the Department of Agriculture’s expectations. Torrance, writing in 1917, could not understand why more municipalities were not taking advantage of a free program that provided compensation to cattle owners. Most notably, he argued the usefulness of the program given the results demonstrated from the participating municipalities:

In one dairy our inspectors found ten cows all of which reacted to the tuberculin test. When these were slaughtered, all were found diseased, some extensively. Among them were cows whose milk was loaded with tubercle bacilli. The dairy was distributing raw milk in the city. How many children were exposed to disease in this way is unknown, or how many contracted the disease, but there is no reason to expect that all escaped.

In Torrance’s opinion, municipalities that relied solely on pasteurization or nothing at all were taking serious, unnecessary risks with their citizens’ health: “The burden of carelessness does not

fall upon those who deserve it, but upon the poor defenseless children, many of whom are doomed to early graves or to lives of crippled misery from tubercular infection…”

Ultimately the MTO was discontinued in 1923. Municipalities in the program would continue to receive services and support until their eventual inclusion in other bovine tuberculosis testing programs. These programs, the Accredited Herds Plan (1919) and in particular, the Restricted Areas Plan (1922), would incorporate the supervision of domestic dairy herds into the broader supervision of breeding cattle, import and export cattle, etc, under essentially one bureaucratic body. This ultimately proved to be both a more time and cost efficient way of addressing bovine tuberculosis in Canadian herds.

New Directions in the Eradication of Bovine Tuberculosis, 1917-1922

The legislation to manage bovine tuberculosis began to appear in the late 1910s. These would be the programs that ultimately brought bovine tuberculosis under control to the extent it could be considered eradicated. In these programs, the years of individual state and community control programs were replaced with programs that were uniform and federally-controlled. The form these programs took, both in Canada and the United States, initially focused on breeding cattle and then widened into creating whole areas of tubercular-free animals.

The more visible involvement of the federal government in bovine tuberculosis eradication in the United States involved not only the creation of the Cooperative State-Federal

51 F. Torrance, “Tuberculosis,” Report of the Veterinary Director General, for the Years Ending March 31, 1919, and March 31, 1920, 11.
Program in 1917, but the also the creation of a new body within the Bureau of Animal Industry which was named the Tuberculosis Eradication Division (TED). It was first created on May 1, 1917, “…with a view to increasing greatly the scope of activities looking toward the ultimate eradication of tuberculosis from the livestock of this country.” The realization that a larger, more all-encompassing approach to bovine tuberculosis was required to successfully address the disease in the preceding years certainly contributed to the formation of this new federal body but there were other reasons for it as well. Most significantly, the formation of the TED was the culmination and recognition of several years of existing federal involvement in bovine tuberculosis initiatives.

The involvement of the United States federal government in the eradication of bovine tuberculosis began long before the inception of the TED. Examinations by scholars such as Olmstead and Rhode note that the federal government first became involved with tuberculosis through Washington, D.C.’s milk supply in 1906. As Washington was a federal jurisdiction, the BAI offered tuberculin testing to any owners who requested assistance with their herds and discovered, much to its alarm, that eighteen percent of those tested were tubercular. As a result of this high percentage of tubercular cattle, in 1909 tuberculin testing of all dairy cattle in the district was made mandatory and, as Olmstead and Rhode note, the percentage of tubercular cattle declined steadily, descending to 0.63% by 1919. Summaries of this work appeared, for example, in 1911, outlining the work and including provisions for compensation and the inspection of premises on which dairy cattle were held. In addition to safeguarding the dairy

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supply of Washington, D.C., the BAI undertook the work “…in the belief that a demonstration of the practicability of eradicating cattle tuberculosis from a given area would act as an incentive for other communities, municipalities, or States to take up similar work.”

The establishment and initial function of the cooperative state-federal program in 1917 reflected the close relationship between BAI and the United States Livestock Association (USAHA) in establishing accredited herds. An accredited herd, as defined by the plan, entailed the following:

A tuberculosis-free accredited herd is one which has been tuberculin-tested by the subcutaneous method, or any other test approved by the Bureau of Animal Industry, under the supervision of the Bureau of Animal Industry or a regularly employed veterinary inspector of the State in which cooperative tuberculosis-eradication work is conducted jointly by the United States Department of Agriculture and the State. Further, it shall be a herd in which no animal affected with tuberculosis has been found upon two annual or three semi-annual tuberculin tests, as above described, and by physical examination.

Reflecting the focus of the majority of bovine tuberculosis eradication thought and practice from the preceding decades, the accredited herd plan was focused primarily on herds containing breeding animals. Once accredited, a herd or individual cattle from the herd could be shipped to another State or even another country (in particular, Canada) without the need for any further


55 See Palmer and Waters, 9. To review, the USAHA was first proposed in 1884 by state representatives and members of the BAI. Its first meeting was held in 1897 and its membership was made up of state sanitary board members, state veterinarians, and representatives appointed by the Secretary of Agriculture. Palmer and Waters emphasize that the USAHA was an influential body and that the USDA followed many of their recommendations in regards to dealing with infectious diseases including bovine tuberculosis and Texas Fever. See Palmer and Waters, 9.

tuberculin tests. This would allow the BAI to address the problem of bovine tuberculosis in the segment of the cattle population it felt was most susceptible to the disease and was the most likely, due to its high mobility, to spread the disease to other herds, with less disruption for normal flow of the livestock economy.\(^{57}\)

Cattle owners who registered their herds to become accredited were required to comply with a strict set of regulations or risk the cancellation of their cooperative relationship with state and federal authorities. The process of having one’s herd accredited unfolded generally in the following manner: after an application to the program was received and approved, a herd was subjected to two consecutive tuberculin tests at least six months apart and was required to pass two consecutive tests in order for certification to be granted. If any tuberculosis was found in the herd, it could not be certified as accredited. Only when two tests were passed consecutively could certification be granted. Any cattle removed from the herd through sale, slaughter, or death had to be carefully and precisely reported to state and federal authorities. Milk from these animals was required to be pasteurized; and, finally, accredited herds could be shipped interstate or to another accredited herd, in clean and disinfected cars, with the proper certificate issued by the state or federal authorities, and absolved them from having to undergo another tuberculin test for a year.\(^{58}\)

During its first year of operation, the USDA wrote of the enthusiastic reception of the program from the breeding community and the value it brought to their herds:

The idea and advantages of accrediting herds of cattle found to be free from tuberculosis has gained wide publicity and popularity among cattle breeders during the first year’s work. They appreciate the fact that a certificate of approval endorsed

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\(^{57}\) See Palmer and Waters, 9. See also *Yearbook of Agriculture for the Year 1918*, 215-216.

\(^{58}\) *Yearbook of Agriculture for the Year 1918*, 216-217.
by the State in which the herd belongs, and the further endorsement by the United States Department of Agriculture, give prospective purchasers confidence that the animals are free from the disease, and they are in consequence willing to pay a considerable advance in price for such animals.\textsuperscript{59}

The operation of this program and its subsequent transformations will be examined in more depth in Chapter VI, but it is clear the program met with success early on. A total of 296 herds were accredited in the program’s first year comprising, 9,284 head of cattle (these herds passed two consecutive tuberculin tests). In addition to this completed work, 1,462 herds with 35,052 cattle were in the process of being accredited, having passed their first tuberculin test, and were waiting the required minimum period of six months for their second. The program was in operation in forty states by the end of its first year, including New York State.\textsuperscript{60}

Canada began its own accredited herd program in 1919, largely as a direct response to the American program. Canadian authorities closely followed the development of the American program. Writing in 1919, Frederick Torrance, then-VDG of Canada, noted the “great progress” being made by the United States and pressed for a similar program in Canada: “…it is most important that the system should be adopted in Canada without delay, as otherwise our pure-bred cattle are in danger of losing the American market.”\textsuperscript{61}

Torrance’s push for an accredited herd plan became a reality in September of 1919. The program’s shape and function was very similar to that of the United States. Once an application was received, veterinarians affiliated with the VDG office would apply an initial test of tuberculin to the herd. If any reactors were detected they were removed from the herd and

\textsuperscript{59} Yearbook of Agriculture for the Year 1918, 217.
\textsuperscript{60} Yearbook of Agriculture for the Year 1918, 217-218.
\textsuperscript{61} Government of Canada, Department of Agriculture, F. Torrance, “Tuberculosis,” Report of the Veterinary Director General For the Years ending March 31, 1919 and March 31, 1920, 12.
another test was administered roughly sixty days later. Some cattle that were tubercular, Torrance noted, passed the first test but were identified on the second. Like American herds, once the herd had passed two consecutive rounds of tuberculin testing, the herd was deemed accredited and the owner was issued a certificate indicating such. The possession of accreditation certificates allowed for the more efficient movement of purebred animals, particularly to the United States, as further tuberculin tests were not required during the importation process.  

The accrediting of herds, as we will see in Chapter VI, continued to be a major activity for a number of years. However, just a few years after accredited herd programs began in both the United States and Canada, authorities began to increase the scope and scale of eradication to whole areas containing herds as opposed to focusing on single herds. The United States would again lead the way in this work.  

When John Kiernan took the position of Chief of the Bureau of Animal Industry in 1917 and the Tuberculosis Eradication Division was formed, he began to advocate immediately for area-wide tuberculosis testing. While this is certainly true, it was in the 1920s that the program took off in popularity and arguably the program grew as much from the ground-up as it did from the top-down. Reporting in 1919, John Mohler, Chief of the Bureau of Animal Industry, wrote of area-wide testing developing “…as a result of the active interest of interested communities. Some counties in a number of the States either have established agencies by which such counties may be entirely freed from the disease or are making plans of this nature.”  

Mohler reported area-wide testing had taken place in Clay County, Mississippi, Island County,  

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63 Susan Jones, Valuing Animals, 94.
Washington, and Clatsop County, Oregon, with several other counties in Oregon in the process of testing.⁶⁵

Area-wide accreditation followed the same procedure as that of accredited herds, however instead of a single herd receiving tuberculin testing and financial support, a whole area, often a county, was put under the authority of the State and BAI. Mohler was quite convinced that area-wide testing was a feasible and practical next step in the eradication of bovine tuberculosis. Not only did he note the success of the above communities across the United States, but also of the work of the BAI through the ongoing eradication work in Washington, D.C. In his opinion, the communities he reported on showed that it was possible to eliminate the disease from a region, and the work of the BAI in Washington illustrated that it could be maintained.⁶⁶ Area-wide testing would grow significantly in the years that followed its first tenuous steps. In 1921, for example, 31 counties in Oregon, Washington, Wisconsin, Michigan Mississippi, Montana, Nebraska, Idaho, New York, North Carolina, Utah, Virginia, and West Virginia, had established tubercular-free areas, with a further 138 counties actively testing cattle and 296 where foundational work to get the program underway was being completed.⁶⁷

Canada’s own Restricted Area Plan got underway in 1922. Introduced in December of 1922, its goal was, similar to the United States, to create a series of tuberculosis-free areas. As such, it widened the scope of accredited herds that contained mainly purebred breeding animals to testing groups of herds that contained all classes of cattle. Writing of its introduction in 1922,

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VDG George Hilton said of the plan: “It is undoubtedly the most logical and economical method of dealing with this disease, as it affords an excellent opportunity for systematic and methodical work and permits the testing of the largest number of cattle in a given period.”

To participate in the Restricted Areas Plan, an application would be made by the provincial Minister of Agriculture to the federal Department of Agriculture expressing a desire to seek federal aid for bovine tuberculosis eradication. In making this application, the province was required to define the boundaries of the proposed restricted area, the number of cattle within the proposed area, an agreement signed by at least two-thirds of the cattle owners within the proposed area that they would comply with the program’s requirements, and an agreement from the provincial government to assist with the enforcement of the regulations and conducting prosecutions for those who violated them. In this way, the provincial government became more involved in bovine tuberculosis work than it ever had been before. It is somewhat unclear, however, how much involvement the province actually had in running this program given its lack of presence in provincial Department of Agriculture’s annual reports and other publications.

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69 Government of Canada, “Regulations Regarding the Establishment of Restricted Areas in Canada,” The Canada Gazette, 16 December 1922, 2635. Livestock owners too played an important role in this program and were required to assist the veterinarian on their farm with testing as well as provide room and meals for him. The owners were of course compensated under this program similar to the way they were under the Accredited Herd Plan, with compensation fixed at two-thirds the appraised value of a purebred animal and one-third the appraised value of a grade animal.
70 A review of the Restricted Areas Plan records at Library and Archives Canada reveals that one might think of the province as more of a conduit of information rather than an active participant. In the proposed areas and required signatures for the Restricted Areas Plan, any complaints or concerns appeared to be passed on to the Health of Animals Branch rather than dealt with directly by the provincial Department of Agriculture. It may be that the province was more directly involved in the resolution of disputes, prosecutions, etc, but archival sources are not particularly revealing, nor are published sources. See Diseases of Animals, Tuberculosis. Restricted Area in Ontario, # 37-7-8, Library and Archives Canada, Ottawa.
A close review of the Restricted Areas Plan program reveals that the critical factor for its success was keeping the restricted areas quarantined and having complete control over any cattle exiting and especially entering the area. This is interesting when one steps back and looks at the course of eradication thinking and practice over the roughly thirty years prior to the point of creating the Restricted Areas Plan. While eradication programs gradually widened their scope over time from testing individual animals (mainly import/export cattle), to whole herds, to whole areas, the Restricted Area Plan reemphasized the importance of the individual animals and how the success of this widened scope of eradication work, while perhaps more economical and efficient, depended entirely on the surveillance and control of individual animals.

The first area to seek federal aid under the Restricted Areas Plan was in Manitoba’s Carman district, a predominately agricultural area in the southern end of the Province. The area contained 16,550 head of cattle and, during the first test of the area, 992 (5.57%) produced positive tuberculin reactions. Of the first test, Hilton noted: “The test cost in compensation five and a half times as much as all retests and the annual general retest of all herds in the area combined, and there is, therefore, every prospect that this area will soon be free from bovine tuberculosis.”

**Conclusion: The Way Forward**

The supervision of individual herds and defined areas of herds, and the inspection and treatment of meat and milk, would be the ultimate solutions for the control of bovine tuberculosis. It took authorities in Canada and the United States roughly three decades of trial-and-error, creating and recreating bureaucratic structures, authority changing hands, and a great deal of discussion and negotiation, but by the early 1920s the final management of bovine tuberculosis was underway in Canada and the United States.

Authorities learned a great deal about bovine tuberculosis in the years that preceded the State-Federal Cooperative Program, Accredited Herds Plan, and Restricted Areas Plan. Authorities learned, through a great deal of debate and discord, that bovine tuberculosis was a bacterial disease. They learned that bovine tuberculosis was zoonotic, having the ability to infect and kill through contaminated meat and milk. Authorities also learned that it was an efficient and cunning disease, able to move effectively in cattle with little to no clinical symptoms. The problem of bovine tuberculosis, it had turned out, was far more extensive than anyone had imagined.

A final aspect of the disease, known by the 1920s though research would continue in the coming decades, was that bovine tuberculosis could not be cured in cattle. The way forward was test-and-slaughter and compensation, followed by managing the disease in herds and areas where the disease had been dealt with. What will follow in Chapter VI is an examination of how this course of action unfolded. While it may not appear fraught with drama, this was the stuff of eradication. As has been repeated throughout this examination, the eradication did not come about through a dramatic intervention of science. Rather, it came about through sober testing,
year after year, until the disease was at such a small level that it could be declared eradicated and effectively managed should it appear. That these programs were carried out for the next several decades in the regimented manner they were is a testament to the dedication of the state, the veterinarians on the ground carrying out the work, and the livestock owners whose operations would ultimately benefit.
Chapter VI:

Eradication through Legislation: The Final Eradication of Bovine Tuberculosis in Canada and the United States, 1917 - 1960

By the early 1920s, the final programs for eradicating bovine tuberculosis in both Canada and the United States were well underway. These programs, the American Cooperative State-Federal Bovine Tuberculosis Eradication Program, and the Canadian Accredited Herd and Restricted Areas Plans broadened the scale of eradication work to the surveillance and eradication of bovine tuberculosis in whole herds as well as groups of herds within defined geographical areas. These programs represented the culmination of decades of research, experimentation, and debate on the nature and control of the disease. Historians outlined in this dissertation such as Olmstead and Rhode, and Myers have examined the establishment of these programs, but what is often missing in the existing histories of bovine tuberculosis is the story that occurred after these programs began. Some historians such as Jenkins, in her examination of New Brunswick, have begun to unpack how these programs unfolded on the ground.¹ What will follow is a contribution to that growing body of scholarship by examining how these final eradication programs unfolded in Ontario and New York State, exploring the period between the establishment of the final eradication programs in the late 1910s and early 1920s and the point, decades later, when the

initial testing in both jurisdictions was complete. These large programs, described once by US Secretary of State Henry Wallace, as “…an impossible undertaking…,” were carried out through a combination of compensation, the strong presence and mandate of veterinarians employed by the states, and peer pressure between jurisdictions and livestock owners. It was through these structures that bovine tuberculosis was successfully managed. A dramatic intervention of new science did not happen, a slow and steady intervention of the state did.

Monetary compensation for tubercular animals was introduced in the 1890s at the state level in the United States and at the federal level in Canada with the Municipal Tuberculosis Order in 1914. Its success resulted in its incorporation into the eradication programs of the late 1910s and early 1920s. In the end, the eradication of bovine tuberculosis would cost the Canadian and American governments millions of dollars, far more than was spent on other infectious livestock diseases in the period. However, compensation was essential in order for the programs to proceed and secure cooperation from livestock owners. A cooperative relationship between livestock owners was also as essential for success as the relationship between livestock owners and the state. Some form of cooperation between owners was critical, since clean herds were still susceptible, particularly from neighbouring herds or operations, if those owners had not tested their animals. All of the work and hardship of losing animals for the sake of herd improvement and public health could very well be for nothing should a neighbouring herd with tubercular cattle come into contact with those who had been tested and declared clean. Both Canadian and American authorities sought to eliminate this through area testing. By creating

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4 See Susan Jones, *Valuing Animals*, 94.
pockets or areas of tubercular-free herds, some security was created. Livestock owners were given the opportunity to pressure fellow livestock owners into cleaning up their herds. Peer pressure between livestock owners was built into the Canadian Restricted Areas Plan, for example. In order to participate in the program, two-thirds of the owners of the geographic area applying to the program had to agree to participate.

Veterinarians were central to the ultimate eradication of bovine tuberculosis in this period. They have appeared at several points throughout this study. They performed groundbreaking research and provided insight into the disease, they advocated for the eradication for the disease in cattle and its elimination as a public health issue, and they helped plan and implement the various eradication programs that were implemented between the 1890s and early 1920s. In essence, veterinarians, very visibly in this period, embodied the State. They were the point where the State met the disease itself and were a potent and sometimes conflicting symbol of state intervention.

*The Eradication of Bovine Tuberculosis in New York State and the United States, 1917-1937*

The growth of the Cooperative State-Federal Bovine Tuberculosis Eradication Program was immediate from its establishment in 1917. Like the eradication programs in Canada that would get underway in this same period, the Cooperative State-Federal Program represented a transformation in the organization, centralization, and concentration of eradication programming,
funds, and authority. Houck, in his review of the work of the Bureau of Animal Industry (BAI) in 1924, commented on what the State-Federal program was leaving behind:

Many spasmodic attempts were made prior to 1917 by the livestock sanitary officials of various States and the health officers of various municipalities to control tuberculosis. Much good was accomplished, but permanent results were not conspicuous, as these attempts lacked uniformity and force. Sufficient educational work had not been conducted to convince owners of cattle of the wisdom of attempting to eradicate the disease, and members of the veterinary profession itself had not acquired sufficient knowledge concerning the detection and prevention of tuberculosis to handle the situation properly in their respective localities.⁵

The Cooperative State-Federal Program represented a significant transformation in eradication thought and practice. Within the BAI, a new body was created to oversee bovine tuberculosis eradication work specifically. In May of 1917, the Tuberculosis Eradication Division was created and the Chief of the BAI, A.D. Melvin, named John A. Kiernan as Chief of the Division. In July of 1917, work was able to get underway with an appropriation from Congress. Field offices were immediately established in Indiana, Oregon, Virginia, Minnesota, Utah, and Massachusetts. New York would see its field office established in Albany in May of 1918. These field offices served as a central location out of which federal and state livestock officials would oversee eradication work in a given state.⁶

Livestock owners were encouraged to place their herds under the supervision of the state and the federal government, agreeing to have their herds tuberculin tested, separate and slaughter any reacting cattle, and thoroughly disinfect their premises. In addition, they were required to

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⁵ Houck, The Bureau of Animal Industry of the United States Department of Agriculture: its establishment, achievements and current activities, 351.
“…observe prescribed precautions in making additions to their herds.”\textsuperscript{7} Their participation was encouraged in the two projects of establishing tuberculosis-free accredited herds and the elimination of bovine tuberculosis from defined geographic areas.\textsuperscript{8}

A cooperative relationship between several federal, state, and local agencies carried out this program at the state level. In New York State, this began with the BAI of the United States Department of Agriculture. Its role was the “…the responsibility of the work and the indemnity fund appropriated yearly by Congress.”\textsuperscript{9} The Bureau of Animal Industry, acting generally in an oversight position, was joined in this role by the State Department of Farms and Markets, whose role was in the overall administration of the program as well as the disbursement of the indemnity provided every year by the State Legislature.\textsuperscript{10}

Several other bodies at the more local level were closely involved with carrying out the program. The first was the County Board of Supervisors, which was responsible for a number of the logistical elements of carrying out either accredited herd or area testing. First, this body worked in conjunction with both the state and federal departments of agriculture by making appropriations for the employment of a county veterinarian. It was charged with obtaining disinfection equipment, cattle tags and various other supplies, and transportation for additional veterinarians when their services were required. E.T. Faulder of the BAI noted that the amount of work and expense required of the County Board of Supervisors varied over a given year.

\textsuperscript{7} Houck, \textit{The Bureau of Animal Industry of the United States Department of Agriculture: its establishment, achievements and current activities}, 353.

\textsuperscript{8} Houck, \textit{The Bureau of Animal Industry of the United States Department of Agriculture: its establishment, achievements and current activities}, 353. There was a third project of eradication promoted by the Bureau, which was the eradication of tuberculosis in swine.


\textsuperscript{10} Faulder, 91.
depending on the amount of work being done in a given county and the extent of tuberculosis infection in it.\textsuperscript{11} Other organizations involved included medical societies, such as county health officers who promoted the public health benefits of eradicating bovine tuberculosis to the livestock community; the farm bureau, whose cooperative work educating breeders and dairy owners about bovine tuberculosis eradication went hand-in-hand with its involvement in the production, value and improvement of stock; and finally, tuberculosis committees, made up of members of breeder’s organizations, represented both the national and state departments of agriculture in terms of the implementation of the program on the ground, distributing funds for veterinarians’ salaries and other expenses, holding meetings, and assisting in any other way deemed necessary.\textsuperscript{12}

The advisory and organizational roles of these various bodies at the national, state, and local level, all ultimately served to support the work carried out on the ground by county and supervisory veterinarians. A county veterinarian was defined as “…a graduate of a recognized veterinary college, duly licensed and accredited by the United States Department of Agriculture…”\textsuperscript{13} It would be these veterinarians who would travel to thousands of farms throughout the state and perform tens of thousands of tuberculin tests. These veterinarians served under the authority of the state department of agriculture and were required to follow its instructions. In addition to these county veterinarians, supervisory veterinarians were more seasoned veterinarians with years of field experience. Their job was to monitor and report on the progress of testing throughout the state to local, state, and national bodies. They also served a

\textsuperscript{11} Faulder, 92.
\textsuperscript{12} Faulder, 93-94
\textsuperscript{13} Faulder, 94.
supportive role in terms of resolving disputes, assisting tuberculosis committees and aiding areas desiring to join the program to organize and prepare them for inclusion in the program.\textsuperscript{14}

New York State entered into the Cooperative State-Federal Program in May of 1918. For New York, the importance of active participation in such an aggressive bovine tuberculosis eradication program was essential given the value and size of New York State’s livestock population. Reporting for 1921, just a few years after the commencement of the program, Berne A. Pyrke, the Commissioner of Agriculture for the State, emphasized:

New York State ranks second in number and first in the value of its dairy cattle, having 2,081,074 cattle valued at approximately $194,357,117. It will be seen from these figures that we cannot afford to have this insidious disease eating away at the profits derived from one of our greatest industries. The losses caused by bovine tuberculosis necessarily increase the cost of all beef and dairy products. Many dairymen will not introduce animals into their herds unless reasonably sure that the herd from which the purchase is made is tuberculosis-free. This means paying a premium for animals from clean herds…Another important feature of this subject is its bearing on the reputation of the Empire State for producing breeding stock. At present, Cuba, China, Argentina, and other countries frequently make purchases of pure-bred cattle in New York State – this in addition to the large demand from our sister states. It is obvious that failure to supply this trade with tuberculosis-free cattle will mean, first, a reduction in price, and, second, the loss of a market.\textsuperscript{15}

Although New York State had been the first in the United States to implement a bovine tuberculosis program, Pyrke noted that “intensive work” did not begin until the start of the Cooperative State-Federal Program in 1918. Participation in the program began immediately and grew steadily over the next few years:

\textsuperscript{14} Faulder, 94-95.
### Table 1.0: Operation of the State-Federal Cooperative Program in New York State, 1917-1921

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Approximate Number of Animals Examined</th>
<th>Approximate Number of Animals Rejected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1917-18</td>
<td>17525</td>
<td>1493</td>
</tr>
<tr>
<td>1918-19</td>
<td>24304</td>
<td>2097</td>
</tr>
<tr>
<td>1919-20</td>
<td>48566</td>
<td>6842</td>
</tr>
<tr>
<td>1920-21</td>
<td>115505</td>
<td>20702</td>
</tr>
</tbody>
</table>

In addition to the accredited herd plan, the above cattle also represented cattle participating in area testing. By 1921, ten counties in the State were pursuing area testing. They were the counties of Allegany, Cattaraugus, Chenango, Essex, Greene, Madison, Onondaga, Ostego, Steuben and Tompkins. Collectively, these counties, by 1921, comprised 4158 herds, with some 83160 animals under supervision. By 1921, 121 of these herds had been declared free of bovine tuberculosis.  

The Cooperative program grew substantially throughout the 1920s. By 1928, the State was able to report on a decade of work with the program. By that point, New York State’s cattle population stood at 2,016,000 which was made up of approximately 176,000 herds in 62 counties. The first ten years of the accredited herd program unfolded in the following manner:

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16 Statistics for this table were taken from Pyrke, *Report of the Department of Farms and Markets For the Year 1921*, 31.
The growth in the number of accredited herds in New York State was matched by the growth in area testing in the state as well. As the following chart, published in 1928, indicates, growth in area testing was matched by the reduction in the rates of bovine in those areas:

<table>
<thead>
<tr>
<th>County</th>
<th>Approximate percent of bovine tuberculosis, May, 1918</th>
<th>Estimated percent of bovine tuberculosis, August 1, 1928</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hamilton</td>
<td>2.8</td>
<td>.1 of 1</td>
</tr>
<tr>
<td>Warren</td>
<td>5.7</td>
<td>.3 of 1</td>
</tr>
<tr>
<td>Yates</td>
<td>6.2</td>
<td>.2 of 1</td>
</tr>
<tr>
<td>Essex</td>
<td>7.2</td>
<td>.1 of 1</td>
</tr>
<tr>
<td>Steuben</td>
<td>7.3</td>
<td>.4 of 1</td>
</tr>
<tr>
<td>Schuyler</td>
<td>7.4</td>
<td>.2 of 1</td>
</tr>
<tr>
<td>Allegany</td>
<td>8.8</td>
<td>.2 of 1</td>
</tr>
<tr>
<td>Cattaraugus</td>
<td>15.3</td>
<td>1.0</td>
</tr>
<tr>
<td>Clinton</td>
<td>17.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Chautauqua</td>
<td>19.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Ontario</td>
<td>19.3</td>
<td>1.0</td>
</tr>
<tr>
<td>Wyoming</td>
<td>20.8</td>
<td>1.5</td>
</tr>
<tr>
<td>Tompkins</td>
<td>22.2</td>
<td>1.0</td>
</tr>
<tr>
<td>Oswego</td>
<td>24.4</td>
<td>1.5</td>
</tr>
<tr>
<td>Livingston</td>
<td>25.6</td>
<td>1.0</td>
</tr>
</tbody>
</table>

19 See Faulder, 119.
In addition to producing charts of all forms reporting the progress of the State-Federal Co-operative Program and the various facets of its operation, the BAI and New York State of Agriculture and Markets produced illustrative maps. In these, one observes the State progressively carpeting the livestock of the State and the areas they inhabited with their authority and supervision:

![Map showing progress of bovine tuberculosis eradication](image)

Figure 1.0: Tuberculosis Eradication Area Testing & Accredited Herd Work, 1921

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20 See Faulder, 120.
21 See Faulder, 124.
By 1928, one observes the tremendous growth in the amount of bovine tuberculosis work in New York, and by extension, the authority of the state:

![Tuberculosis Eradication Area Testing & Accredited Herd Work, 1928](image)

**Figure 2.0: Tuberculosis Eradication Area Testing & Accredited Herd Work, 1928**

The late 1920s offer an interesting glimpse into the execution of the State-Federal Cooperative Program. As was the case with Canada, as time passed and bovine tuberculosis eradication programs moved closer and closer to their ultimate achievement and other diseases took increasing precedence, reporting from year to year on bovine tuberculosis became less and less detailed and descriptive. It is therefore in earlier decades such as the 1920s where some really interesting and detailed observations about how this program ran on the ground are found.

In New York State, Cattaraugus County in the Southwestern portion of the state became a subject of study. Efforts to eradicate bovine tuberculosis in Cattaraugus County began in 1923.

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22 See Faulder, 125
The work of eradication in this county, first summarized by Veranus Moore in 1929, and then by Division of Research of the Millbank Memorial Fund in 1931, illustrates not only how the work was carried out, but also the challenges that arose in carrying it out and the importance of the cooperation between different agencies.\textsuperscript{23} Bovine tuberculosis eradication was part of a wider public health initiative in Cattaraugus County. Prior to the start of the bovine tuberculosis eradication program in 1923, the county, with money it provided along with additional funds from the State, and the Milbank Memorial Fund, “…set up in Cattaraugus a thorough and efficient county health service, that would serve as a demonstration in rural public health administration…known as the Cattaraugus County Health Demonstration.”\textsuperscript{24} A sanitary milk supply was quickly concluded to be essential to this rural public health initiative and with additional funding from the BAI and New York State Department of Farms and Markets, a tuberculosis committee consisting of members such as the famous Theobald Smith, then-director of Animal Pathology at the Rockefeller Institute; William Park, director of the Bureau of Laboratories of New York City’s Department of Health; and Veranus Moore, who was then Dean of the New York State Veterinary College, advised and oversaw the organization of the work.\textsuperscript{25}

A considerable amount of background work and consultation was performed before any new work got underway. Meetings were held to discuss the extent of tuberculin testing in the county at that time, which was found to be limited to certain areas that had merely been “gone

\textsuperscript{23} Briefly, The Milbank Memorial Fund was first established in 1905 under the auspices of wealthy New York philanthropist Elizabeth Milbank Anderson. Beginning in the late 1920s, the organization funded a number of public health and social welfare causes in New York State. See Clyde V. Kiser, “The Work of the Milbank Memorial Fund in Population Since 1928,” The Milbank Memorial Fund Quarterly 49, no. 4 (1971): 15-66.

\textsuperscript{24} Veranus Moore, “An Attempt to Eradicate Bovine Tuberculosis from Cattaraugus County,” Veterinary Medicine 22, no.7 (1929): 283.

\textsuperscript{25} Moore, “An Attempt to Eradicate Bovine Tuberculosis from Cattaraugus County,” 283.
This was not to say that livestock owners and individuals were ignorant of the problem of bovine tuberculosis. Indeed, Moore notes that a great deal of educational work had been done in the county to prepare for overseeing the creation of accredited herds. A number of well-attended meetings were held in communities as well as individual meetings between veterinarians and livestock owners to get their approval for tuberculin testing. With these background exercises, eradication work got underway in 1923 and took several years to complete. A summary of the work illustrates the slow removal of bovine tuberculosis from Cattaraugus County through successive tuberculin tests:

In all the tests made in 1923, there were 65,208 cattle examined, with 7.7 per cent reactors. In 1924, there were 71,003 cattle tested with 4.9 per cent reactors. From November 1, 1924, to September 15, 1925, there were 25,483 cattle, largely in infected herds, retested with 2.53 per cent reactors. During this period, in all there had been removed 11,451 infected animals from the herds of Cattaraugus County. In May 1927, Dr. E.T. Faulder, chief of the Bureau of Animal Industry in the Department of Agriculture and Markets in Albany, wrote Dr. Smith to the effect that the infection in Cattaraugus County had been reduced from 10.3 to .99 of one per cent, which he considered as “a very satisfactory showing.” By the end of 1930, according to data furnished… the per cent reacting was .85.

There were some difficulties encountered carrying out the work of eradication in Cattaraugus County. Obtaining and sustaining the funding necessary to carry out testing and indemnities, not surprisingly, was a challenge early on. Moore notes, for example, that obtaining funds from the state for compensating livestock owners for their tubercular cattle was initially a challenge. In his opinion, “…it was impossible to operate in so large an area if money was not available for

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26 Moore, “An Attempt to Eradicate Bovine Tuberculosis from Cattaraugus County,” 284.
27 Moore, “An Attempt to Eradicate Bovine Tuberculosis from Cattaraugus County,” 284.
28 “A Note on the Extent of Tuberculin Testing and Tuberculosis Infection in Cows in a Rural Area of Cattaraugus County,” The Millbank Memorial Fund Quarterly Bulletin 9, no. 2 (1931): 47. The whole of Cattaraugus County was declared an “area” to be accredited.
The Commissioner of the state committed $120,000 of guaranteed state money to the program in order, at roughly a $60.00 average per animal, to test up to 2000 animals. Ultimately the initial funding provided by the state was insufficient as the number of tubercular cattle identified was much higher than expected:

After the seriousness of the situation had been presented to the Commissioner of Farms and Markets, in the light of the extraordinary effort that was being made by the supervisors of the county and the Milbank Memorial Fund to remove all possible sources of tuberculous infection, the department consented to allow the county an additional $60,000 of indemnity money.

A second difficulty in carrying out eradication work in Cattaraugus County was manpower. Moore noted that, at that time, governments at both the state and federal level were unable to provide a large enough number of veterinarians to oversee the work. The County turned, then, to local veterinarians to shore up their numbers in order that the tuberculosis “drive” could go ahead successfully. For example, when tuberculin testing got underway in 1923, of the eighteen veterinarians working on the program, six were local practitioners. Although unable to compensate them for their work, both the BAI and state authorities accepted the tests performed by local practitioners.

The participation of local practitioners was advantageous in the end. Not only did these veterinarians serve an immediate need, providing additional professional support where federal and state authorities were unable to do so, but they were also essential to the overall operation of the program after initial testing was completed. As Moore noted: “…as the owners were

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30 Moore, “An Attempt to Eradicate Bovine Tuberculosis from Cattaraugus County,” 285. Moore noted that based on local opinion, it was felt that the number of tubercular animals would not exceed 2000.
31 Moore, “An Attempt to Eradicate Bovine Tuberculosis from Cattaraugus County,” 286.
dependent on the local practitioners to continue the testing after their herds became accredited officially, it seemed wise to the committee that they should be familiar with the findings on the initial examinations."

The participation of local practitioners became all the more essential when the testing “drive” in Cattaraugus County came to an end before the entire cattle population was tested. It was a disappointing end to such an aggressive exercise, but although clear reasons for the “drive” were not forthcoming, outstanding tuberculin tests could be overseen by the county’s veterinarian. Furthermore, Moore noted that many livestock owners, upwards of 40%, in the County were not timely in having their herds retested. After a representative of the BAI spoke with many of these owners, many retests were carried out.

In October of 1937, New York State was declared a modified accredited area. This meant the state could demonstrate that one hundred percent of the cattle in the state had undergone at least one tuberculin test and that the rate of bovine tuberculosis infection in the state’s cattle was less than one-half of one percent. It was a great achievement for the state, whose aggressive Cooperative State-Federal Program began in 1918, as Holton V. Noyes of the New York State Department of Farms and Markets explained:

The eradication campaign involved more individual tests, more funds, and more reactors than similar campaigns in other states. In all, 17,798,839 individual tests were administered, and $57,773,000 was expended by the state and federal governments for indemnities for 967,624 reactor cattle. The average infection was reduced from approximately 40 per cent in 1919 to less than one-half of one per cent when the test was completed on October 1, 1937. On December 31, 1937, the state had 143,891 accredited herds, containing 1,811,696 cattle.

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33 Moore, “An Attempt to Eradicate Bovine Tuberculosis from Cattaraugus County,” 286.
34 Moore, “An Attempt to Eradicate Bovine Tuberculosis from Cattaraugus County,” 287.
New York State achieved the goal of accreditation in the same way Ontario and countless other political jurisdictions did through a consistent and sustained exercise of tuberculin testing. The work itself did not appear glamorous or dramatic, but its results certainly were. Nearly eighteen million tuberculin tests and the expenditure of nearly $58 million represented an impressive effort, reflecting not only the importance placed on the eradication of bovine tuberculosis, but the sustained effort and investment it required. The decade of the 1930s would see this work completed, carrying on from the work begun in the 1920s outlined earlier in the chapter. For example, the following chart illustrates the progress of accredited herds in the state from the beginning of the State-Federal Cooperative Program in 1919 to 1937 when the state was declared an accredited area:

Table 4.0: Progress of Accredited Herd Plan in New York State, 1918-1937

36 New York State, Department of Agriculture and Markets, Annual Report of the Department of Farms and Markets For the Year 1937, 20.
The transformation of New York State into an accredited area is further observed with the spread of the State-Federal Cooperative Program in the form of maps produced by the Department of Farms and Markets. Throughout the 1930s state intervention and authority gradually carpeted New York State until it reached its accredited status in 1937:

![Map of Tuberculosis Eradication Area Testing & Accredited Herd Work, 1931](image)

Figure 3.0: Tuberculosis Eradication Area Testing & Accredited Herd Work, 1931

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Figure 4.0: Tuberculosis Eradication Area Testing & Accredited Herd Work, 1934\textsuperscript{38}

Figure 5.0: Tuberculosis Eradication Area Testing & Accredited Herd Work, 1936\textsuperscript{39}

\textsuperscript{38} New York State, Department of Agriculture and Markets, \textit{Annual Report of the Department of Agriculture and Markets For the Year 1933} (Albany: J.B. Lyon Company, 1934), 14.

\textsuperscript{39} New York State, Department of Agriculture and Markets, \textit{Annual Report of the Department of Agriculture and Markets For the Year 1935-38} (Albany: J.B. Lyon Company, 1937), 14.
Authorities in New York State saw education and preventative measures on the farm as additional essential measures in the success of the Cooperative State-Federal Program. Throughout the summaries of the program’s progress in the 1930s, the value of educational work was regularly emphasized. Performed with the desired outcome of “…giving our cattle owners full information relative to the methods to be followed in eradicating tuberculosis from the herds, and the benefits to be derived from maintaining herds free from disease,” educational work took several forms. For example, literature was distributed to livestock owners through various printed circulars and bulletins produced by the Department of Agriculture and Markets and made available at various livestock and township meetings. Educational work also took the form of demonstrations at public events:

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41 State of New York, Department of Agriculture and Markets, Holton V. Noyes, *Annual Report of the Department of Farms and Markets For the Year 1933* (Albany: J.B. Lyon Company, 1934), 27. One such publication appeared in 1930. Produced by the Department of Agriculture and Markets, this bulletin was a collection of papers given at conference of veterinarians in the Eastern United States. Within the collection, for example, are reports on the progress of the State-Federal Cooperative Program in several eastern states as well as papers on bovine tuberculosis and public health, meat inspection, other infectious livestock diseases such as Bang’s Disease and Rabies, and the role of veterinarians in disease control. See State of New York, Department of Agriculture and Markets, Berne A. Pyrke, *Proceedings of the Eleventh Annual Eastern States Conference on Tuberculosis and Other Animal Diseases*, Bulletin 242 (Albany, 1930).
A final essential measure in the success of the State-Federal Cooperative Program that was continually emphasized year after year by the Department of Agriculture and Markets was the maintenance of tuberculosis-free herds and, in particular, the prevention of further disease on the farm. Like Canada, the disinfection and renovation of buildings on the farm to prevent the spread of disease and promote a healthy environment was built into the State-Federal Cooperative Program.

On some occasions, owners were asked to address the built environments in which their herds were housed. Once barns were disinfected after herds were tuberculin tested, attention was pointed “...to insufficient space, light or ventilation and to faulty construction.” Owners were compelled to remove debris (often large piles of manure situated close to where animals were

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penned), construct windows and ventilation systems, and replace wooden walls, floors, and troughs with cement or metal that was easier to keep clean. In addition, drainage systems to remove feces and debris away from pens, if not already installed, were encouraged.  

![Figure 7.0: Example of an “ideal” barn with concrete floors and walls for efficient cleaning and optimal sanitation](image)

Many farms did not require the renovation or complete reconstruction of their facilities. For many, disinfection was effective, and the Department of Agriculture and Markets provided both the equipment and manpower to see it carried out. Laymen, employed by the state, were equipped with power washing equipment and detergents, and would arrive at farms whose herds were undergoing or had undergone testing and thoroughly cleaned their premises.

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44 *Annual Report of the Department of Farms and Markets For the Year 1933*, 27.
By 1937, the state employed 87 laymen to disinfect thousands of New York State farms. In 1937 alone, 2,484 farms were disinfected, reflecting the tremendous emphasis placed on preventative measures. Authorities were encouraged by these measures, connecting disinfection with the overall decline of bovine tuberculosis infection in the state:

During the past year, the results of retests upon infected and clean herds have been highly satisfactory – in fact, have exceeded the greatest expectations. The percentage of reactors resulting from retests has been exceedingly low and the number of infected herds from passing successful tests has also exceeded expectations. This may be credited in a large degree to the thorough manner in which infected premises have been cleaned and disinfected by the method described, the removal of infection reducing the re-infection of cattle to a minimum.47


By 1934, all cattle in New York State were under the State-Federal Cooperative Program and had undergone at least one round of tuberculin testing. In 1937, New York was declared the forty-sixth Modified Accredited State in the United States. This meant that all cattle in the state had been subjected to at least one tuberculin test and that the level of infection in the state was less than 0.5 of one percent. This was eradication. Eradication did not mean annihilating the disease from existence, but suppressing it to a level where it could be managed should it appear. It was achieved in New York State through compensation, cooperation between veterinarians and livestock owners, and an efficient, cooperative structure of authority from local veterinarians to federal policymakers.

Canada and the United States began their major eradication campaigns around the same time. However, it took Ontario significantly longer to successfully carry out its programs compared to New York State. For example, Ontario was still incorporating new herds and areas into its programs for nearly two decades after New York received its modified accredited area status. The latter half of this chapter will explore not only the operation of Canada’s bovine tuberculosis in Ontario, but offer suggestions as to why the programs unfolded so differently there than in New York State. Two aspects stand out. Firstly, the Canadian Department of Agriculture chose to pursue bovine tuberculosis eradication with a series of programs rather than a single, unified effort. The logistics of continuing past programs alongside new ones stretched resources and ultimately impeded their progress. Secondly, the way the Department structured the authority and administration of its programs restricted the ability to carry them out faster.

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The Ultimate Eradication of Bovine Tuberculosis in Ontario, 1919-1950

Canada moved forward with the final eradication of bovine tuberculosis in the 1920s not with a single program devoted to the disease but with several separate programs. Notable were the Supervised Herd Plan, Municipal Tuberculosis Order, Accredited Herd Plan, and Restricted Areas Plan. Of the four, the Restricted Areas Plan was the most extensive, but the others also contributed significantly to the ultimate control of the disease. Making this work possible in this period was an army of veterinarians and researchers employed by the Department of Agriculture.

Canada stood in contrast to the United States for its choice to eradicate bovine tuberculosis through a series of distinct programs as opposed to one single program, however some similarities did exist. The American State-Federal Cooperative Program was essentially made up of both accredited herds and restricted areas, but the Canadian government continued operating programs it had started earlier in the century, most notably the Supervised Herd Plan. The Veterinary Director General’s office was mum on its decision to create new programs and continue the legacy of older ones rather than create a new, all-inclusive program. Regardless, these numerous programs reflect a lack of homogeneity in the Canadian cattle industry. The livestock industry was made up of different parts and these programs reflect that. The Accredited Herd Plan focused largely on purebred breeding animals, the Supervised Herd Plan focused on those who did not qualify for it, and the Restricted Areas Plan combined the two.

Veterinarians appointed by the Health of Animals Branch were the official administrators of tuberculin testing and the daily functioning of programs. For example, the agreement reached between Canada and the United States in the 1890s requiring tuberculin tests for cattle imported
from each nation required the veterinary inspector be appointed by the government. Furthermore, the testing in the first domestic bovine tuberculosis program introduced in 1895 and the 1903 order were mandated to be carried out by federally-employed veterinarians. With the introduction of the Accredited Herd Plan and Restricted Areas Plan, the need for veterinarians grew. Their presence and activity would increase substantially over the next thirty or so years.

In implementing and operating these programs in the coming decades, the Health of Animals Branch continued its long engagement with the livestock owners of Ontario and the rest of Canada. In addition to employing the veterinarians who carried out the day-to-day function of bovine tuberculosis programs, the Health of Animals Branch and its veterinarians engaged with the livestock community. For this, the federal and provincial departments of agriculture worked in cooperation.

Unlike New York State, the role that Ontario’s provincial government played in bovine tuberculosis eradication in cattle was less direct. First, the veterinarians who went out and administered the hundreds of thousands of tuberculin tests for the programs were the most visible legacy of the provincial government. Trained by the Ontario Veterinary College, these veterinarians were employed by the Health of Animals Branch and became the face of the federal government to countless livestock owners in Ontario and the rest of Canada.49

The provincial government also played an important role in promoting the merits of bovine tuberculosis eradication through educational literature and demonstration work. In 1897, for example, the Department produced a special bulletin titled *Tuberculosis in Cattle.*50 In it, |

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49 The Ontario Veterinary College was the only English-language veterinary school in Canada until 1964. The Western College of Veterinary Medicine, located at the University of Saskatchewan, opened that year, and graduated its first class in 1969.

50 Ontario Department of Agriculture, *Tuberculosis in Cattle* (Toronto: Warwick Bro’s & Rutter, 1897).
interested livestock owners were instructed in the properties of the disease and the function and application of tuberculin. In addition, the bulletin announced the appointment of Lt. Col David McCrae of Guelph, Ontario, to give demonstrations and lectures to interested Farmer’s Institutes.51

The Ontario government continued to produce literature on tuberculosis and the sanitation of barns and farms generally over the next few decades with contributions from faculty and researchers at the Ontario Agricultural College and, to some extent, the Ontario Veterinary College. Several publications outlining tuberculosis in the province’s swine and poultry populations were produced, reflecting the province’s more direct involvement in those industries.52 In addition, literature related to Ontario’s beef and dairy industries frequently mention bovine tuberculosis. The province encouraged its livestock owners to actively engage with the programs offered to them in order to strengthen and increase the value of their own herds and the products they produced.53 For example, a meeting of the Dairyman’s Association of Eastern Ontario in 1919 proclaimed: “…if dairy products, butter, cheese, condensed milk, etc., are to be of the very highest quality, milk itself must be pure and sanitary.”54 The Minister of Agriculture in 1929, John S. Martin, reflected on the success of the Restricted Areas Plan in

Prince Edward County, the first to come under the program: “...the test has been of untold advantage...cattle prices and demand have increased... [and]...best of all, the people are much healthier since the reactors have been removed and no milk with tuberculosis germs is being used.”55

The Health of Animals Branch also distributed several pamphlets on bovine tuberculosis to provincial livestock associations and interested livestock owners. In addition to literature such as reports of the International Commission on the Control of Bovine Tuberculosis outlined in Chapter IV, the Health of Animals Branch produced other pieces such as *Bovine Tuberculosis: Questions and Answers* in 1922. In it the merits of the programs were outlined, the role and duties of both veterinarians and livestock owners in carrying out the programs were described, and practical matters such as disease control and the frequent change in the composition of a herd were discussed.56

If veterinarians physically represented the intervention and presence of the State in the operations of livestock owners, behind the scenes, an equally important group of laboratory scientists were toiling to unravel the mysteries of bovine tuberculosis, exploring possible treatments and vaccines for the disease as well as manufacturing the tuberculin needed by veterinarians in the field. In Canada, for example, this research and production was performed by the Pathological Division of the Health of Animals Branch at a research station located in Hull, Quebec.

Publicly-sponsored tuberculosis research in Canada began with the establishment of a small experimental station at Outremont, Quebec, in 1897/98, largely at the insistence of Duncan McEachran, whose concern for the threat of bovine tuberculosis to Canadian herds was well documented. Very early on, the preparation, use, and effectiveness of tuberculin was of central concern to those working at the station, notably Charles Higgins, who was appointed to oversee the work carried out at the Outremont station in 1899. Here, Higgins began carrying out laboratory work (mainly at the Royal Victoria Hospital, where vital laboratory equipment unavailable at the research station was available) on identifying various strains of tuberculosis. In addition, Higgins made numerous visits to farms to perform necropsies and collect samples of tuberculosis for examination as well as receive samples sent to him from across the country. In addition, it was during this period that the work of the station extended to the manufacture of tuberculin. Europe had been the main source of tuberculin, making it incredibly expensive and time-consuming to obtain. The Pathological Division subsequently began manufacturing tuberculin and became the official source of the substance for the various policy initiatives in Canada. The control of the manufacture and distribution of tuberculin was important as it limited those who could administer it to officially-sanctioned veterinarians, limiting the chance of farmers having their animals tested by unqualified individuals, and ultimately placing another level of control on the eradication of bovine tuberculosis. The Pathological Division, over the course of the several decades it took to eradicate tuberculosis, prepared and distributed hundreds of thousands of samples of tuberculin.

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58 Sayers, 263-264.
59 Sayers, 264.
A major change for the Pathological Division and to tuberculosis research generally in Canada would occur in 1917. That year, a new research station was established at Hull, Quebec. This station would be the locus of tuberculosis research for the next several decades until research on the disease tapered off in the 1950s. The division’s research included the identification and study of the characteristics of different strains of tuberculosis, the susceptibility and possible immunity exhibited by some calves to the disease, experimentation and subsequent disproving of the efficacy of the BCG vaccine on cattle, and the degree of infection in cattle and how it would inform what to do with infected cattle – whether or not, for example, they should be slaughtered immediately upon diagnosis or could be kept for breeding purposes.

In the early 1950s, the division’s bovine tuberculosis research declined sharply. As the majority of Canadian cattle fell under the surveillance of one of the numerous bovine tuberculosis programs, the need for aggressive research lessened considerably. Moreover, other emerging and problematic infectious diseases such as brucellosis and foot-and-mouth disease took precedence over tuberculosis both in terms of research and funding. Regardless, the research and veterinary practitioners illustrated here were the indeed the face of the bureaucratic solution to bovine tuberculosis, enhancing the scientific understanding of the disease in Canada, producing the diagnostic medium required to identify it, and ultimately carrying out the work of eradication on the ground.

60 Dukes and McAninch, 60.
The 1920s saw the introduction and initial operation of both the Accredited Herd Plan and Restricted Areas Plan. While these two programs were to be the most prominent and indeed costly programs carried out by the Canadian government, the Health of Animals Branch continued to carry out the Supervised Herd Plan. The consistent application and maintenance of these programs was key, even though the yearly accounting of their operation appears repetitive and monotonous. Though the programs would experience shortages of funds and personnel in the coming decades due to events such as World War II, their forward movement was maintained. In addition to internal issues, officials and veterinarians also had to contend with competing government programs that threatened to undo testing and eradication work, such as the Sire Sharing Program began by the Department of Agriculture’s Livestock Division in 1913.

Beginning in 1919, the Health of Animals Branch emphasized the importance of the Accredited Herd Plan as a means to control bovine tuberculosis in largely mobile breeding herds bound for the United States. Here was a program of convenience and efficiency, allowing livestock owners who met the criteria (a herd with at least five registered animals, one of which had to be a sire), to be issued, after successfully testing and eliminating reactors from the herd, a certificate certifying the tubercular-free status of their herd. Although a Canadian program, the Health of Animals Branch was keen to emphasize the international nature of this program:

This is an international plan and the regulations governing the accreditation of herds are therefore similar in this country to those in force in the United States. This arrangement facilitates the importation and exportation of fully accredited cattle between these two countries, as they are admitted to either country without special test, or detention at the boundary if accompanied by a Federal certificate declaring their fully accredited status.62

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With the prospect of compensation and an efficient manner of moving herds to the United States, the Accredited Herd Plan met with immediate popularity with Canadian livestock owners. Throughout the 1920s, the program grew considerably, as evidenced in reports released by the Veterinary Director General and its popularity was clear as it grew from zero to over 4500 herds over the course of a decade. It would only continue to grow in the coming decades.

The Accredited Herd Plan strained the resources of the department soon after its introduction and thus a common complaint from the Veterinary Director General’s office of a lack of resources began, a complaint that would persist throughout the decade and indeed until all Canadian cattle came under one of the Health of Animals Branch’s eradication programs. Frederick Torrance foresaw the challenge early in 1920:

…[the work] adds very greatly to the work of our inspectors, and as we advance will still further impede our progress. We appear to be dragging a chain which lengthens at every step. Relief will be in sight when we have a list of fully accredited herds from which purchases can be made, and when the time arrives for turning over the herds which have been fully accredited for one year to the future control of the approved practitioner.  

Regardless of any real or perceived lack of manpower and resources, the Health of Animals Branch and its veterinarians would press on with the Accredited Herd Plan, continually emphasizing its importance. In particular, when the percentage of tuberculin reactors in the Accredited Herd Plan are compared to that of the Municipal Tuberculosis Order, nearly three

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times as high, the importance of the program was all the more clear. Moreover, the Veterinary Director General’s office was critical of breeders regarding the state of their herds:

Comparing the two, it is to be noticed that the owners of pure-bred herds are frequently sending their best animals to be exhibited at fairs and exhibitions. These animals naturally come into more or less close contact with other animals from different herds, and the opportunity for the dissemination of disease is favourable. On the other hand, animals from ordinary dairy herds do not come to exhibitions, and consequently this source of infection is absent. Another reason why the accredited herd percentage is so high is found in the manner in which additions to these herds are made. Breeders have been generally more concerned with obtaining animals of desired breeding, or of special families, or of fashionable strains, than they have been to ensure that the animals they purchase are free from disease.

Running alongside the Accredited Herd Plan in the 1920s was the Supervised Herd Plan. For example, many single animals were tested for import and export, and private practitioners also conducted general tests that were accepted by the Health of Animals Branch so long as they were performed by an accredited veterinarian. More intriguing though were substantial numbers of cattle tested under the Supervised Herd Plan. The earliest substantial test-and-slaughter program implemented by the Department of Agriculture in 1905, it is curious in some ways that the program persisted for so long and with such popularity in the presence of other, more lucrative, programs such as the Accredited Herd Plan and Restricted Areas Plan, which both offered monetary compensation for tubercular cattle. However, many livestock owners did not have the number of purebred cattle necessary to participate in the Accredited Herd Plan, or they did not meet the residence requirements for the Restricted Areas Plan. So the Supervised Herd Plan was their only alternative. Moreover, the persistence of the Supervised Herd Plan reflected the

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ongoing problem of bovine tuberculosis within Canada and in particular, the *movement* of bovine tuberculosis within Canada. The following graph illustrates the growth of both the Accredited Herd Plan and Supervised Herd Plan in the 1920s:

![Growth of Accredited Herd Plan (Ontario) and Supervised Herd Plan (Canada), 1920 - 1929](image)

Three years after the introduction of the Accredited Herd Plan, the Restricted Areas Plan was introduced. At first, it did not grow as quickly as the Accredited Herd Plan, since veterinary inspectors had to organize the testing of several herds in defined geographical areas as opposed to single herds. The growth of the Restricted Areas Plan in the 1920s, however, facilitated a wide system of eradication and surveillance for many of the nation’s herds. The first area brought

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66 For numerical data contained in Figure 9, See Government of Canada, Department of Agriculture, *Report of the Veterinary Director*. See years 1921 – 1930.
under the program was the Carman District of Manitoba. Ontario would not see its first restricted area, Prince Edward County, until 1927:

Figure 10.0: Growth of the Restricted Areas Plan, 1922-1930

Running parallel to the various bovine tuberculosis eradication programs in Canada were other programs designed to improve the nation’s livestock. One such activity was a program of pure-bred bull sharing that began in 1913. An initiative of the Department of Agriculture’s Livestock Branch, a separate body from the Health of Animals Branch, the program, called the Sire Sharing

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Program, consisted of the Department loaning bulls of various breeds through the numerous livestock associations across the country for a period of one year to actively breed and improve herds in a given area. During the loan period of one year, the association and its members were responsible for the care and upkeep of the bull and should they have needed the bull for more than the one year the program allowed, the association could apply for an extension.68

The Sire Sharing Program was popular from its beginning. Two years after the implementation of the program in 1915, for example, 916 cattle were distributed across the country, including 88 in Ontario and the largest, 265, in Quebec.69 The following year in 1916, 1259 animals were participating in the program.70 By 1920, the number of bulls in the program numbered 3424.71

The Sire Sharing Program presents an interesting case of two branches of the same department working at cross-purposes. Although created with a clear and beneficial purpose, the Sire Sharing Program presented significant epidemiological issues and had the potential to undermine the ongoing programs for the eradication of bovine tuberculosis. The mobile bulls in the program posed a considerable risk for spreading bovine tuberculosis to herds across the country. It is clear in the records of the Department of Agriculture that the program saw bulls sent to every province and the risk these animals posed to the spread of bovine tuberculosis was

very real. In 1934, for example, George Hilton noted the inclusion of these animals in the testing activities of the veterinarians from his office.\textsuperscript{72}

Canada’s various bovine tuberculosis eradication programs continued throughout the 1930s. Many more herds were incorporated into both the Supervised Herd Plan and Accredited Herd Plan. Furthermore, the eradication and surveillance work of the Health of Animals Branch expanded to several more areas through the Restricted Areas Plan. Interestingly, over the course of the 1930s and well into the 1950s, one can observe the spread of the influence of the state across the country, much in the same fashion that bovine tuberculosis itself spread across the country beginning in the nineteenth century, as more and more areas came under the Restricted Areas Plan.

The Accredited Herd Plan grew throughout the 1930s. Its popularity, however, along with eradication work in general, was tempered by the logistical challenges of carrying out such a large initiative. A common complaint of the Veterinary Director General was the slow pace at which the work was progressing: “It has, in the circumstances been necessary to employ every available inspector at times in this work, and while every effort has been made to conduct this work expeditiously, it has not been possible to satisfy the demand.”\textsuperscript{73} The Accredited Herd Plan in the 1930s in many ways became the victim of its own success. As more and more livestock owners signed on to the program, the amount of testing and, especially, of retesting herds in order to certify and recertify them, increased substantially:


While it is important to meet this demand to the greatest extent, it is just as important that we do not permit our eagerness to make progress to interfere with efficient methods. The very nature of this infection necessitates constant vigilance and prevents the making of permanent progress unless due attention is paid to the retesting of all herds at suitable intervals.  

Regardless of the challenges, the Accredited Herd Plan forged ahead and the reports of the Veterinary Director General’s office reflect, again, that a majority of herds participating in the Accredited Herd Plan were from Ontario. The Supervised Herd Plan grew alongside the Accredited Herd Plan throughout the 1930s. As the various eradication programs grew in Canada, tubercular-free herds or individual animals became a more fixed part of the agricultural landscape. Owners were increasingly forced to turn to eradication programs in order to remain competitive or even participate in the livestock market. As was the case in the 1920s, many owners who did not meet the herd requirements of the Accredited Herd Plan or fall within the boundaries of a proposed area under the Restricted Areas Plan were left to turn to the Supervised Herd Plan:

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The observation of fluctuations in the number of herds under the Supervised Herd Plan in Ontario may be largely explained by the relationship of that program to other programs, most notably the Restricted Area Plan. Prior to 1931, if a restricted area was created in a district which contained a supervised herd, the owner was given the choice to remain a supervised herd or be included in the newly-formed restricted area. Presumably many chose to join the restricted area given the compensation it provided for tubercular animals. In 1931, owners participating in supervised herds were required to join restricted areas should they be created in an area containing that herd.76

75 For numerical data contained in Figure 11.0, See Department of Agriculture, Health of Animals Branch, *Report of the Veterinary Director*. See years 1931-1940.

Despite the popularity and participation in programs such as the Accredited Herd Plan and the Supervised Herd Plan, the Restricted Areas Plan was clearly favoured by the Veterinary Director General as the most effective bovine tuberculosis program in Canada:

The area plan is undoubtedly the most practical, economical, and quickest method to control this disease. It provides a clean area for clean herds and materially diminishes the possibility of contact with tuberculous animals. It has many advantages over the single herd policies, one of which is the publicity it affords. The regulations governing the movement of cattle into an area cannot escape public attention, and it is not long before there is an active market for dairy cattle within these areas.77

The following map illustrates the growth of the Restricted Areas Plan in the 1930s. A discussion of the cost of the program as a whole in terms of compensation will be presented towards the end of the chapter. The following numbers reflect the testing work, which often took more than one calendar year to complete given factors such as manpower and the size and number of herds, in a given area:

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With each year’s testing work, the area’s percentage of tubercular animals decreased. The remainder of the 1930s would see the continuation of the initial testing of the counties above as well as several more. For some areas that contained abattoirs, applying legislation was somewhat problematic given the mobile nature of the animals moving through them. As Hilton explained, these facilities were “…incompatible with the practical application of the regulations…” Hilton ultimately made the decision to exclude stockyards from the provisions of the Restricted Areas

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Plan. Furthermore, like the Accredited Herd Plan, the Department of Agriculture made an agreement with the Federal Government of the United States to move animals between restricted herds without detention between Canada and the United States. However, Hilton noted the agreement ran into some difficulties with the regulations of certain states which did not allow cattle into their districts without first passing a tuberculin test. Although frustrating, Hilton noted: “…although it is the function of a federal service to comply with the federal requirements of importing countries and not with the requirements of smaller governing bodies within these countries, an endeavour has been made to meet as far as practicable the laws of the destination state in addition to those of the federal authorities.”

The situation Hilton described is an interesting one as it highlights a tension between the protection of the livestock herds of individual states and the international agreements made by the Bureau of Animal Industry. Since the mid-1890s, cattle entering the United States from Canada had been required to pass a tuberculin test before they could move on to their ultimate destination. With the creation of the Accredited Herd Plan in 1919, the delay for the movement of some cattle was lessened given the Bureau of Animal Industry’s recognition of tuberculin tests performed by their counterparts in Canada. However, each state had its own set of regulations regarding the movement of livestock within and across its borders. Where tuberculosis was concerned, the regulations were similar, with a few minor variations. So long as the certificate was approved by the state, cattle would be permitted to enter having passed a standard tuberculin

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81 Government of Canada. Department of Agriculture, George Hilton, “Tuberculosis,” Report of the Veterinary Director for the Year Ending March 31, 1937, (Ottawa: J.O. Patenaude, 1937), 4. This is an interesting situation that Hilton highlights. A number of American states possessed regulations regarding the interstate movement of livestock in order to protect their herds from exposure to a variety of infectious diseases. New York State, for example, did not possess interstate movement regulations for several decades, putting their herds at considerable risk.
test. However, for other states, the process to move cattle was not as straightforward and these were the states to which Hilton was referring in his report. New York State happened to fall within this category. New York required a combination of tests for cattle to enter the State. In addition to the traditional tuberculin test done on the skin, the State also required an ophthalmic tuberculin test (performed in the tissue surrounding the eye). It was the addition of this second test that held up cattle in transit. Indeed, Hilton could very well have been referring to New York State when he made his remarks about the laws of certain states.

What course of action in light of these varying regulations did Canadian livestock owners have? It was not simply a case of the Bureau of Animal Industry exercising its authority and overruling state regulations. In the early 1900s, the notion of the Bureau of Animal Industry overseeing the interstate transit of animals was promoted by S.H. Ward, the state veterinarian of Minnesota, however cost and low manpower overruled this happening. Indeed, individual states had long challenged the health of incoming animals. Ultimately, livestock had to meet the requirements of the state they were entering and the only recourse for livestock owners in this period was to comply and work as best they could with members of the Bureau of Animal Industry and the relevant state authorities involved in those particular cases.

The progress of Canada’s bovine tuberculosis programs in the 1940s was slowed due to the war effort and the emergence of other infectious animal diseases. In 1940, for example, Veterinary Director General A.E. Cameron noted: “…because of the necessity of employing large numbers of veterinary officers on the control of hog cholera it was not possible to

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82 In 1928, a summary of the various laws regarding the interstate travel of cattle was provided in a report of the progress of New York State’s bovine tuberculosis eradication work. See Faulder, Bovine Tuberculosis: Its History, Control and Eradication, 137-142.
83 Faulder, Bovine Tuberculosis: Its History, Control and Eradication, 140.
accomplish the usual amount of tuberculin testing and some restricted areas testing for the eradication of bovine tuberculosis which had commenced were not completed at the end of the fiscal year.” Specific statistics for numbers of cattle involved in many bovine tuberculosis programs were not always forthcoming or written about with any specificity in this decade; however, some general observations can be made. At the beginning of the decade, Cameron noted that, in the estimation of his office, roughly forty-six percent of Canada’s cattle population was under the supervision of one of the country’s bovine tuberculosis eradication programs. By the end of the decade, over sixty-five percent of the nation’s cattle were under supervision.

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85 Government of Canada. Department of Agriculture, A.E. Cameron, “Tuberculosis,” Report of the Veterinary Director for the Year Ended March 31, 1941, (Ottawa: Edmond Cloutier, 1941), 6. Briefly, hog cholera, also known as swine fever, is a contagious viral disease that affects swine populations. Hog cholera was a problematic disease for the swine industry from the late nineteenth century well into the twentieth and was the subject of numerous studies, reports and farmer’s bulletins. See, for example, United States Department of Agriculture, Bureau of Animal Industry, Hog Cholera: Its History, Nature, and Treatment (Washington: Government Printing Office, 1889), and Dominion of Canada, Department of Agriculture, A.E. Cameron, Hog Cholera, Farmer’s Bulletin No. 79 (Ottawa, 1940).


Like the Accredited Herd Plan, the Supervised Herd Plan continued to include new herds throughout the 1940s. As with prior decades, the majority of herds participating in this program were from Quebec, however several thousand cattle from Ontario were added to the program every year. Although the Supervised Herd Plan would continue to include new herds, particularly in the west, it declined in the 1950s, the result of the inclusion of herds into the Restricted Areas Plan instead. Ontario’s last herds to be included in the Supervised Herd Plan were in 1948 and reports for the program cease after 1951.

The Restricted Areas Plan grew substantially in the 1940s, bringing several more areas of livestock herds in Ontario, and indeed the rest of Canada, under the supervision of the federal government. The statistics presented for the Restricted Areas Plan in the 1930s earlier in this

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88 For numerical data contained in Figure 13.0, See Government of Canada. Department of Agriculture, *Report of the Veterinary Director*. See years 1940-1949.
examination reflected not only the initial inclusion of various Ontario communities in the program, but the sometimes several years of subsequent testing work required to fully deem the area free of bovine tuberculosis. The following table illustrates the work of the Restricted Areas Plan in the 1940s:  

Ontario’s last restricted area, Parry Sound, was established in 1950, leaving Ontario with a total of fifty five restricted areas. Other provinces, notably in the west, would continue to create more

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89 Government of Canada. Department of Agriculture, T. Childs, “Tuberculosis,” *Report of the Veterinary Director for the Year Ended March 31, 1950*, 26-27. To note, it is evident that the war effort restricted the work of the program in this period.

restricted areas throughout the early 1950s until the last, in Alberta, was established in 1953.⁹¹
By 1953, all cattle in Ontario had been subjected to at least one tuberculin test.⁹² The following year, Kenneth Wells, the Veterinary Director General of Canada, noted that with the exception of Newfoundland, all cattle in Canada east of Ontario’s border with Manitoba had undergone at least one tuberculin test and roughly 87% of Canadian cattle in total were under supervision.⁹³
By 1960, 99% of Canadian cattle had undergone at least one tuberculin test, with the remaining one percent following the next year.⁹⁴

The subsequent testing that areas had to go through in order to become fully accredited and maintain their accreditation was substantial. Although all restricted areas in Ontario were defined by 1950, eradication work was far from over. Noted throughout the annual reports of the office of the Veterinary Director General are statistics reflecting hundreds of thousands of subsequent tuberculin tests in Ontario alone. For example, in 1952, after all restricted areas in the province had been defined, 167,690 first tuberculin tests were performed in the province to the tune of $80,495.64 in compensation.⁹⁵ Likewise, the Accredited Herd Plan continued to perform

tuberculin tests, owing to the fluid nature of ownership in these herds. For example, Canada as a whole saw 395,912 tuberculin tests performed on its accredited herds in 1958.96

The initial testing of cattle in Canada was in many ways the beginning of eradication work. To eradicate bovine tuberculosis, meaning to reduce its level to less than 0.5 of one percent, required thousands of retests with tuberculin and ongoing monitoring of domestic herds as well and import as of export cattle. This could only be achieved with the inclusion of all Canadian cattle under one of the Department’s bovine tuberculosis programs. This was achieved throughout Canada at different times. For accredited herds across the country, new cattle and new herds continued to be modified and added to the program up until the late 1950s. By 1960, with the exception of Alberta which sat at 99.5%, all of the country’s accredited herds had been tested at least once. These cattle numbered 455,552. For the Restricted Areas Plan, in the Maritimes, for example, Prince Edward Island’s cattle were all defined by 1925.97 In Nova Scotia, the inclusion of the province’s cattle in the Restricted Area Plan was mostly complete by the end of the 1920s, with the exception of a few areas added in 1949 and 1950. In New Brunswick, restricted areas were defined by the end of the 1930s. For other provinces, the establishment of restricted areas took longer. Ontario’s fifty-five restricted areas, as demonstrated throughout this chapter, began in the 1920s with the last being added in 1950. Quebec had a similar experience with its seventy-five restricted areas. Manitoba, Saskatchewan, and Alberta with 122, 321, and 103 restricted areas, respectively, experienced the program comparatively later than those in central and eastern Canada. The majority of Saskatchewan’s

restricted areas, for example, were established in the 1940s, as were Alberta’s. Alberta was the last province to add a restricted area in 1960. In total, by 1961 there were 737 restricted areas in Canada.⁹⁸

The completion of the first general test of Canadian cattle brought to an end nearly forty years of sustained, systematic, inaugural work. These programs came at a significant price. Some historians, such as George Wherrett for example, estimates that by 1961, when the first general test of all cattle in Canada had been completed, roughly $15 million in compensation had been paid out.⁹⁹ To give an idea of the expense bovine tuberculosis commanded, the following table, published in 1948, illustrates the amount of compensation paid out to Canadian livestock owners between 1904/05 and 1948/49 for various livestock disease programs:

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⁹⁹ Wherrett, 147.
Although glanders, hog cholera, and dourine were all unique diseases in their own right with their own distribution and created their own sets of issues, the amount of money spent on compensation for them was dwarfed by the amount spent on bovine tuberculosis.
Though Canada’s bovine tuberculosis eradication efforts began in the 1890s, clearly it was the late 1910s and early 1920s that the exhaustive system to eradicate bovine tuberculosis from the country was fully realized. Through the Restricted Areas Plan and Accredited Herd Plan, along with other programs such as the Municipal Tuberculosis Order and other local efforts outlined in Chapter III, all Canadian cattle were under some form of supervision. A remarkable feat, this was achieved not through a vaccine or other form of intensive veterinary therapy. Indeed, active research on bovine tuberculosis throughout this period was unsuccessful in the development of a vaccine or other type of therapy. Eradication was achieved test-by-test, herd-by-herd, area-by-area, retest-by-retest.

The final eradication programs for bovine tuberculosis in the United States and Canada reflected several decades of experience with the disease. With the creation of the State-Federal Cooperative Program and the AHP and RAP, authorities in both Canada and the United States learned that the most effective way to eradicate bovine tuberculosis was through voluntary programs of testing and slaughtering livestock with the disease and providing compensation to owners. What was created through this test-and-slaughter practice was not the annihilation of bovine tuberculosis, but the creation of a system of suppressing and managing the disease. By employing this system on both sides of the border, the state spread its authority over every livestock operation, eliminating diseased cattle but also reforming the farm environment into an ideal, sanitary environment to prevent the spread of disease. Unfortunately, bovine tuberculosis found new reservoirs that would prove much more difficult to manage. These reservoirs in wild North American species such as deer and bison would ultimately present new management challenges for veterinarians and government authorities, and would present new challenges for managing the disease in livestock.
Conclusion:

This study concludes with the successful initial incorporation of all of the herds contained in Ontario and New York State by the early 1950s into herd or area-wide bovine tuberculosis testing programs. The work of ridding Canadian and American herds from the disease was, however, far from over. Testing and re-testing herds for the disease would continue on for several decades. In the United States, in fifty years following the beginning of the Cooperative State-Federal program in 1917, bovine tuberculosis had been reduced in America’s national herd from 5% to 0.3%. By 1940, each American state had achieved a Modified-Accredited status, reflecting that bovine tuberculosis rates had been reduced to 0.5% or less. In 1965, bovine tuberculosis intervention transformed from the area-wide testing established in 1917 to a system of slaughter surveillance. If bovine tuberculosis was detected in cattle at one of the nation’s abattoirs, the disease was traced back by government inspectors to the herd and farm from which the animal originated. The herd was then tested and any reactors were destroyed and compensation provided. At the same time, the process of herd depopulation was promoted. If a tubercular animal was traced back to the herd, the offer was made to destroy the entire herd and provide compensation given the high likelihood of the disease appearing. Despite the decline of bovine tuberculosis in the nation’s herds, the work remains a constant challenge. The potential of bovine tuberculosis in imported cattle from other countries, specifically Mexico, as well as new

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2 Essey and Koller, 16-19.
reservoirs of the disease in wildlife presents constant challenges for the United States Department of Agriculture and the nation’s veterinarians.³

The Restricted Areas Plan reduced levels of bovine tuberculosis in herds to the point where in 1978 the Canadian government transformed its program from area testing to slaughter-surveillance. Another method employed in Canada beginning in 1978 that was also practiced in the United States was the depopulation of herds exposed to bovine tuberculosis. The United States began this practice in 1965 following the realization that roughly thirty percent of herds that had been exposed to the disease contained cattle who tested positive for the disease years after.⁴

Throughout this examination, it is clear that several aspects of bovine tuberculosis thought and practice transformed between the 1890s and the 1950s. They included how veterinarians, public health authorities, government officials and the general public understood bovine tuberculosis, and how all of these bodies went about addressing it. On both sides of the border, this meant that bovine tuberculosis in both human and animal populations were addressed essentially together as one disease for a number of years, however the introduction of meat inspection and pasteurization in the first decade of the twentieth century saw bovine tuberculosis addressed separately as a public health and livestock health issue.

For the disease in livestock, a further significant transformation over the period centred on the goal of bovine tuberculosis intervention. In both the United States and Canada, the “eradication” of the disease transformed and took on different meanings. Beginning in the late

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⁴ Essey and Koller, 16-21.
nineteenth century, for example, the sentiment for eradicating bovine tuberculosis essentially meant annihilating it from existence and there were a number of people who thought this was a correct and ideal goal. Waddington attributes a great deal of support for this sentiment to the experience of many individuals with other infectious livestock diseases in the nineteenth century, particularly the cattle plague of the 1860s. As a result, a number of European nations created eradication programs to address the issues that arose from other dramatic, acute outbreaks of disease such as bovine pleuroneumonia and foot-and-mouth disease.\(^5\)

Although there were some who thought that bovine tuberculosis could be eradicated completely out of existence, there were many, even in the nineteenth century, who had come to the realization that annihilating bovine tuberculosis was not possible. Several leading authorities, including Theobald Smith and J. George Adami in the period spoke not of annihilating the disease, but of arresting its spread and introducing measures to prevent its spread.\(^6\) As this dissertation has demonstrated, “eradication” became the suppression and management of bovine tuberculosis. This was the course of action taken by both the Canadian and American governments and was successful.

Above all, the most significant influence this disease exercised throughout this period lies in the bureaucratic transformations that were performed to see its successful suppression and management. Bovine tuberculosis was a complicated disease. It was widespread, and affected both livestock and humans. It showed few clinical symptoms and its properties were often debated. Despite these challenges, the disease was not suppressed and managed through a heroic

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effort of science, but through a slow and steady application of policy. Voluntary participation in
disease control combined with appropriate market and financial incentives allowed both the
United States and Canada to effectively deal with bovine tuberculosis and provide leadership to
other nations seeking to rid their herds of the disease. For example, Mexico initiated a national
Bovine Tuberculosis eradication program in 1993. To oversee the program, a joint United States-
Mexico Tuberculosis Committee was formed to study the problems the disease posed for both
nations. Through this committee, the United States government has provided training in post-
mortem inspection, tuberculin testing, and laboratory work, drawing on their many years of
experience with the disease.\footnote{National Research Council, \textit{Livestock Disease Eradication: Evaluation of the Cooperative State-Federal Bovine Tuberculosis Eradication Program}, 50-51.}

It would be easy to conclude this examination in 1950 with the incorporation of the last
remaining area into the Restricted Areas Plan in Ontario. By 1950, all cattle in New York State
and Ontario were under some form of bovine tuberculosis legislation and both jurisdictions were
well on their way to successfully suppressing and managing the disease. To conclude in 1950
would, however, do an injustice to \textit{M. bovis}. The bacillus responsible for bovine tuberculosis had
already shifted into new reservoirs by that time and had begun to pose new challenges to
government, veterinarians, and livestock owners on both sides of the border.

The current reservoir of bovine tuberculosis in Canada and the United States is in various
wildlife species. Recalling the exchange in Chapter IV between the various members of the
ICCBT in 1909-10, there was agreement amongst the members that the disease was one that was
not present in wildlife species nor did they ever expect it to be. This has turned out to be exactly
the opposite case and the presence of the disease in these reservoirs has presented new
challenges for authorities to address the disease in populations that are far less contained than
livestock. Furthermore, the presence of bovine tuberculosis in wildlife also poses new challenges to protect livestock from infection. There are several examples of ongoing investigations of bovine tuberculosis in wildlife; two of note in Canada and the United States are the presence of the disease in two of Canada’s national parks and in wild deer populations in parts of the United States.

As early as the 1910s, bovine tuberculosis had been informally identified in bison on the Canadian plains and in elk, moose and deer in what would become Wood Buffalo National Park (WBNP) in Northern Alberta. By the late 1950s, the disease had been identified in deer in various parts of Ontario and, by the early 1990s, in the elk population of Riding Mountain National Park (RMNP) in Manitoba. Suppressing and managing the disease in wildlife populations has created numerous challenges for government and veterinary authorities as well as presented new risks of exposure to the disease for livestock populations. That said, for the major reservoirs of the disease in Canada within WBNP and RMNP, animals are contained to a degree within the national parks, aiding in the management of the disease.8

Gary Wobeser, a wildlife veterinary pathologist from the Western College of Veterinary Medicine, characterizes the problem of bovine tuberculosis in the bison population of WBNP as “…a fascinating combination of apparent conservation triumphs and serious disease blunders.”9 Canadian bison had been exterminated from the prairies in the late nineteenth century. The bison population of WBNP grew out of several hundred animals first reintroduced into the area from the United States beginning in 1907. The bison, numbering several hundred, were introduced and managed like cattle, with hay supplied for feeding over the winter. The park, which was

9 Wobeser, 1170.
determined to be able to hold between 5000 and 7000 bison, swelled to near 6800 by 1923.\textsuperscript{10} Although tuberculosis was suspected in the bison population as early as 1916, in 1923 the Veterinary Director General’s office became involved, providing tuberculin, personnel, and other equipment to facilitate testing the herd. Over the next couple of years, several hundred tubercular bison were slaughtered however it was generally agreed amongst veterinarians that completely suppressing the disease would be impossible and they were discouraged from divulging too much about the problem in either public or scientific literature.\textsuperscript{11}

It was generally thought that the source of bovine tuberculosis in the park was from United States (Montana, specifically), where the animals were bred and raised prior to their removal to WBNP. Bison were continuously culled throughout the 1920s and advanced cases of the disease were identified in nearly half the animals. After World War II, over 1000 plains bison were introduced into WBNP to cohabitate with the wood bison. This was a controversial exercise, and one of the results was the hybridization that occurred between the two species of bison and, naturally, the spread of bovine tuberculosis. Over the ensuing decades, a lengthy process of capturing and testing bison and separating healthy from tubercular animals has been undertaken to build a tubercular free herd.\textsuperscript{12}

Although the prevalence of bovine tuberculosis in the bison population of WBNP poses a number of questions about the consequences of reintroducing species and the epidemiological issues that result, one might question what influence this episode has had on the livestock population of Canada. It is true that bison might come into contact with cattle along the


\textsuperscript{11} See Wobeser, 1170-1171.

\textsuperscript{12} See Wobeser, 1170-1172.
perimeter of the park but, for the most part, the bison remain relatively contained within the park’s boundaries and thus their interaction with livestock and potential to spread bovine tuberculosis is low. In another instance in Canada, however, the potential for spreading bovine tuberculosis beyond the borders of a national park and into surrounding livestock herds was and remains very real.

In the 1990s, several livestock herds within a short distance of Riding Mountain National Park (RMNP) in Manitoba were found to contain bovine tuberculosis. This discovery was joined by the identification of several elk and deer in the park’s vicinity who were also affected with the disease. In 2002, an active investigation began to examine the problem of the disease in the park. This has involved, for example, restricting the movement of cattle around the park, increasing wolf conservation to encourage predation, and extending hunting seasons for elk and deer and necropsying the carcasses to identify any cases of bovine tuberculosis. This work is ongoing.

As recently as December of 2012, the Canadian federal government announced new funding and personnel to coordinate an enhanced program to address bovine tuberculosis in RMNP. The threat of bovine tuberculosis spreading from elk and deer in the park to neighbouring livestock populations provided the motivation for this new effort. Of the effort, the Canadian Food Inspection Agency remarked: “Although progress has been made in managing bovine TB in Riding Mountain in recent years, the disease continues to be endemic in wild deer and elk, posing significant challenges for livestock producers in the area. Many producers are required to have their herds tested for TB periodically, in order to protect animal health and maintain market access.”

The situations of WBNP and RMNP illustrate the very real challenges not only of

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13 See Wobeser, 1172-1173.
supressing and managing bovine tuberculosis in wild populations, but also the very real threat that these reservoirs of the disease pose to cattle.

The challenges of bovine tuberculosis in species of wildlife are not only confined to Canada. Indeed, the United States faces similar challenges with the disease. Bovine tuberculosis, in wild deer populations, for example, has become a serious issue for several U.S. states, notably Michigan and Minnesota. The recognition of bovine tuberculosis in wild deer populations began in the early to mid-1990s. Given their wide range, deer possess a strong ability not only to spread bovine tuberculosis to each other, but to livestock populations as well. Sport hunting white-tailed deer is a very popular activity in both of these states and studies produced about the disease point to sport hunting as a significant contributor to the bovine tuberculosis program. Several studies, for example, note the practice of baiting deer as creating an ideal environment through which they may pass the bacillus on to each other.\textsuperscript{15} As a result, baiting has been restricted in certain parts of Michigan, for example. For Minnesota, de-populating livestock herds found to contain tuberculosis, measures to reduce the density of deer populations, and banning deer baiting have all been employed.\textsuperscript{16} Not only are government and veterinary authorities challenged in this case with trying to suppress and manage a disease in a unpredictable animal population, but they must also contend with the public, many of whom do not support aggressive measures.\textsuperscript{17}


Despite the present challenges of bovine tuberculosis, there is much to admire about the transformation of bovine tuberculosis intervention over the last century. Bovine tuberculosis was a disease that, unlike other livestock ailments, spread quietly and gradually over the livestock populations of Canada, the United States, and abroad. Cattle often produced few symptoms of the disease and when bovine tuberculosis was finally identified scientifically and a diagnostic substance was developed and employed, it was clear that both the Canadian and American governments had a significant endemic disease to address. This subtle disease was made more insidious by its zoonotic qualities, infecting thousands of individuals, particularly children, through infected milk and meat. The efforts to address the disease in cattle were the most significant aspect of the history of the disease. Rather than a dramatic intervention of science, a slow and tedious bureaucratic solution was employed both in Canada and the United States. This examination shed light on how this was carried out in Ontario and New York State, reflecting the very different nature of agricultural and veterinary authority in those two locations. It also shed light on the growth of the veterinary profession as an agent of the state and the central role these individuals played in the formation and implementation of legislation. Although perhaps not glamorous or dramatic, the slow and steady decline of bovine tuberculosis and the attitude of suppression and management over outright annihilation had a lasting influence on disease management on both sides of the border.
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