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The Powered Generation: Canadians, Electricity, and Everyday Life

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Graduate Program in History
A thesis submitted in partial fulfillment of the requirements for the degree in Doctor of Philosophy

WIRED!
HOW CANADA BECAME ELECTRIFIED

(Spine title: Wired!)

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by

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Graduate Program in History

A thesis submitted in partial fulfillment
of the requirements for the degree of
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Abstract and Keywords

Most studies of electricity in Canada have examined the process of electrification from a business or political perspective, emphasizing the role of private and public institutions in electrifying the country. Such approaches neglect the primary targets of the electrification process: Canadians as consumers of electricity. This dissertation analyzes electrification as a social phenomenon. Drawing from archival sources in Canada and the United States, as well as newspapers, magazines, and government documents, the author addresses technological debates in Canadian history and investigates the relationship between technology and society. The broader themes in this dissertation include: urban electrification, rural electrification, domestic electrification and the changing role of electricity in medicine.

This thesis is the first study of the social implications of electrification in Canada on a nationwide scale, and a step toward understanding the broader social implications of technological change for Canadians.

(Keywords: Electricity, electrification, Canada, technology and society, lighting, appliances, medicine, farm, rural, urban, consumerism, gender, fairs)

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Table of Contents

Wired: How Canada Became Electrified

List of Figures

List of Abbreviations

BCER — British Columbia Electric Railway

BCPA — British Columbia Provincial Archives

CMST — Canadian Museum of Science and Technology

CNEA — Canadian National Exhibition Archives

GA — Glenbow Archives

GMA — Galt Museum and Archives

HEPC — Hydro Electric Power Commission of Ontario

HQA — Hydro Quebec Archives

LAC — Library and Archives of Canada

OESR — Ottawa Electric Street Railway Company

REA — Rural Electrification Administration

RERF — Rural Electrification Revolving Fund

SCOT — Social Construction of Technology

UGMAC — University of Guelph Manuscript and Archives Collection

UWO — University of Western Ontario

Introduction

The crowd at the 1882 Toronto Industrial Exhibition buzzed with excitement. Gas lamps diffused a pale yellow glow over the throng that had gathered outside the Main Building, which housed several exhibits and fixtures. Children giggled their way through the crowd while women tucked away their hand fans in favour of a gentle breeze emanating from Lake Ontario. The clock struck seven-thirty, and, one newspaper reported, "as if by magic" the entire edifice was illuminated by bright light. Porters swung open the doors, and a stream of people filled the luminous rooms, hallways, and stairways to explore the wonders of electric light. The effect was breathtaking; light spilled into the building's shadowy corners revealing exhibits that would otherwise have remained hidden under the cloak of darkness. A reporter for the *Globe* commented that "the faces of friends could be recognized clearly across the entire length of the building [while] every part of the hall glistened with an intensity which no diffused sunlight could ever impart on the interior of a building."[1] The steady brightness was accompanied by celebratory music from a grand piano on the main floor that wafted above the babble of voices.

Outside, the entire fairground was aglow. One journalist rhapsodized that "the transformation was sudden and complete […] like the slumber of a hundred years awakened by the kiss of a fairy prince."[2] Light from a lamp directed at a rock fountain adjacent to the Main Building was filtered through coloured glass, which reflected deep shades of red, blue, and yellow off the spray, transforming the fixture into an "electro-

[1] "Canada's Great Fair," *Globe*, 11 September 1882, 9.

[2] "The Electric Light," *Globe*, 11 September 1882, 9.

hydraulic fireworks" show.[3] Across the grounds, five miles of wire connected sixty 2,500-candle-power bulbs strategically perched above gas lanterns, creating a sea of white to drown the murky yellow gloom that fell dimly along the landscape. Spectators became enchanted by their own shadows cast against buildings and along the grass, and some couples "posed themselves, as if expecting the light to produce a photographic effect."[4] The significance of artificial illumination surpassed that of mere utility; for the visitors of the Exhibition, electric light was a wonder — a technological phenomenon that turned the ordinary into extraordinary.

Although the illumination of its fairgrounds in September 1882 made the Toronto Industrial Exhibition one of the world's first electrically-lit fairs, it was not the first time electricity was used in Canada, nor was the event an entirely Canadian initiative. But since the annual festival was traditionally a venue for showcasing innovative products and ideas, the Exhibition is the ideal starting point for an historical journey across the Canadian technological landscape. Indeed, it could be argued that the 1882 electric light display, orchestrated by the New York-based Fuller Company and the Bell Company of London, Ontario, was pivotal in demonstrating the superiority of electricity in brightening the night sky. Soon, electrification became the order of the day and was applied wherever sufficient power could be generated — the home, factory, farm, city, street, hospital, store, theatre — thereby influencing multiple levels of Canadian life. Journalists, government representatives, advertisers, manufacturers, and the like, hailed

[3] "The Great Exhibition," *Toronto World*, September 9, 1882, 1.

[4] Keith Walden, *Becoming Modern in Toronto: The Industrial Exhibition and the Shaping of Late Victorian Culture* (Toronto: University of Toronto Press, 1997), 307.

electrification as a monumental victory for scientific and technological progress, and from the 1880s onward, Canada became electrified.

Historians of technology argue that electricity had a profound effect on labour, communication, transportation, and the design of cities.[5] But it would be well to remember that electricity was just one method of producing power; other methods, such as natural gas, have continued to evolve and remain relevant since the rise of electrical consumption at the turn of the twentieth century. There is little doubt that electricity transformed patterns of work and life, and helped create a new standard of living. However, the changes brought by electricity were gradual, did not occur for everyone at the same time, and were by no means determined. By shifting our focus away from the bigger socio-economic forces that governed the "electrical revolution" and examining instead the choices that people made — on a local and personal level — we can see that electrification was not a monolithic entity forcing change on Canadian life, but was instead a process shaped by those who used electric goods. This thesis describes how Canadians in the late nineteenth and early twentieth centuries encountered and used electricity Its primary focus is on the social effects of electric technologies and addresses how Canadians first experienced electricity, who used electric power and why, how Canadians responded to electric gadgetry, what expectations they had about electrification, and finally, what difference electricity made to their lives.

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[5] See, for example: Frank and John Dolphin, *Country Power: The Electrical Revolution in Rural America* (Edmonton: Plains Pub, 1993); David Egerton, *The Shock of the Old*: *Technology and Global History Since 1900* (Oxford: Oxford University Press, 2006); David Nye, *Electrifying America: Social Meanings of a New Technology, 1880-1940* (Cambridge: The MIT Press, 1990); Bruce Sinclair et. al., *Let Us Be Honest and Modest: Technology and Society in Canadian History* (Toronto: University of Toronto Press, 1974).

I

How many historians does it take to change a light bulb?

I support the notion that it takes two — one to change the bulb and the other to complicate the narrative. Historian David Leeson has offered a more enlightened response:

> There is a great deal of debate on this issue. Up until the mid-20th century, the accepted answer was 'one': and this Whiggish narrative underpinned a number of works that celebrated electrification and the march of progress in light-bulb changing. Beginning in the 1960s, however, social historians increasingly rejected the 'Great Man' school and produced revisionist narratives that stressed the contributions of research assistants and custodial staff. This new consensus was challenged, in turn, by women's historians, who criticized the social interpretation for marginalizing women, and who argued that light bulbs are actually changed by department secretaries. Since the 1980s, however, postmodernist scholars have deconstructed what they characterize as a repressive hegemonic discourse of light-bulb changing, with its implicit binary opposition between 'light' and 'darkness,' and its phallogocentric privileging of the bulb over the socket, which they see as colonialist, sexist, and racist. Finally, a new generation of neo-conservative historians have concluded that the light never needed changing in the first place, and have praised political leaders like Ronald Reagan and Margaret Thatcher for bringing back the old bulb. Clearly, much additional research remains to be done.[6]

True to the punch line, the light bulb has received considerable attention from historians, both professional and amateur, seeking to uncover the technological workings of a design that helped make Thomas Edison a household name (neglecting George Westinghouse, whose alternating current electrical system helped make widespread electrification

[6] David Leeson, "How Many Historians Does it Take to Change a Light Bulb?," *David's Notes* (Facebook blog), 13 March 2011, http://www.facebook.com/notes/david-leeson/q-how-many-historians-does-it-take-to-change-a-light-bulb/10150104573791022.

possible, in the process).[7] But perhaps we should not be surprised. Edison embraced the media and used its outlets to his advantage in publicizing his designs; in comparison to Edison, Westinghouse remained relatively mute in his endeavours. Historical scholarship of Edison reflects the historiography of electricity and the historiography of technology in general; historians have tended to focus on the novel — on technological innovations that have caused a break with the past, and in this case, the light bulb is the perfect representation of a "new" technology in an "old" world that promised fundamental change.[8] It also presents historians of technology with a conundrum: to what extent do we accept historical propaganda as evidence of our material past?

In his assessment of the historiography of technology in the United States, historian David Egerton notes that "standard lists of significant technologies" are often connected by "high cultural visibility," which he suggests is misguided. In his 2006 book *The Shock of the Old: Technology and Global History Since 1900*, Egerton argues that timelines in the history of technology and the "electrical revolution" in particular — most often dated between 1880 and 1940[9] — need to be re-evaluated. He advocates a "history

[7] For studies of Edison, see for example: Francis Rolt-Wheeler, Thomas Alva Edison (New York: Macmillan, 1915); Frank Lewis Dyer and Thomas Commerford Martin, *Edison, His Life and Inventions* (New York: Harper and Brothers, 1929); M. Josephson, "The invention of electric light," in G.I. Rochlin, *Scientific Technology and Social Changes: Readings from Scientific American*, 127 – 37 (San Francisco: W.H. Freeman, 1974); Keith Ellis, *Thomas Edison, Genius of Electricity* (London: Priory Press, 1974); Robert Silverberg, *Light for the World: Edison and the Power Industry* (Princeton: Van Nostrand, 1967); Ronald William Clark, *Edison: The Man Who Made the Future* (London: Macdonald and Jane's, 1977); William S. Pretzer, *Working at Inventing: Thomas A. Edison and the Menlo Park Experience* (Dearborn: Henry Ford Museum, 1989); Martin V. Melosi, *Thomas A. Edison and the Modernization of America* (Glenview: Little Brown Higher Education, 1990); A.J. Millard, *Edison and the Business of Innovation* (Baltimore: Johns Hopkins University Press, 1990); Neil Baldwin, *Edison, Inventing the Century* (New York: Hyperion, 1995).

[8] David Egerton, "Innovation, Technology or History? What is the Historiography of Technology About?", *Technology and Culture*, 51 (July 2010) 3, 681.

[9] David Egerton, *The Shock of the Old: Technology and Global History Since 1900* (London: Profile Books, 2006), 1. See also: Colin Chant, ed. *Science, Technology and Everyday Life, 1870–1950* (London: Routledge, 1989); Thomas P. Hughes, *American Genesis: A Century of Invention and Technological*

of technology-in-use," versus the conventional invention or innovation-based timelines, to make better sense of the "historical relationship between technology and society."[10] In the Canadian context, this suggests that the real significance of Edison's light bulb lay not in his dramatic lighting up of Wall Street in 1882 (see chapter one), but in the gradual process of electrification that occurred later: the incorporation of electric lighting in urban designs making streets safer at night; the spread of electric transportation, which allowed faster and more reliable movement of people; the mechanization of housework following the introduction of electric appliances into the home, and the raised standard of living afforded to farming families who introduced electric lighting and gadgetry onto the farm — all of which became relevant to Canadians ten, thirty, fifty, and seventy years after Edison introduced his bulb, and in many cases, decades after the accepted dates of the "revolution."

Most Canadian historians have not concerned themselves with these particularities. Scholarship in Canada has been focused on the politics of electricity, with authors probing the debates between public and private power or focusing on the economic aspects of electricity generation. The country's geography has proven a distinguishing feature for our understanding of the history of electricity. Access to natural resources has influenced how electricity was generated and how the general population has come to understand the power source. For example, what is known in the Prairie Provinces as "the light bill," in Ontario, at least, is known as "the hydro bill" —

Enthusiasm (New York: Viking, 1989); Ruth Schwarz Cowan, *A Social History of American Technology* (New York: Oxford University Press, 1997); Thomas J. Misa, *Leonardo to the Internet: Technology and Culture from the Renaissance to the Present* (Baltimore: Johns Hopkins University Press, 2004); R.A. Buchanan, *The Power of the Machine: Impact of Technology from 1700 to the Present* (London: Penguin, 1992).

[10] Egerton, *Shock of the Old*, 211.

reflecting the importance of waterpower in the history of electrification in that province. Regional variations across the country have also informed the structure of electric utilities, as well as the historiography of electrification in Canada. Electrification is provincial domain, not federal, thus studies of electricity have largely taken the shape of provincial electric company histories.[11] Ontario Hydro has generated the most attention from historians, probably because it was the first publicly-owned utility in North America, though not much historical attention has been given to the company since the mid-1990s.[12] Other available studies have devoted little analysis to the utilities, and are instead filled with illustrations and chronological narratives.[13]

While these studies are important for tracing the political developments of electrification in Canada, they are primarily written from a business or economic perspective, and thus do not question what technological innovation has meant for the generation of Canadians whose lives became increasingly powered by electricity. There are, of course, some exceptions. Clinton O. White's *Power for a Province: A History of Saskatchewan Power* does devote "a few words […] to what farmers thought" of rural

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[11] David S. G. Ross, "History of the Electrical Industry in Manitoba," *MHS Transactions* 3, no. 20 (1963–64): 39–70; Clinton O. White, *Power for a Province: A History of Saskatchewan Power* (Regina: Canadian Plains Research Centre, 1976); Jeremy Mouat, *The Business of Power: Hydro-Electricity in South Eastern British Columbia, 1897-1997* (Victoria: Sono Nis Press, 1997)*;* William Hawkins, *Electrifying Calgary: A Century of Public and Private Power* (Calgary: University of Calgary Press, 1987).

[12] John H. Dales, *Hydroelectricity and Industrial Development: Quebec, 1880–1940* (Cambridge: Harvard University Press, 1957); Keith Fleming, *Power at Cost: Ontario Hydro and Rural Electrification* (Montreal: McGill-Queens University Press, 1992)*;* Merill Denison, *The People's Power: The History of Ontario Hydro* (Toronto: McClelland and Stewart, 1960); Neil B. Freeman, *The Politics of Power: Ontario Hydro and Its Government*, (Toronto: University of Toronto Press, 1996); Paul McKay, *Electric Empire: The Inside Story of Ontario Hydro*, (Toronto: Between the Lines, 1983); Christopher Armstrong and H.V. Nelles, *Monopoly's Moment: The Organization and Regulation of Canadian Utilities, 1830–1930* (Toronto: University of Toronto Press, 1988); and Nelles, *The Politics of Development: Forests, Mines, and Hydro-electric Power in Ontario, 1849-1941* (Toronto: MacMillan of Canada, 1974).

[13] Newfoundland Light and Power, *The First 100 Years: The History of Newfoundland Light and Power* (St. John's: Robinson Blackmore, 1985); B. Dyer, *Peterborough: The Electric City – An Illustrated History* (Burlingon: Windsor Publications, 1987).

electrification in that province. He concludes that farmers on the whole were generally favourable toward electrification schemes, and that the introduction of electricity on the farm held positive economic and social effects for farming families.[14] Though helpful, his review is cursory and limited to the findings of the 1957 Royal Commission on Agriculture and Life. This dissertation broadens that focus to examine the Canadians who used and abused electricity, those who rejected, accepted and manipulated it, those who praised and cursed it, and those who were inspired by it in their daily lives, from the time of the first electrified Toronto Industrial Exhibition to the rural electrification projects after the Second World War.[15] In doing so, *Wired* builds on the historiography of technology and society, and takes a first step toward answering Egerton's call by challenging preconceived notions of an "electrical revolution" and examining how and when electricity was introduced in varying areas of Canadian life.

The history of technology as a discipline developed in response to the unprecedented growth in capitalist and market-oriented manufacturing, but more importantly, in areas of personal consumption. Although these developments were not free from criticism, early historical writing on technology was influenced by ideas of technological determinism, the notion that technology is an autonomous force that

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[14] White, *Power for a Province*, 285–90.

[15] Absent from this work is a study of First Nations communities across Canada, and this is due to a lack of sources. Evidence does suggest that in the 1920s and 1930s, First Nations groups wanted electric power, but any development was dictated by the "colonial mindset" between the government and these peoples. See Martin Thibault and Steven M. Hoffman, eds., *Power Struggles: Hydroelectric Development and First Nations in Manitoba and Quebec* (Winnipeg: University of Manitoba Press, 2008), 4. A newspaper clipping found at Ontario Archives indicates that residents of Six Nations Reserve in Brantford requested that they be able to access power from a high tension line cutting across their land, but their request was denied as it was supposedly a reserve line for the St. Thomas district. In addition, since the Indian Act made no provision for providing light and power to reserves, the province did not feel compelled to do so. See: Ontario Archives, RG 35-4, Box: 2, "Press Clippings Files, 1926–29," Document: "#29 Indians are debarred from hydro service." For more information on electrification and First Nations communities in Ontario see: Jean Manore, *Hydro Currents: Hydroelectricity and the Engineering of Northern Ontario* (Waterloo: Wilfrid Laurier Press, 1999).

imposes change and progression on society. However, by the 1950s a generation of historians decried the "myth of progress" and insisted that the choices people make — as designers, producers, and users — give meanings and functions to technologies. Abandoning the notion that technology drives social change, for good or for evil, current historians of technology generally agree that a combination of factors is required to understand the relationship between technology and society.

But breaking away from ideas of progress has not been easy. Technological determinism formed the backbone of the earliest scholarly endeavours to make sense of the relationship between invention and social change. The proliferation of new technologies from the eighteenth century onward led University of Chicago historian William F. Ogburn to champion the idea that science and technology played a definitive role in shaping society. He argues that technological innovation and invention acted as outside forces that "impacted" society and triggered change. Ogburn developed this idea in a report published in the 1930s called "The Influence of Invention and Discovery," in which he claims that the "derivative effects of invention follow one another like ripples after a pebble is thrown into water."[16] Historian Claude S. Fischer has since termed Ogburn's impact analysis the "billiard-ball model," whereby "a technological development rolls in from outside and impacts elements of society, which in turn, impact one another."[17] Ogburn's contemporaries maintained that technology produced a "ripple"

[16] As quoted in, Ronald R. Kline, *Consumers in the Country: Technology and Social Change in Rural America* (Baltimore and London: Johns Hopkins Press, 2000), 4.

[17] Claude S. Fischer, *America Calling: A Social History of the Telephone*, (Los Angeles: University of California Press, 1992), 8.

or "billiard-ball" effect, and belief in the inevitability of technological development dominated early historical discourse.[18]

Despite these early works, the history of technology remained largely understudied, especially in comparison to the history of science. By the mid-twentieth century, one group of historians chose to concentrate on technological history and in 1958, John Rae, Thomas P. Hughes, and Carl Condit, led by Melvin Kranzberg, formed the Society for the History of Technology. They argued for an approach that acknowledged human agency in the relationship between technology and society. The following year, the society's founders established a quarterly called *Technology and Culture* to provide a venue for more inclusive and contextual approaches to the history of technology. In his 1985 book, *Technology's Storytellers: Reweaving the Human Fabric*, John Staudenmaier provides a detailed analysis of articles published in the journal from its inception to 1980. He notes that the early articles in *Technology and Culture* were marked primarily by a quest to determine how and why humans innovate, and how new technologies were incorporated into "the tangled web of technology and society."[19] The method of approaching technology through the lens of social history inspired many authors to incorporate social and cultural factors into their histories of particular technologies. This inclusive methodology started slowly in the 1960s, picked up speed through the 1970–80s, and has been most fully used in studies of one particular

[18] Nye, *America as Second Creation*, 282–5.

[19] John Staudenmaier, *Technology's Storytellers: Reweaving the Human Fabric*, (Cambridge: The MIT Press, 1985), 35.

technology that left an indelible imprint on the American consciousness: the automobile.[20]

Wired is supported by the analytical scaffolding of the Social Construction of Technology (SCOT), a methodological approach designed by Wiebe Bijker, Trevor Pinch, and Thomas P. Hughes. At a conference of the newly formed European Association for the Study of Science and Technology, held in Austria in 1982, Bijker, a sociologist of technology, and Pinch, a sociologist of science, advocated incorporating sociological techniques with studies of technology and society for a more integrative approach to technological histories.[21] Their proposal fell in line with the wider trend in historical discourse of focusing more attention on social groups, such as women, ethnic minorities, and the working class, that were often neglected in the grand political narratives of the 1950s and 1960s. Traditional studies in the history of technology tended to examine specific inventions or certain inventors, which by their very nature were limited in both focus and scope. Staudenmaier's *Technology's Storytellers* shows that, despite the journal's title, even *Technology and Culture* was failing to meet its own mandate of integrating histories of technology within a cultural ambiance.[22]

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[20] See for example: James J. Flink, *The Automobile Age* (Cambridge: The MIT Press, 1990); Michael Berger, *The Devil Wagon in God's Country: The Automobile and Social Change in Rural America, 1893–1929* (Hamden, Conn: Archon Books, 1975); Georgine Clareson, *Eat My Dust: Early Women Motorists* (Baltimore: Johns Hopkins University Press, 2008); Donald L. Lewis and Laurence Goldstein, eds., *The Automobile and American Culture* (Ann Arbor: The University of Michigan Press, 1983), Ronald R. Kline, *Consumers in the Country: Technology and Social Change in Rural America* (Baltimore and London: Johns Hopkins Press, 2000; Virginia Scharff, *Taking the Wheel: Women and the Coming of the Motor Age* (New York: The Free Press, 1991).

[21] Wiebe Bijker, Thomas P. Hughes, and Trevor Pinch, eds., *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology* (Cambridge, MA: MIT Press, 1987), 1.

[22] Staudenmaier, *Technology's Storytellers*, 120.

Building on discussions from the 1982 conference, Bijker, Pinch, and Hughes edited a collection of essays called *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*. Advocating a new language to study technological change, Bijker, Pinch, and Hughes proposed SCOT, which was modeled after EPOR, the Empirical Programme of Relativism. A central premise of SCOT is that artifacts can (and should) be subject to analysis at any stage, whether design, development, or usage. The meaning given to a technology is in itself a social construction, and Bijker and Pinch contend that there is not only one possible way of designing, thinking about, or interpreting an artifact and that "different social groups can have radically different interpretations."[23] This premise, known as interpretative flexibility of artifacts, is practiced by relevant social groups, such as designers, advertisers, or even entire societies, which give meaning to a technology. The practice of interpreting technology is continuous: a network of people connected to the development of an artifact will continually define and redefine the object until all problems are resolved, resulting in stabilization of the artifact, or what Bijker and Pinch have called "closure." However, debate about a technological artifact may be re-opened at any time by additional social groups, such as consumers, who can prescribe new meaning to the object.

Electrification provides an interesting case study because the focus is not on a specific product, but rather a complex process. Thomas P. Hughes's 1983 comparative study of the United States, Germany, and Great Britain *Networks of Power: Electrification in Western Society, 1880–1930*, was the first of its kind, taking the reader

[23] Bijker, *Social Construction*, 41.

through the process of electrification in the three countries. He highlights how environmental (in this case regional versus national) circumstances played an active role in dictating the growth of electric systems — an underlying theme throughout his book. Hughes adopts a four-phase approach to studying electrical development: inventor-entrepreneur, technology transfer, system growth, and "momentum". His fourth point is perhaps the most original and intriguing; situating technological momentum "somewhere between the poles of technological determinism and social constructivism," Hughes suggests that when a technology is new, it is easily malleable by the society that uses it. However, once that technology becomes more established or "mature" it becomes more deterministic in nature and thus more difficult to change.[24] Other scholars have adopted his method in studies of national and international electrical systems.[25] One criticism with Hughes's method is that although he acknowledges the existence of consumers, he does not provide space for them. Historian David E. Nye filled in that gap in 1990 with the publication of his superb book, *Electrifying America: Social Meanings of a New Technology, 1880–1940*.

Nye's study, which analyzes electrification as a social process, has been the inspiration for this work. His focus is on the "human experience of making electricity part of city, factory, home, and farm."[26] He begins with a case-study of electrification in

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[24] Thomas P. Hughes, "Technological Momentum" in *Does Technology Drive History?: The Dilemma of Technological Determinism*, eds. Merritt Roe Smith and Leo Marx, 101 (Cambridge, MA: MIT Press, 1994).

[25] See for example, Vincent Lagendijk, *Electrifying Europe: The Power of Europe in the Construction of Electricity Networks* (Amsterdam: Aksant, 2008) and William J. Hausman, Peter Hertner, and Mira Wilkins, *Global Electrification: Multinational Enterprise and International Finance in the History of Light and Power, 1878 –2007* (Cambridge: Cambridge University Press, 2008).

[26] Nye, *Electrifying America*, xi.

Muncie, Indiana — the quintessential American "Middletown" — before exploring the ways that Americans encountered and perceived electricity as it was gradually introduced in various areas of their lives.[27] One notable conclusion of Nye's work is the American perception of electricity as a commodity that could be bought or sold depending on marketplace conditions. Privately-owned utility companies sprung up across the United States, with most Americans displaying little patience for the view of electricity as a public service. This was in sharp contrast to developments in Canada, where Canadians have historically supported electricity as a public service, albeit with some reservations.

There exists no comparable work in Canada. Historians of gender interested in the role of technology in women's lives have been the most prolific authors on the social aspects of electrification, with an emphasis on the Prairie Provinces.[28] Though electric technologies are treated as a sub-theme to these studies, their use of gender as a category of analysis provides a helpful framework for understanding the motives for introducing technologies into the home. In "Help for Farm Homes: The Campaign to End Housework Drudgery in Rural Saskatchewan in the 1920s," Marilyn Barber examines the role of female farm reformers in encouraging efficiency in housework on Saskatchewan farms through the promotion of domestic service and labour-saving technologies. She

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[27] Sociologists Robert Staughton Lynd and Helen Merrell Lynd popularized the idea of Muncie as the typical American city. See: Nye, *Electrifying America*, Chapter One.

[28] Angela E. Davis, "'Valiant Servants': Women and Technology on the Canadian Prairies, 1910 –1940," *Manitoba History*, 25 (Spring 1993): 33–42; Joy Parr, *Domestic Goods: the Material, the Moral, and the Economic in Postwar Years* (Toronto: University of Toronto Press, 1999); Joy Parr, "What Makes Washday Less Blue? Gender, Nation, and Technology Choice in Postwar Canada," Technology and Culture, 38 (1997) 1: 153–86; Linda L. Graff, "Industrialization of Agriculture: Implications for the Position of Farm Women," *Resources for Feminist Research*, 11 (March 1982): 10–11; Marilyn Barber, "Help for Farm Homes: The Campaign to End Housework Drudgery in Rural Saskatchewan in the 1920s," *Scientia Canadensis*, 9 (June 1985) 1: 3–26; Veronica Strong-Boag, "Pulling in Double Harness or Hauling a Double Load: Women, Work and Feminism on the Canadian Prairie," *Journal of Canadian Studies*, 21 (Fall 1986) 3: 32–52.

concludes that these initiatives were not focused on liberating women from their duty in taking care of the household, but in providing them more time to devote to their families and to leisure activities. Influenced by the domestic science movement of the early twentieth century, these female reformers argued that new technologies would make homemaking more efficient and professionalized, and thus place it on a more equal footing with men's work in the barn.[29]

The important role played by women in helping to achieve societal acceptance of electric goods has been examined more recently by Graeme Gooday in his highly informative monograph, *Domesticating Electricity: Technology, Uncertainty, and Gender, 1880–1914*. His use of the word "domesticating" serves a dual purpose: firstly, it captures the essence of introducing electricity into the home; secondly, it conjures the imagery of "taming" electricity — seen as dangerous, unpredictable, and unstable in the late nineteenth century — for home use.[30] In order to understand why Victorian Britons adopted electric technologies, Gooday goes beyond the typical study of historical actors involved in the diffusion of early electric products (namely, male scientists and electrical manufacturers) to include wives of electrical engineers and female domestic experts. He demonstrates that through the publication of books about electricity, and by wearing electric jewellery to public events, these women helped to familiarize the upper echelons of society with electric technology, and in the process helped to make electricity seem like a safe and respectable power source for home use.

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[29] Barber, "Help for Farm Homes," 3.

[30] Graeme Gooday, *Domesticating Electricity: Technology, Uncertainty, and Gender, 1880–1914* (London: Pickering and Chatto, 2008), 1.

These studies of domestic technologies build upon Ruth Schwartz Cowan's landmark study *More Work for Mother: The Ironies of Household Technology from the Open Hearth to the Microwave* published in 1983. She examines the household as a site of production from preindustrial to capitalist society, and argues that the introduction of technologies in American homes resulted in a shift from housework being shared between husbands, wives, and children to the burdens of labour being placed on the housewife's shoulders.[31] Tracing the shifting patterns in the division of labour in relation to the introduction of domestic goods, Cowan provides valuable lessons about the relationship between gender and technology. However, her emphasis on decision-making in a market-driven and capitalist society leaves little room for the role of government, making her analysis difficult to apply to Canada. Here, local and provincial governments greatly influenced the course of electric development, and by consequence, whether or not domestic electric goods were a viable option for Canadian families.

Few Canadian historians have taken Nye or Gooday's lead in integrating the study of electricity into the broader historical narrative. Two notable exceptions are Kenneth Norrie and Doug Owram's *A History of the Canadian Economy*, which includes technology in its national history and makes special reference to electricity in particular, and Graham D. Taylor and Peter A. Baskerville, *A Concise History of Business in Canada*, which names the spread of electric power grids and the expansion of rail lines as the "two technologies [that] occupied much of the attention of […] the general public in

[31] Ruth Schwartz Cowan, *More Work for Mother: The Ironies of Household Technology from the Open Hearth to the Microwave* (New York: Basic Books, 1983).

Canada in the early twentieth century."[32] However, like the power company histories, these books are written from the perspective of the financial giants that controlled electric utilities, and not from the perspective of the people who used the related technologies. With the exception of the aforementioned historians of gender, Canadian historians have been slow to recognize the importance of electricity in the everyday lives of Canadians.

But what do I mean by "everyday life"? I have chosen that title purposely to highlight the mundane, the repetitive actions we take for granted day-to-day, yet which define who we are. Most historians strive to document change but continuities can be much more revealing. A focus on the everyday can help bring attention to people or processes sometimes neglected in historical discourse; as sociologist Georg Simmel once remarked, "even the most banal externalities of life" are significant reflections of how a society functions.[33] This approach is not without its limitations, but it is one way for social historians to probe assumptions about the role of technology in Canadian society. Everyday life will be different for different people, but asking questions about the processes and transactions that take place in acquiring and consuming electric goods reveals "complex dialogues about identity, status, aspirations, cultural capital, and position within a social group."[34] The everyday is where Canadians interacted with electric technologies — in streetcars, walking downtown, at the fair, in their doctor's office, and in their homes — and where they prescribed meaning to those technologies.

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[32] Kenneth Norrie and Doug Owram, *A History of the Canadian Economy*, 2nd ed. (Toronto: Harcourt Brace Canada, 1996), 245–50. See also Graham D. Taylor and Peter A. Baskerville, *A Concise History of Business in Canada* (Don Mills: Oxford University Press, 1994), 264.

[33] As quoted in David Inglis, *Culture and Everyday Life* (London and New York: Routledge, 2005), 3.

[34] Mark Paterson, *Consumption and Everyday Life* (London: Routledge, 2006), 7.

For much of the late nineteenth and early twentieth century, electricity was a powerful symbol. Much of what was considered "modern" at that time was fuelled by electricity. Modern can simply mean "contemporary," referring to things either in the present tense or to events or people that occurred or lived at the same time. But for our purposes, these definitions are simplistic. Just like the meaning of "everyday life," modern is symptomatic of societal aspirations and assumptions about the world, making the concept of "modernity" neither evident nor uncontested; indeed Daniel J. Singal notes that "despite modernism's unquestionable significance, we currently have almost no agreement on how to define it."[35] Canadians at the turn of the twentieth century, too, had multiple definitions of modernity, but the evidence makes one thing clear: electricity, in its varying forms, was symbolic of what many considered to be modern, a factor proving instrumental to their acceptance of electric technologies.

Indeed, during the first sixty years of electrification in Canada, a quest for modernity helped fuel the acceptance of electricity and its related goods. This desire for a newer, better way to complete everyday tasks was coupled with governmental preference for electricity as a power source. Local and provincial governments were vocal supporters of electrification, and through direct investment and financial incentives for private utility companies, they ensured that electricity, especially hydroelectric power, would play a pivotal role in the industrial development of Canada. However, this pattern of development was uneven across the country as local and regional circumstances influenced the process of electrification in each province. While many factors determined

[35] Daniel J. Singal, "Modernity," in *A Companion to American Thought*, eds. Richard Wightman Fox and James T. Kloppenberg, 460 (Malden, Mass.: Blackwell, 1995).

whether the general population would adopt an electric device, as we will see, government support and the notion of modernity were the most constant.

II

My research into the history of electricity in Canada began with an examination of the *Canadian Electrical News*. Written primarily for those involved in the electrical industry, whether electricians, manufacturers, or advertisers, this trade journal is full of articles about the process of electrifying Canada. I examined every printed issue from its inception in 1894 up to 1950, and collected a plethora of statistical, analytical, technical, and anecdotal material. In an effort to remain broad in my early research, I then examined every issue available of *Maclean's* (1907–), *Chatelaine* (1928–), *Canadian Homes and Gardens* (1927–) and *Saturday Night* (1888–), from the earliest dates available to me until the 1940s. I picked 1950 as my ideal end date for two reasons: firstly, electricity had become a part of everyday life in most of non-rural Canada at that time; and secondly, aside from the topic of rural electrification, I did not want to venture too far past the post-war years.

Following these initial searches, I then focused on other trade journals, primarily the *Canada Lancet* (from 1868 to 1911), House of Commons debates (from 1902 to 1923), and newspaper searches. The *Globe and Mail* (known between 1844 and 1936 as the *Globe*) was my main newspaper source as it was intended as a national daily, but can also be navigated online by keyword searches, which I conducted from 1845 to 1960.

Similarly, when Paper of Record could still be considered a useful database, I examined all relevant Canadian newspapers, and found the *Drumheller Mail* (Alberta) to be the most relevant. Prompted by mentions of events found in secondary sources, I searched through key dates of other local newspapers including the *Ottawa Daily Citizen*, the *Toronto Evening Telegram*, and the *Manitoba Free Press*.

Although newspapers and magazines as historical evidence provide an incomplete picture of popular attitudes, for the period under discussion, the print media does lend valuable insight into aspects of the wider social order. As I have noted elsewhere, in order to remain relevant, newspapers and magazines had to ensure that they met the ostensible needs and values of their Canadian readers.[36] In reference to reporting on technological developments, historian Michael B. Schiffer notes that newspapers in particular were "a major source of information on happenings of general interest, such as inventions that heralded revolutions in everyday life. By virtue of this communication function, the press acquired an authoritative aura as well as the power to render judgments of practicality."[37] This argument can be extended to magazines as well, especially women's magazines where authors encouraged the use of particular technologies in the home. Noting the potential issues faced with using print media as a source, historian Roberto Franzosi argues that "the type of bias likely to occur in mass media consists more of silence and emphasis than outright false information."[38] Thus, by

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[36] Dorotea Gucciardo and Megan Howatt, "Sniper Girls and Fearless Heroines: Wartime Representations of Foreign Women in English-Canadian Press, 1941–43," in *Companion to Women's Military History*, eds. Bart Hacker and Margaret Vining, Chapter 15 (Boston: Brill, 2011).

[37] Michael Brian Schiffer, *Power Struggles: Scientific Authority and the Creation of Practical Electricity Before Edison* (Cambridge, MA: MIT Press, 2008), 109.

[38] Roberto Franzosi, "The Press as a source of socio-historical data: Issues in the methodology of data collection from newspapers," *Historical Methods*, 20 (1987) 1, 7.

using language as a tool of manipulation — employing certain adjectives, synonyms, and nouns — journalists and editors prescribed meaning to electric developments in Canada.

I also conducted archival research. This proved a bit tricky, given the nature of my topic. I examined holdings at the Library and Archives of Canada, but due to the provincial nature of electrification, I came up relatively empty-handed. I then focused on visiting utility company archives in hopes of examining company records with a focus on customer relations and correspondence. I was sad to discover that Hydro One (historically the Hydro Electric Power Commission of Ontario) had destroyed or donated much of its collection. I was able to examine its material culture collection at the Canadian Museum of Science and Technology in Ottawa, which also housed an impressive array of trade publications and primary documents related to past exhibits on domestic life. I was able to consult the archival holdings of Hydro Quebec, the Calgary Power Company, the Edmonton Lighting and Power Company, British Columbia Electric Railway (BCER), and London Hydro. The records for the BCER and London Hydro proved most complete and useful, the latter of which also held an impressive material culture and photographic collection.

In the process, I also examined university archival collections, where funding and timing permitted. This included an examination of the University of Western Ontario Archives, where I found local county histories documenting the arrival of electricity, the University of Guelph Manuscript and Archive collection, which housed plenty of information on domestic science, and the University of British Columbia Archives, where I located the company newsletter and other paraphernalia of the BCER. At provincial archives (Toronto, Calgary, Victoria) and local archives (Calgary, Guelph, Toronto,

Lethbridge, Edmonton) I found much in the way of newspaper clippings and unpublished reports about the arrival of electricity to those towns.

Finally, I received travel funding to conduct research at the Bakken Museum of Electricity and Life. Located in Minneapolis, Minnesota, the Bakken is the world's largest repository of information related to the history of electric medicine. I scoured through the Library's vast collection of printed primary documents, and was given the opportunity to examine some of the most intriguing material culture I have ever seen (see chapter five). Together, this research has provided me with a base to uncover the themes and trends in the process of electrification in Canada, and to trace societal response to the introduction of electric technologies in everyday life.

I have adopted a thematic approach to make the most of my findings. A strictly chronological history would inadvertently imply a natural progression of events, which would distort the process of electrification in Canada. Having noted that, this dissertation begins with an overarching chronology of electrical developments, but the overlapping periods in the remaining chapters are reflective of the complementary and occasionally contradictory nature of electrification in this country. Given the general nature of my topic, it was necessary to scale down my area of focus. Thus, aside from the streetcar, which was one of the earliest visual symbols of electricity, I did not discuss electric transportation nor did I focus on electric communication, such as the telephone, because the communicative aspect of these devices tended to trump their electrical nature. Including these two aspects of electrification would have made my topic unmanageable. Though interesting, an examination of electrification in work spaces, such as factories,

was left out as this type of electrification did not involve the personal choice of the worker in embracing electricity.

It was my goal to start broadly and narrow my focus with every chapter, from electricity in the world to electricity in Canada to electricity in the home to electricity in the body. This approach is meant to show the multiple layers of electrification, and provide various opportunities to examine the extent to which Canadians used electric technologies. Canada was not a pioneer in electrical technology. Most scientific breakthroughs occurred outside our borders, and only gradually over several centuries. Electricity made its grand debut on Canadian soil in the form of the telegraph in the 1840s, which helped to shape the way future generations would perceive electrical innovations. Chapter one, "The Electrical Era," traces the scientific and technical milestones in the history of electricity, from antiquity to the Niagara power projects of the late nineteenth century, and examines how developments in Europe and the United States had a direct influence on electric development in Canada.

Chapter two, "Since the Hydro Came," examines the process of electrification in urban settings. The rise of the central station industry during the First World War gave impetus to the spread of electric power in cities across the country. At the turn of the century, electricity was prominent in three areas that helped to shape the urban landscape and the day-to-day lives of urban Canadians: transportation, lighting, and leisure. These public experiences of electricity demonstrated that from the beginning, Canadian need for electricity went beyond the practical to embrace the symbolic and illustrative capabilities of electric power.

Any benefits urban Canadians derived from electricity were not shared by the majority of their rural counterparts until well after the Second World War. Chapter three, "More Power to the Farmer," details the slow process of electrifying Canada's farms. Rural electrification provides a poignant example of the political and geographic disparities between provinces, two factors that proved both a help and a hindrance to widespread farm electrification. This chapter also investigates the decision-making process on the family farm, and questions the oft-repeated claim by gender historians that farm wives benefited least from electric power on the farm.

Advertisements promised women that they would experience a direct benefit from the incorporation of electrical appliances into their daily routines. Chapter four, "The Domestic Workshop," examines those claims in closer detail. During the interwar years, urban housewives were inundated with messages from advertisers, journalists, and schools that electricity would eliminate drudgery from housework, and provide them the freedom to enjoy leisurely pursuits. The infiltration of this message in Canadian media might suggest that urban Canadian women, who had ready access to electric goods, would have whole-heartedly embraced an electrical lifestyle, but statistical evidence suggests otherwise.

Chapter five, "Nature's Tonic," explores a more intimate relationship that Canadians may have had with electricity in the form of medicinal or therapeutic devices. Whether at a doctor's office or in the privacy of their own homes, Canadians applied electric current on and in their bodies in an often misguided attempt to cure whatever ailed them. Few Canadians in the late nineteenth and early twentieth century held a proper understanding of what electricity was or how it worked, and thus many people

believed it to be a magical or mystical force, with some purporting it was a medicinal agent as well. This chapter explores what one historian has called a “Golden Age of Electrotherapy,” and traces the rise and fall (and rise) of electric medicine in Canada.

Chapter One: "The Electrical Era"

The electrical age will broaden our vision and widen our hearts and out of all the chaos and unrest and disorder, then will come peace and rest and order. Cant and creed, doctrinal hypocrisy and religious and social narrowness and inequality will all give away to a bigger, broader, godlier conception and the electrical era will be the greatest era, and the happiest era the world has ever seen.[1]

So wrote journalist Guy Cathcart Pelton, in a July 1919 issue of *Western Woman's Weekly*. The magazine published a series of articles about the role of electricity in life, in which Pelton insisted that Canadian society was on the verge of a new, electrical era. Probably inspired by recent electrical developments in medicine, communication, and transportation, he wrote of "his growing impression […] that electricity [was] the source of life." He predicted that the sick would be healed, that machines would be powered, that the burdens of physical labour would be lifted, and that communication would become instantaneous owing to the electrical energy of the air. While Pelton's utopian visions at times bordered on the absurd (he believed the universe was "bound together by invisible electribands […] that would transform tomorrow into an age of hope and happiness and love"), his sentiment that electricity held the key to a prosperous future was a popular one among Canadians at the turn of the century.[2]

Enthusiasm for the technology manifested itself in public demonstrations, fairs, and street performances with electricity, usually in the form of a light display, as the main attraction. Canadians were not just embracing the coming of electric light; they were celebrating all that electric power symbolized: modernity, progress, success. Locals

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[1] Guy Cathcart Pelton, "The Electrical Era," *Western Women's Weekly* 2, no. 31 (12 July 1919): 2.

[2] Pelton, "Electrical Wonders Yet to Come," *Western Women's Weekly* 2, no. 33 (26 July 1919): 11.

pointed to their electrical grids as evidence to the rest of the country, and possibly the world, that their city was a place worth living in, worth working in, and worth investing in. The versatility of electricity for use in cities, on farms, in homes, and in medicine, ensured that the technology would have a lasting effect on Canadian society. Electric service evolved into such an integral part of the everyday that it became the subject of passionate debate between those who argued that utility companies be publicly-owned and -operated by either municipal or provincial governments, and those who maintained that cheap and reliable power could only be provided by commercial, private companies.[3] Cities and provinces across the country developed their systems, some public, most private, and the political and economic history of these initiatives has been well documented.[4] But missing from these studies is the technological history of electricity. Until the mid-1800s, most electrical breakthroughs occurred in Europe, followed thereafter by the United States, which led developments in electrical engineering well into the twentieth century. Canada was a latecomer to the stage, and remained technologically dependant on its southern neighbour for its electrical equipment.

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[3] See Christopher Armstrong and H.V. Nelles, *Monopoly's Moment: The Organization and Regulation of Canadian Utilities 1830-1930* (Philadelphia: Temple University Press, 1986), 11 –58; Mark Bouman, "Luxury and Control: The Urbanity of Street Lighting in Nineteenth Century Cities," *Journal of Urban History* 14, no. 1 (November 1987): 14; Patricia Roy, "The Illumination of Victoria: Late Nineteenth Century Technology and Municipal Enterprise," *BC Studies* 32 (1976–77): 72–92.

[4] See for example, David S.G. Ross, "History of the Electrical Industry in Manitoba," in *MHS Transactions Series 3, 1963-64 Season*; Clinton White, *Power for a Province: A History of Saskatchewan Power* (Regina: Canadian Plains Research Centre, 1976); Jeremy Mouat, *The Business of Power: Hydro-Electricity in South Eastern British Columbia, 1897-1997* (Victoria: Sono Nis Press, 1997)*;* William Hawkins, *Electrifying Calgary: A Century of Public and Private Power* (Calgary: University of Calgary Press, 1987)*;* Merill Denison, *The People's Power: The History of Ontario Hydro* (Toronto: McClelland and Stewart, 1960); Neil B. Freeman, *The Politics of Power: Ontario Hydro and Its Government* (Toronto: University of Toronto Press, 1996); Paul McKay, *Electric Empire: The Inside Story of Ontario Hydro* (Toronto: Between the Lines, 1983), and H.V. Nelles, *Politics of Development: Forests, Mines, and Hydro-Electric Power in Ontario, 184 –1941* (Toronto: Macmillan, 1974); Newfoundland Light and Power, *The First 100 Years: The History of Newfoundland Light and Power* (St. John's: Robinson Blackmore, 1985); B. Dyer, *Peterborough: The Electric City – An Illustrated History* (Burlingon: Windsor Publications, 1987).

Consequently, the history of electricity in Canada is inextricably entwined with preceding developments in the United States and Europe — developments that began centuries before Pelton's utopian visions.

I

The history of electricity can be traced back to antiquity, when the Greeks inadvertently discovered static electricity in 600 BC. Thales of Miletus, a philosopher and mathematician, provided the first known account of the natural force of static electricity after rubbing amber on cat fur and then using its charge to pick up feathers. The word "electron" derives from the Greek word for "amber". The potential medicinal properties of static electricity were recorded roughly 500 years later, when Scribonius Largus, a Roman physician, recommended the electric shock of the torpedo fish to cure headaches and gout.[5] The characteristic properties of static electricity (and subsequent electrostatic therapy) remained shrouded in mythology and superstition until the Renaissance, when William Gilbert, physician to Queen Elizabeth I, conducted the first scientific tests to unlock the secrets behind electricity's mysterious force.

Gilbert tried to determine if material other than amber, such as glass, rock crystal, and sulphur, could generate static electricity. He separated his test objects into what he called "electrics" or "non-electrics"; Benjamin Franklin later renamed these categories

[5] Julius Althaus, *On Paralysis, Neuralgia, and other Afflictions of the Nervous System; and their Successful Treatment by Galvanisation and Faradisation*, 3rd ed. (London: Trubner and Company, 1864), 1.

"conductors" and "insulators" in the late eighteenth century.[6] By rubbing these substances together, Gilbert unwittingly created charged electrons. (When charged electrons travel through a conductor, such as copper wire, they become electric current.) Gilbert concluded that friction between objects could create a static charge, and in 1600, while also serving as president of the Royal College of Physicians in London, he published his results in a treatise entitled *De Magnete*. He was the first to use the word "electricity," and also coined the terms "electric attraction" and "electric force."[7] His work became the standard text throughout Europe and America.

The seventeenth and eighteenth centuries were marked by several electrical breakthroughs: in 1660, Otto von Guericke, a German experimenter, invented a device that generated static electricity; in 1745 Pieter van Musschenbroek, a physicist and mathematician in Leiden, Holland, was one of the first to create the Leyden jar, which delivered high-voltage bursts of static electricity (fundamental to developments in electric medicine); and in 1752, Benjamin Franklin famously flew his kite in a thunderstorm to prove that lightning was electricity.[8] But for all these advancements, it was not until the scientific experiments of the nineteenth century that electricity's potential as a power source began to be realized. In 1800, Alessandro Volta, professor of physics at the University of Pavia in Italy, created the first battery to produce consistent electric current.

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[6] Tom McNichol, *AC/DC: The Savage Tales of the First Standards War* (San Francisco: Jossey-Bass, 2006), 9.

[7] McNichol, *AC/DC*, 9; Stephen Pumfrey and David Tilley, "William Gilbert: Forgotten Genius," *Physics World*, 1 November 2003, http://physicsworld.com/cws/article/print/18485 (accessed 16 August 2007).

[8] Jill Jonnes, *Empires of Light: Edison, Tesla, Westinghouse, and the Race to Electrify the World* (New York: Random House, 2003), 28–33; McNichol, *AC/DC*, 11; Iwan Rhys Morus, "Marketing the Machine: The Construction of Electrotherapeutics as Viable Medicine in Early Victorian England," *Medical History* 36, no. 1 (January 1992): 37.

Unlike the Leyden jar, which required a supply of electricity from an outside source in order to dispense an electric charge, Volta's battery, known as the Voltaic Pile, generated a steady flow of direct current electricity through alternating rings of zinc and copper saturated in an acidic solution.[9] That the chemical energy in the battery was converted into electrical energy furthered Volta's belief that "animal electricity" — a theory that electricity was naturally generated by animal tissue, popularized by his contemporary Luigi Galvani — did not exist.

Galvani, a physician at the University of Bologna in Italy, made headlines in 1791 with *De Viribus Electricitatis*, the first published evidence that animal tissue, especially nerves and muscles, developed electricity. He based his treatise on a series of experiments conducted on dissected frogs' legs. Galvani stimulated the muscles with electrostatically charged metal, and noted that the charge caused the frog's legs to twitch. Galvani then tried to produce contraction in the muscles by touching the frog's nerves using metals that were not electrostatically charged, which also proved successful. This led him to believe that the tissue contained a life force, which he termed "animal electricity," to distinguish it from "natural" (lightning) electricity and "artificial" (static) electricity.[10] But Volta was not convinced. He challenged Galvani's claims that the frog's legs produced electricity, and argued that what Galvani witnessed was actually

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[9] Randy Alfred, "March 20, 1880: Volta's Battery Shows Potential," *Wired*, http://www.wired.com/science/discoveries/news/2008/03/dayintech_0320 (accessed 6 September 2008); Graham Hough, "Electro-Medical Apparatus," in *Antique Collecting*, 23, no. 8 (January 1989): 8; Institute of Electrical and Electronic Engineers, "Volta's Electrical Battery Invention, 1799," *IEEE History Centre*, http://www.ieee.org/web/aboutus/history_center/volta.html (accessed 14 December 2008); McNichol, *AC/DC*, 2; Walt Patterson, *Transforming Electricity: The Coming Generation of Change* (London: Earthscan, 1999), 37.

[10] Laura Otis, "The Metaphoric Circuit: Organic and Technological Communication in the Nineteenth Century," *Journal of the History of Ideas* 63, no. 1 (January 2002): 109.

metallically generated electricity. This dispute led Volta to investigate the nature of electric current, which resulted in his observation that "any two dissimilar metals connected by a moist conducting substance would allow the same current to flow."[11] In other words, the contact between the two metals while in the moist environment of the frog's muscle had produced Galvani's electricity — not the frog itself.

The two men became embroiled in a bitter public debate, and the scientific community was divided between Volta's theory of contact electricity and Galvani's theory of animal electricity. In the end, the practicality of Volta's battery led scientists and experimenters to favour his interpretation over Galvani's. (In fact, they were both right — thanks to an "ambiguity" that will be explored further in chapter five).[12] The Voltaic Pile not only provided scientists with a continuous source of direct current, it was also a major step in the discovery of the basic principles of electricity, which proved crucial in the evolution of electric devices. Perhaps most significantly, Volta's battery left an indelible imprint on a future field of study: electromagnetism. Magnetism — the ability of certain substances to attract other substances — had been studied for centuries (it was William Gilbert who first declared that the Earth acted like a magnet), but soon after Volta's discovery, scientists began to link electricity with magnetic properties. In 1820, Hans Christian Ørsted, a physicist at the University of Copenhagen, confirmed that the wires that carried electric current could also create a magnetic field. Electromagnetism was born. [13]

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[11] Otis, "The Metaphoric Circuit," 110.

[12] For an in-depth analysis on this topic see, Marcello Pera, *The Ambiguous Frog: The Galvani-Volta Controversy on Animal Electricity*, trans. Jonathan Mandelbaum (Princeton: Princeton University Press, 1986).

[13] Hough, "Electro-Medical Apparatus," 10.

Enter Michael Faraday, a chemist and physicist at the Royal Institution in London, England. Inspired by the publication of Øersted's paper in the October 1820 issue of the *Annals of Philosophy*, Faraday tirelessly investigated the relationship between electricity and magnetism. In 1831 he observed that the opposite of Øersted's findings was also true: voltage could be generated in a wire if it was introduced to a magnetic field. The significance of his discovery to applied science cannot be overestimated. The principle of induction led Faraday to invent three key elements of the modern electrical industry: the motor, which converts electrical energy into mechanical energy; the generator, which converts mechanical energy into electrical energy; and the transformer, which increases or decreases the amount of voltage in a wire.[14] While much of the world remained in the dark about the very existence of electricity, Faraday had laid the foundation for the lifestyles that Canadians take for granted today. Even Faraday's contemporaries were too preoccupied with improving Volta's battery — it stopped working once the chemical solution ran dry — to appreciate the significance of his achievements.

The cumulative results of electromagnetic principles were largely confined to laboratories and academic circles until 1844, when one unlikely individual turned them into a commercial success. Samuel Morse, professor of arts and design at New York University, had dedicated his life to art but developed an intense fascination with electricity and in particular the potential of electromagnetism as a communications tool. His interest was piqued in 1829 while crossing the Atlantic Ocean from England to the

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[14] Geoffrey Cantor, *Michael Faraday: Sandemanian and Scientists* (New York: Martin's Press, 1991), 228; McNichol, *AC/DC*, 23; John Meurig Thomas, *Michael Faraday and the Royal Institution* (Bristol: Adam Hilger, 1991), 29.

United States, where conversations with fellow passengers about electromagnetism led him to sketch his idea for a Recording Electric Magnetic Telegraph.[15] The idea of the telegraph (derived from the Greek words *tele* meaning "distance," and *graph*, or *graphe*, meaning "write") was not new; primitive versions, which discharged the Leyden jar through long wires, were introduced in the mid-eighteenth century but the charges were weak and the devices impractical. The recent experimentations in electromagnetism made the possibility of effective communication over long distances via electric current a discernable reality, and Morse was acutely aware of that fact.

He experimented with ways to exploit the flow of electricity to send and receive messages between two points. His designs eventually evolved into the standard electromagnetic telegraph, which had two basic components: a transmitter and a receiver connected by a wire. The transmitter sent messages by opening and closing electric circuits. The receiver, which housed an electromagnet, relied on a magnetic field to attract and repel an iron armature in accordance with the breaks in current. Morse, with direction from Alfred Vail, a young entrepreneur and early financier of Morse's project, used the resultant dots and dashes to devise the Morse Code, which historian David Billington has labelled "the first modern information system."[16] In 1837, Morse received a patent for his device, and immediately began to solicit the American government for funding to construct a telegraph line. He succeeded six years later, and used his $30,000 grant to build a line between Washington, D.C., and Baltimore, Maryland.[17] On 24 May

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[15] Linda Simon, *Dark Light: Electricity and Anxiety From the Telegraph to the X-Ray* (New York: Harcourt, Inc., 2004), 30.

[16] David P. Billington, *The Innovators: The Engineering Pioneers Who Made America Modern* (New York: John Wiley and Sons, 1996), 130–35.

[17] Billington, *The Innovators*, 133.

1844, a small crowd gathered at the Supreme Court in Washington to watch Morse transmit his now-famous inaugural message — "What hath God wrought" — to Vail who was stationed at a train depot in Baltimore. While the Washington-Baltimore line was the first of its kind in North America, British railways had been using the technology since 1837. Regardless, Morse has often been credited with inventing both the telegraph and the language used to transmit messages; in reality his creations were collaborative efforts that modified work done by others before him, most notably the British inventors Sir William Fothergille Cooke and Sir Charles Wheatstone, and the American scientist Joseph Henry. But to most Canadians in the mid to late nineteenth century, the telegraph became just as synonymous with Samuel Morse, as did the code that bore his name.

The Toronto Hamilton Niagara and St. Catharines Electro-Magnetic Telegraph Company became Canada's first operating telegraph business with two circuits: one that stretched from Toronto to Queenston, and the other from St. Catharines to Buffalo, New York. The company sent its first telegraphic message on 19 December 1846. By 1851 it had extended its first circuit from Toronto to Quebec City, before being taken over by the Montreal Telegraph Company in 1852.[18] The primary customers of these new enterprises were newspapers, grain farmers, and millers. The *Globe* was one of the technology's biggest proponents and on 3 April 1847, the newspaper announced that it, along with the publishers of the *Banner* and the *British Colonist*, had acquired exclusive use of the telegraph. "The expense will be very heavy," it declared, "but it is hoped that a discriminating public will appreciate this effort to secure for Canada the News at the

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[18] Robert Burner, *Canadian Railway Telegraph History* (Mississauga: Quality Plus Printing, 1996), 3.

earliest moment."[19] By the mid-1850s, the telegraph extended westward from the major eastern towns and cities into British North America's industrial heartland, and southward into the principal American centres.[20] Journalists were soon able to print timelier commercial and political news; the *Globe*, for example, could reliably announce the arrival and delay of ships, and it frequently published market reports transmitted from New York, Buffalo, and Montreal.

In 1858, the telegraph went international. On 20 August, the city of Toronto closed its public offices, and hung streamers and flags across downtown streets to celebrate the arrival of the first message from England via the Atlantic telegraph cable. The mayor, William Boulton, stood on a platform and proclaimed to the crowd around him that the event was "one of the most important that had ever taken place in the history of the world […] that of uniting two great continents by the bond of electricity."[21] The undersea cable across the Atlantic Ocean was completed by 1866, and provided the Canadian press with up-to-date information on European affairs. According to historian Mary Vipond, it also helped make the "publication of regular daily editions of newspapers feasible for the first time."[22] The unprecedented speed with which communication travelled led journalists to nickname the new technology a "lightning line," but for author J.W. Dunbar Moodie, the telegraph was a "trusty messenger from heav'n sent forth." In a poem about the "Mighty Telegraph," Moodie quipped about its

[19] "Exclusive use of the Telegraph!", *Globe*, 3 April 1847, 2.

[20] Mary Vipond, *The Mass Media in Canada*, 3rd ed. (Toronto: James Lorimer and Company, Ltd., 2000), 9.

[21] "Atlantic Telegraph Cable," *Globe*, 20 August 1858, 2.

[22] Vipond, *Mass Media*, 9.

efficacy ("whizz, whizz — buzz, buzz — dotti, dot, dot, dot, dot / Here's lots of news, but we can't read a jot") before hinting at its symbolism:

> The world is now alive — filled with a living soul,
> With veins and nerves far stretching through the whole,
> The Railroads — veins — the nerves — the Telegraph,
> The parallel's complete — you need not laugh.[23]

It was not unusual for nineteenth-century Canadians to evoke images of the body when describing new technologies, or, as we shall see in chapter five, even to describe their own bodies in technological terms. The telegraph, for Moodie, was the life force of the world: its "wires may boast a great enlightened soul / That learns and spreads the truth from pole to pole."[24]

The telegraph, it appeared, was dissolving geographical boundaries, but could it dissolve ideological boundaries as well? The idea that a technology could fuse disjointed societies together is a common trope embedded in national mythologies.[25] But there is no evidence to suggest that the telegraph helped to create a common identity in Canada, even though it was tied to the most potent and recognizable symbol of nationalism: the railroad. As early as 1852, telegraph companies began to construct poles alongside rail lines. Soon, the telegraph became an indispensible signalling device for railroad companies, and its lines continued to establish links between communities. But the building of the railway, as Graham Taylor and Peter Baskerville have noted, had less to

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[23] "The Magnetic Telegraph," *Globe*, 6 November 1847, 1.

[24] "The Magnetic Telegraph," *Globe*, 6 November 1847, 1.

[25] See for example, A.A. Den Otter, *The Philosophy of Railways: The Transcontinental Railway Idea in British North America* (Toronto: University of Toronto Press, 1997) and David Nye, *America as Second Creation: Technology and Narratives of New Beginnings* (Cambridge, MA: MIT Press, 2003).

do with "National Dreams" than it did "sectoral, regional, and metropolitan" interests.[26] Indeed, stringing telegraph wire alongside railroad tracks was a conscious business decision on the part of the telegraph companies to help offset the costs of their own expansion.[27]

The telegraph operated on a complete electric circuit, which meant telegraph companies incorporated all the material necessary for successful transmission into their designs. Indeed, until the 1880s, all novel applications of electricity, including the telegraph, the motor, and the electric light, were closed designs.[28] The latter technology had its genesis in 1802 when Sir Humphry Davy, an English chemist and Michael Faraday's supervisor at the Royal Institution, connected two wires to a voltaic battery and attached the other ends of the wires to a charcoal strip. The result was an intense white light from the charged charcoal.[29] Six years later, he gave a series of public demonstrations of his electric light by using two pieces of charcoal, wires, and a battery: first Davy drew the charcoal together, and then separated them, slowly, which created a dazzling electric arc that stupefied his audience.[30] The arc light confirmed the significance of Volta's battery as a power source while also demonstrating the commercial appeal of electricity to the scientific world. But the high costs of the battery

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[26] Taylor and Baskerville, *Concise History of Business*, 230.

[27] Burner, *Canadian Railway*, 8.

[28] Patterson, *Transforming Electricity*, 37.

[29] Keith Ellis, *Thomas Edison: Genius of Electricity* (London: The Pitman Pres, 1974), 41.

[30] Harold C. Passer, *The Electrical Manufacturers, 1875-1900: A Study in Competition, Entrepreneurship, Technical Change, and Economic Growth* (Cambridge: Harvard University Press, 1953), 11.

coupled with the charcoal's rapid burn rate deterred inventors from creating a workable version of Davy's light for another thirty-four years.[31]

The turning point came with Faraday's 1831 discovery of the dynamo, which provided a cheaper source of direct current. Otherwise known as an electric generator, the dynamo worked on the principle of electromagnetic induction, and in subsequent years inventors made improvements to Faraday's designs. The most significant contribution was made in the 1860s by Zénobe-Théophile Gramme, a Belgian electrician, who introduced a new form of armature winding — the main current-carrying element of the dynamo — that allowed for more reliable, efficient, and uniform current.[32] The availability of cheaper power sources such as the Gramme dynamo provided the stimulus that creative minds needed to improve Davy's arc light design. By the 1870s, the arc light evolved into an integrated system, which included the lights, generating equipment, and supplies, such as wires, that a customer could purchase.[33] But the technology was in a constant state of transition; the *Canadian Architect and Builder* warned its readers that the arc light was noisy, emitted odour, and was prone to shooting sparks.[34] Health hazards aside, the arc light was just too intense for small spaces, and its brightness could not be adjusted. By the second half of the nineteenth century, traditional forms of illumination, such as fire and candles, remained the standard in Canadian homes, although usage of kerosene lamps and gas lighting, already common in Europe and

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[31] Arthur A. Bright, *The Electric-Lamp Industry: Technological Change and Economic Development from 1800 to 1947* (New York: The MacMillan Company, 1949), 22.

[32] Bright, *Electric-Lamp Industry*, 29.

[33] Patterson, *Transforming Electricity*, 38.

[34] "To Avoid Fires from Electrical Appliances," *Canadian Architect and Builder*, 9 (September 1896): 135.

America, was on the rise.[35] The contrast between the soft glow of a flame and the brightness of the arc light must have been startling — and perhaps even troubling — for some. But electric light was inescapable, and one scientific breakthrough would forever alter how Canadians experienced artificial light.

On 22 October 1879 Thomas Alva Edison invented the light bulb — almost. While it is true that Edison produced the first practical incandescent lamp, it is less true that he *invented* it. The incandescent bulb was similar to the arc light, except instead of carbon rods, it relied on a thin carbon filament to produce light. It was the filament, notes historian Arthur Bright, made from a "high-resistant carbon conductor" that allowed Edison's product to be commercially successful.[36] But its fundamentals had been known for over seventy years; at the same time that he tinkered with the arc light, Davy was researching the basic elements of incandescence, although he never developed a prototype.[37] And in the period from 1809 to 1880, twenty different kinds of incandescent lamps had been created, including one designed by Canadians Henry Woodward and Mathew Evans for which Edison purchased the patent rights in 1876.[38] And in the same year that Edison had designed his lamp, Joseph Swan, an English physicist and chemist, independently produced his own incandescent light with a carbon filament, and evidence

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[35] Loris S. Russell, *A Heritage of Light: Lamps and Lighting in the Early Canadian Home* (Toronto: University of Toronto Press, 2003), 135.

[36] Bright, *The Electric Lamp Industry*, 42.

[37] Passer, *Electrical Manufacturers*, 75.

[38] Bright, *The Electric Lamp Industry*, 53; Library and Archives of Canada, "Patent No. 3738," www.collectionscanada.gc.ca/innovations/023020-2710-e **(**accessed 2 June 2011).

suggests that he had used carbon filaments in his designs since the 1860s.[39] What Edison did do was cleverly separate himself from other electrical manufacturers by focusing on central-supply distribution, and thus carve himself a niche in the electric light market. But he did not invent the concept of the central-supply distribution either — he borrowed that idea from the gas industry.

Since the turn of the nineteenth century, gas companies were promoting their product as a source of artificial light. One of the earliest proponents of gas as a light source, German entrepreneur Frederick Albert Winzer, realized as early as 1800 that "the future of gas lay not in local generation but in central generation, and distribution to customers through a system of mains and pipes."[40] This revolutionary thinking set the gas light apart from the arc light, a distinction that helped prompt historian Wolfgang Schivelbusch to label the arc light a "technological step backwards." Rather than function as part of a forward-thinking central-supply system, he maintains, the arc light "was governed by the pre-industrial principle of a self-sufficient supply."[41] To be fair, it would have been a great stretch of the imagination for Davy or his contemporaries, who were building on precedent and with limited resources, to conceive of the artificial electric light as anything but a closed circuit.

But Edison was a visionary with access to resources. He regarded his incandescent lamp as competition to gas companies, rather than an extension to arc-

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[39] "Swan, Not Edison, Should Receive the Credit," *Canadian Electrical News* 41, no. 24 (15 December 1932): 28.

[40] Trevor Williams, *A History of the British Gas Industry* (Oxford: Oxford University Press, 1981), 8.

[41] Wolfgang Schivelbusch, *Disenchanted Night: The Industrialization of Light in the Nineteenth Century* (Berkeley: The University of California Press, 1988), 56.

lighting systems, as did Swan and others.[42] Edison wanted a lighting service that was both technologically superior and economically advantageous over gas. The cost of gas lighting in the United States was relatively high,[43] but it had qualities that distinguished it from other forms of artificial illumination: its brightness could be adjusted; its use could be regulated by meters; and, most importantly in Edison's eyes, a central distributing station could supply multiple consumers at the same time. Hughes argues that this "systems-based" approach provided Edison with a map of technological development that enabled him to spot problems other inventors overlooked.[44] Indeed, envisioning the incandescent lamp as part of a larger system rather than the system itself reflected Edison's ingenuity, but he was also operating at a different level than other inventors.

At his disposal were the material, money, and men — the leading scientists and engineers were, after all, men — he needed to satiate his inquisitive mind. In 1876, he constructed a research laboratory at Menlo Park, New Jersey, where he assembled the most up-to-date equipment and surrounded himself with experts with whom he conducted research and experiments. [45] In just a few years, the quiet site had evolved into a hive of inventive activity. Edison made profitable improvements to both the telegraph and the still-nascent telephone, and he gained public notoriety with his 1878 invention of the phonograph. The phonograph, a primitive record player, became an international symbol

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[42] Colin Chant, ed., *Science, Technology, and Everyday Life, 1870–1950*, (New York: Routledge, 1989), 73.

[43] Chant, *Science*, 23.

[44] Hughes, *Networks of Power*, 38.

[45] Thomas P. Hughes, "Thomas Alva Edison and the Rise of Electricity," in Carroll W. Pursell, ed., *Technology in America: A History of Individuals and Ideas*, 2nd ed., (Cambridge: The MIT Press, 1990), 119.

of Edison's competence; as authors Robert Friedel and Paul Israel muse, "hardly anything would seem to be beyond the capability of a man who could invent a machine that talked."[46] Thus, when the "Wizard of Menlo Park" claimed later that year that he had perfected the incandescent lamp — more than a slight exaggeration — his reputation alone secured him plenty of support from American financiers, such as J.P. Morgan.[47] He established the Edison Electric Light Company to fund his electric light experiments, and by 1881 he built three sister companies to manufacture the necessary equipment for his electric lighting system.

By the fall of 1882, Edison had successfully implemented his system at Menlo Park.[48] He then turned his attention to his greater goal: the lighting of New York City's Wall Street. In 1881, he had constructed a pilot plant at Pearl Street, just blocks away from the financial district, and by 4 September 1882, the station came to life: six Edison Jumbo generators sent 110-volts of direct current electricity to 59 customers. Writer Tom McNichol comments that "it was the dawn, not of electricity, but of the electricity business."[49] Indeed, after 1882, electricity became synonymous with modernity in North America, as journalists, manufacturers, and advertisers continuously sold the idea of a

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[46] Robert Friedel and Paul Israel, *Edison's Electric Light: Biography of an Invention (*New Jersey: Rutgers University Press, 1986), 1.

[47] Jonnes, *Empires of Light*, 57.

[48] The history of Edison's lighting system is well-documented and need not be repeated here. For more information see: Neil Baldwin, *Edison, Inventing the Century* (New York: Hyperion, 1995); George S. Bryan, *Edison: The Man and His Work*, (New York: Garden City Publishing Co., 1926); Frank Lewis Dyer and Thomas Commerford Martin, *Edison, His Life and Inventions*, (New York: Harper & Brothers, 1929); Friedel and Israel, *Edison's Electric Light*; Jonnes, *Empires of Light*; Martin V. Melosi, *Thomas A. Edison and the Modernization of America*, ed. Oscar Handlin (Glenview: Little Brown Higher Education, 1990); William S. Pretzer, *Working at Inventing: Thomas A. Edison and the Menlow Park Experience* (Dearborn: Henry Ford Museum, 1989); Robert Silverberg, *Light for the World: Edison and the Power Industry* (Princeton: Van Nostrand, 1967).

[49] McNichol, *AC/DC*, 62.

better, electrical life. But historian David Egerton rightfully cautions against using "the technological boosterism of the past [as] a history of our material world."[50] Alternative technologies existed well into the twentieth century, and Edison's commercial successes should be regarded as part of an ongoing dialogue of technological choice, rather than as a revolutionary event that changed the world.

By the early 1880s, arc lighting had undergone significant improvements in both design and function, and several companies were selling the stand-alone system to municipalities, factories, and retail stores in major American and Canadian cities. Gas and kerosene remained popular choices for both domestic and commercial illumination. One Toronto business tried to snuff out the competition in a pamphlet entitled "Don't Use Electric Light! Don't Use Gas Light!" Duffield's Canadian Lamp Company hailed its kerosene product as the brightest, whitest, and most economical lamp that was so easy even a "child [could] wick and handle it."[51] Edison, however, eyed only the gas industry as his competition. He felt his system was the technologically superior choice and considered a workable electric light as the first step toward building a system that would not only rival gas, but would supplant the entire industry. And he believed that success depended on achieving three goals: first, convincing the public that electricity was as technically efficient as gas (or better); second, electricity had to be offered at a competitive price; third and arguably most important, his system had to be safe.[52]

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[50] David Edgerton, *The Shock of the Old: Technology and Global History Since 1900* (London: Profile Books, 2006), 4.

[51] Duffield's Canadian Lamp Company, pamphlet, "Don't Use Electric Light! Don't Use Gas Light!: Light your shop, hotel, church, hall or salon with Duffield's Canadian Lamp" (Pamphlet, 1889), 3.

[52] Friedel, *Edison's Electric Light*, 64.

By 1879, Edison had already become the face of electric development. Not only was he selling incandescent light, he was also informing a public that was largely ignorant about electricity. To help familiarize the foreign, Edison modeled his system after the gas industry: meters measured the amount of current a customer used; incandescent lamps were controlled by a switch; and electric illumination equalled that of gas light at 16 candlepower.[53] Moreover, he underscored the safety of his system, an advertising ploy that was not lost on local gas utilities, whose customers complained of foul odours, headaches, and general malaise from the gaslight, which used up significant amounts of oxygen in crowded rooms.[54] Incandescent light, on the other hand, did not consume oxygen "and left the chemical composition of the air unchanged."[55]

Gas companies, in turn, were quick to note the dangers posed by electricity. They emphasized the risks of shock, fire, and death from the 110 volts of direct current used in Edison's system.[56] This power struggle evolved into a "propaganda campaign" in which both sides took advantage of the news media to bolster support.[57] Edison did not limit his campaign for electrical development to American audiences; in 1881 and 1882, he demonstrated his system at international exhibitions in Paris and London, respectively. Indeed, following the Paris Exhibition, Berlin became the first European city to establish

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[53] McNichol, *AC/DC*, 57.

[54] Jonnes, *Empires of Light*, 58.

[55] Schivelbusch, *Disenchanted Night*, 52.

[56] McNichol, *AC/DC*, 57.

[57] W. Bernard Carlson and A.J. Millard, "Defining Risk Within a Business Context: Thomas A. Edison, Elihu Thomson, and the a.c.-d.c. Controversy, 1885–1900," in *The Social Construction of Risk: Essays on Risk Selection and Perception*, eds. Branden B. Johnson and Vincent T. Covello, 277 (Dordrecht: D. Reidel Publishing Company, 1987), 277.

a central station.[58] But interest alone was not always enough for a city to adopt electricity. Historian Colin Chant notes that early success of electrical installations was largely dependent on local and national legislative circumstances. In England, for example, "national legislation […] favoured enterprises undertaken by local authorities, rather than private companies, [and] the former already had stakes in gas."[59] In Canada, local gas utilities had held a monopoly on municipal lighting; consequently, early electric lighting was the purview of wealthy home and business owners who could afford to install electric generators on their property. However, there were exceptions for public spaces. In 1882, businessmen Thomas Ahearn and Warren Soper, founders of the Ottawa Electric Company, lit up Canada's capital city with 165 electric arc street lamps. Officials in Montreal were forced to respond to public pressure for electric street lighting; gas companies held a monopoly in the city since 1837, but by 1886 the Royal Electric Company won a tender to string up lights in the downtown core.[60]

Edison had established a formal presence in Canada by 1890 with the founding of manufacturing facilities in Toronto, Montreal, and Halifax, but by that time he was already facing steep competition from a newcomer to the electricity market: George Westinghouse. Edison's central station system had a significant limitation: direct current electricity could only travel for a few kilometres before the voltage waned. Long-distance transmission of direct current was technically possible with heavy copper wire, but the high costs associated with the material made the option financially unfeasible. This meant

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[58] Chant, *Science*, 75.

[59] Chant, *Science*, 75.

[60] John Negru, *The Electric Century: An Illustrated History of Electricity in Canada* (Toronto: The Canadian Electrical Association, 1990), 16.

Edison's generating station needed to be located within a reasonable distance from the point of use — fine for a densely packed city like New York, but less so for scattered towns and villages throughout the country. In 1886, however, Westinghouse, founder of the Westinghouse Electrical and Manufacturing Company, introduced a viable alternative. His system involved alternating current, and used a transformer to increase (or "step up") voltage for long-distance transmission, then decrease (or "step down") the voltage for domestic use.

Unlike Edison, who invited journalists to chronicle his every achievement, Westinghouse entered the electricity market with quiet optimism. Great Barrington, Massachusetts, became his launching point in 1886, when he transmitted 3,000 volts of alternating current to illuminate incandescent lamps strung about the town.[61] Alternating current differed from direct current because it consistently reversed its directional flow. Both voltages were just as effective as power sources, but since alternating current could be stepped up and stepped down with the use of a transformer, it could efficiently travel longer distances through a thinner wire. It also meant that it mattered less how distant the point of use was from the generating station — a promising feature for less populated towns and rural areas. Westinghouse knew this would give him a cost advantage over Edison, but in order to compete with Edison's system, he needed a reliable motor that operated by alternating current.

Most electric motors since Faraday were powered by direct current. As demands for electricity strengthened in the late nineteenth century, it was crucial for Westinghouse to incorporate a motor in his system that could feed the power needs of industry. He

[61] McNichol, *AC/DC*, 82.

found the solution in Nikola Tesla, a Serbian engineer living in the United States, who in 1887 received a patent for his polyphase alternating current motor. Tesla improved the notoriously inefficient and spark-inducing commutator — a ring of conducting material that changed the frequency and/or direction of the current in the armature — of existing motors, and produced one that relied instead on alternating currents of the same frequency with a different phase shift. McNichol explains "it was a bit like adding pedals to a bicycle – when one pedal reached the bottom of its stroke, another reached the top and began to push down producing a steady flow of power. By using out of phase alternating current, there was always one cycle nearing its peak."[62] When Westinghouse heard of Tesla's invention he immediately made an offer to purchase Tesla's patents and invited the young engineer to work for him. Tesla's deal with Westinghouse effectively marked the beginning of alternating current's dominance in electrification; ironically, Tesla had offered his idea to Edison first, but Edison turned it down for being impractical.[63] He deemed the high voltage capabilities of alternating current too dangerous, favouring the low voltage of direct current instead.

Westinghouse's adoption of Tesla's motor sparked a "battle of systems", and at the time, it was not clear to anyone who would win. By the early 1890s, Edison had established a cloak of credibility with the American public that was difficult for Westinghouse to penetrate. Edison undertook a campaign that was similar to his public attacks on the gas industry by focusing on the dangers of high voltage alternating current, and even advocated its benefits as a form of capital punishment via the newly designed

[62] McNichol, *AC/DC*, 83.

[63] Jonnes, *Empires of Light*, 107.

"electric chair."[64] (He even coined the term "Westinghoused" to describe criminals who had been executed by alternating current. It did not catch on). While he could have modified his own system to better compete with Westinghouse's, he chose instead to promote the safety of his own system to protect his reputation as an inventor.[65] But his reputation alone could not save his system. Writer Walt Patterson notes that "eventually Edison's own colleagues, seeing alternating current steadily gaining, eased him out, clearing the way for what became the General Electric company."[66]

The 1893 introduction of the "universal system" finally tipped the balance in favour of alternating current. Westinghouse introduced the concept at the Chicago World's Fair, where he won a contract to supply light and power for the exposition. His company constructed the largest ever polyphase system in North America, and used converters and transformers to transmit electricity at a high voltage and deliver it at the desired current and voltage over the entire exhibition grounds.[67] The flexibility of the universal system, combined with alternating current's superiority in long-distance transmission, quickly made the question of hydroelectric power a lively topic at the turn of the century. Hydroelectricity was not a new concept; in 1881, for example, the Ottawa Electric Light Company had constructed a waterwheel at Chaudière Falls to supply power for arc lighting in local mills.[68] But after the Chicago World's Fair, hydroelectricity on a

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[64] Mark Essic, *Edison and the Electric Chair*, (New York: Walter and Company, 2003).

[65] Carlson and Millard, "Defining Risk," 279–81.

[66] Patterson, *Transforming Electricity*, 42.

[67] Patterson, *Transforming Electricity*, 43.

[68] Negru, *The Electric Century*, 18.

large scale was now a real possibility and eyes on both sides of the border turned toward a colossal power source: Niagara Falls.

"Niagara — what other word conveys the same awe and sense of power?" Edward Adams asked rhetorically in his 1927 history *Niagara Power*.[69] Niagara Falls as a power source had achieved mythic proportions by the early twentieth century, as is evidenced by the wide range of historical accounts detailing its development.[70] In Canada, the harnessing of Niagara power was most significant to Ontario, although it had political and technological implications that reverberated throughout the country. In 1892, the Ontario government entered into a contract with American-based Niagara Falls Power Company to generate and distribute power on the Canadian side of the Falls; however, by the turn of the century, the company had failed to build a plant in Canada. In 1897, the Supreme Court of Ontario responded to public pressure to review the company's contract and in 1899 ruled that it had failed to comply with the stipulations. The contract was renegotiated and the company relinquished its monopolistic hold; additional rights to develop power were sold to American-owned Ontario Power Company and Toronto-owned Electrical Power Company. Some authority to generate power may have shifted to Canadian hands, but the Toronto company transmitted power

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[69] Edward Dean Adams, *Niagara Power: History of the Niagara Falls Power Company, 1886–1918*, Vol. 1 (Niagara Falls: Niagara Falls Power Company, 1927), ix.

[70] See for example: Adams, *Niagara Power*; Norman R. Ball, *The Canadian Niagara Power Company Story* (Erin, On: Boston Mills Press, 2005); Robert Blake Belfield, *The Niagara Frontier: The Evolution of Electric Power Systems in New York and Ontario, 1880–1935*, (Philadelphia: University of Pennsylvania, 1981); James A. Carroll, *Power at Niagara*, (Toronto: Ginn, 1971); Merrill Denison, *Niagara's Pioneers* (New York: s.n., 1930); Karl Froschauer, *White Gold: Hydroelectric Power in Canada* (Vancouver: University of British Columbia Press, 1999); William Irwin, *The New Niagara: Tourism, Technology, and the Landscape of Niagara Falls, 1776 –1917* (University Park: Pennsylvania State University Press, 1996); Arthur V. White, *Niagara Power Shortage* (Ottawa: Commission of Conservation Canada, 1918); Samuel S. Wyer, *Niagara Falls: Its Power Possibilities and Preservation*, (Washington: Smithsonian Institution, 1925).

to the city and exported the rest to the United States, effectively forcing smaller Ontario towns to continue their reliance on American coal for steam-generated electricity.

Coal fuelled the industrial development of Canada in the late nineteenth century. Mined underground or from open pits, the combustible sedimentary rock earned the label "black treasure" for its versatility in providing light, heat, and power to homes and businesses across the country.[71] Coal for electric generation was often ground into a fine powder and burned in a boiler combustion chamber, which heated water in pipes connected to the boiler, converting it to steam. The steam was released from the boiler and passed through the blades of a turbine, which in turn powered a generator and produced an electrical current. Early coal-fired electric plants distributed direct current electricity to nearby businesses and homes. After the success of alternating current, transformers were included in the system design and used to step up the voltage for long-distance transmission.

Canada's coal deposits were concentrated in the West (primarily Alberta), with some reserves located in the Maritimes (primarily Nova Scotia). Central Canada imported most of its fuel from the United States. H.V. Nelles notes that in "coal-starved [Ontario], businessmen, manufacturers, investors, newspapermen and politicians eagerly seized upon hydro as a symbol of [a] new industrialism."[72] Indeed, this was generally true for provinces with an abundance of water resources, including Quebec, Manitoba, and British Columbia. Hydro was regarded as cleaner and more sustainable, and many Canadians wanted to exchange the black treasure for this new "white coal." The *Globe*

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[71] Glenbow Archives (hereafter GA), Calgary Power Company Fonds, Calgary Power Company Radio Broadcast, Document: "Lethbridge — Radio Broadcast," n.d.

[72] Nelles, *Politics of Development*, 217.

provided mute testimony of public desire for hydroelectricity in a "Power, Light and Heat Edition" published in 1905. Under the title, "Electricity vs Steam," is a sketch of two towns separated by a goddess-like figure holding an electrified sceptre in her hand. On the left is an electrically-powered city. The buildings are clean, with images of people walking under bright skies. In the foreground is a drawing of an electric motor, a symbol of this electrically-run town. On the right is a city operated by steam. Smokestacks litter the skyline, polluting the air with heavy smoke. The sky is dark, the buildings dirty. No one is seen milling about.[73]

A coal shortage at the turn of the century revealed the fragility of Ontario's industrial centre. In 1902, miners in the anthracite coal fields of Pennsylvania went on strike, unleashing the Great Coal Famine, forcing factories in the province to close, workers to lose their jobs, and coal prices to skyrocket.[74] "Canada's national autonomy is a myth," declared Thomas Church, member of parliament for Toronto North, and former mayor of the city of Toronto, "as long as a great part of our country depends for its coal supply on the United States."[75] Indeed, Nelles notes that the famine "dramatized in cruelly simple terms the Ontario dependence upon American energy. Hydro promised deliverance from this expensive and degrading subordination."[76] Politicians and business owners turned to Niagara, and resented the lack of hydroelectric development in Ontario, especially in light of the industrial boom just across the Falls in Buffalo, New York,

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[73] "Electricity vs Steam," *Globe*, 5 August 1905, 2.

[74] Negru, *The Electric Century*, 24.

[75] Canada, *House of Commons Debates*, Second Session — Fourteenth Parliament, vol. CLVI, 19 March 1923 (Ottawa: King's Printer, 1923), 1266.

[76] Nelles, *Politics of Development*, 218.

where new electro-chemical and aluminum industries were being established. Some development was taking place in Hamilton, which was the first Canadian city to transport electric power over a long distance. In 1898, the Cataract Power Company of Ontario, operating out of DeCew Falls, transmitted 11,000 volts roughly fifty-six kilometers to power Hamilton homes, streets, and businesses.[77] These two examples demonstrated to small manufacturers that Niagara Falls had the potential to power southwestern Ontario, and release them from the stranglehold of American energy sources. But the private companies on the Canadian side of Niagara had failed to support the needs of local business. Thus, some local businesses decided they would have to supply it themselves. And to accomplish that, they turned to the Ontario government.

On 5 July 1905, Ontario Premier Sir James Whitney appointed Adam Beck, simultaneously mayor of London and Conservative member of provincial parliament, to chair a Hydro Electric Commission of Inquiry to determine the power potential of Niagara Falls and other provincial bodies of water. Beck, a wealthy businessman, had established himself as a vocal proponent of government-owned electrical utilities to stimulate economic development. What ensued was a mass swell of support for public power in Ontario, which has captured the attention of numerous historians. The political history of the movement and the formation of the Hydro Electric Power Commission of Ontario (HEPC) have been well documented and need not be repeated here.[78] The HEPC

[77] "Electricity vs Steam," *Globe*, 5 August 1915, 3.

[78] For example see: Denison, *The People's Power*; Fleming, *Power at Cost*; N.B. Freeman, *The Politics of Power*; Ontario Hydro, *The Hydro-Electric Power Commission of Ontario: Its Origin, Administration, and Achievements* (Toronto: Hydro-Electric Power Commission of Ontario, 1928); Jean L. Manore, *Cross-Currents: Hydroelectricity and the Engineering of Northern Ontario* (Waterloo: Wilfrid Laurier University Press, 1999); Nelles, *Politics of Development*; and William R. Plewman, *Adam Beck and the Ontario Hydro*, (Toronto: Ryerson Press, 1947).

began operations in 1910 and was mandated to provide electric power to municipalities province-wide at the lowest possible cost. The Commission would sell electric power at wholesale prices to municipalities, where "local municipal authorities would distribute electricity to the individual customers."[79] The HEPC was the first government-owned utility in North America and provided a model for business organization throughout the rest of Canada and the world. Yet while the Commission was politically innovative, it was technologically infertile.

Almost immediately, the HEPC began to lay transmission lines to connect southwestern communities to Niagara Falls, though almost none of the equipment used was Canadian-produced. From its inception, the HEPC, much like most electrical utilities in Canada, relied heavily on American technology, especially from Westinghouse and General Electric. Historian Karl Froschauer argues that "once these two branch plants took root, they dominated core hydroelectric component manufacturing in Canada in the twentieth century. Thus, Canadian-owned hydro development was derivative to say the least."[80] While politicians lamented American control over the country's coal supplies, Canadians, it seems, were just exchanging one type of control for another. Canada relied heavily on American electrical technology, and these foreign firms have since dictated the development of hydroelectric technology.

However, it is unlikely that many of the small manufacturers to benefit from Niagara power took much notice. On 11 October 1910, Berlin, Ontario, became the first town to receive electricity generated by the Falls when over 110,000 volts were

[79] Hydro Electric Power Commission of Ontario, "Niagara Power" Booklet, (ca. 1931), 23.

[80] Froschauer, *White Gold*, 65.

transmitted roughly 200 kilometres to the southwestern Ontario community. As the townspeople celebrated the arrival of electricity, Beck and Whitney took the opportunity to forecast electricity's role in the province. Electricity was the way of the future, they declared, and the sentiment was echoed throughout Canada. In the first decade of the twentieth century, Canada's "installed hydro-electric capacity grew from 173,000 horsepower to almost one million horsepower. By 1920, it was up to two and a half million."[81] At the same time, steam-generated electricity was also on the rise, and electricity in the form of transportation and illumination became staples in urban centres across the country.

Until the mid-twentieth century, the Canadian experience with electricity was a predominantly public one. Many Canadians could experience illumination of their streets or browse lit-up shop windows at night. They could travel from one end of a city to the other by electric streetcar. They could communicate to one another by telegraph or telephone, the latter playing an increasingly more important role in Canadians lives by the day:

> Time was when one must hold his ear
> Close to the whispering voice to hear,
> Like deaf men near and nearer;
> But now from town to town he talks,
> And puts his nose into a box,
> And whispers through a wire.[82]

[81] Negru, *The Electric Century*, 28.

[82] "Reminiscences and a Glimpse into the Future," *Canadian Electrical News* 9, no. 5 (May 1899): 92. Although interesting and relevant, this dissertation will not be discussing the historical evolution of the telephone. For information on the telephone in Canada see Michele Martin, *Hello Central?: Gender, Technology, and Culture in the Formation of Telephone System*s (McGill-Queen's University Press, 1991).

They could witness the latest electrical marvels at county fairs and exhibitions. They could learn about electricity at their local utility or take classes at local schools. They could see the physical changes made to the landscape by wooden poles and transmission wires, and know they were connected to a greater electric system.

Electricity was equated with modernity, and for a generation that believed in progress, Canadians in the early twentieth century did not want to be left behind. But they did not embrace the technology simply because it existed; Canadians needed to be sold on the idea. And utility companies — both public and private — wasted no time in trying to convince the public that electricity was more reliable, more efficient, and more affordable than any other power source available to them. In the struggle for technological supremacy, electricity was promoted as the ultimate means of self-sufficiency — with electricity, Canadians were told, anything was possible. It was a world of technological potential embodied in a culture of invention, and it was the world in which Pelton wrote a series of articles about the role of electricity in life. Electric power had already been introduced in many aspects of Canadian life, but utility companies, advertisers, politicians, and journalists assured the public that it was only the beginning. Ours is a new, "electrical age," Pelton promised his readers, and "we are only on the outer fringe of electrical discovery."[83]

[83] Pelton, "The Electrical Era," *Western Women's Weekly* 2, no. 31 (12 July 1919): 2.

Chapter Two:
"Since the Hydro Came": Electricity in Urban Canada

Oh! What a difference since the hydro came.
Cosy little corners don't look just the same.
Everywhere a light now is shining bright,
Oh! Oh! Oh! Can't tell day from night.
And when you go a' strolling with your lady love
Don't forget the Hydro shining bright above.
You darsent try to kiss her
The Hydro is to blame.
Ho! Ho! What a difference since the Hydro came.[1]

The supporters of electric development in Canada promised that electricity would brighten Canadians' lives. Cities across Canada communicated their civic pride through the installation of street lighting, often paid for by local taxes. The superior quality of electric lights would also act as a form of social security; illumination would deter criminals lurking in the shadows. The desire for brilliant, shining lights, often referred to as the "Great White Way," that would transform dark city streets into a bright urban utopia, was a sentiment shared across the country. But the transformation of turning night into day did not sit well with at least one resident from London, Ontario. In 1912, Claud L. Graves penned "Oh! What a difference since the hydro came," a lyrical protest to the invasive nature of electric street lighting, which ruined a lover's chances for an evening tryst.

Although probably intended as nothing more than whimsy, Graves's song does reveal a view of electricity not prevalent in the pages of the popular press: that electric street lighting, shining down from above, acted as a spotlight on the actions of passersby

[1] Claud L. Graves, "Oh! What a difference since the hydro came," (1912). Special thanks to Richard Holt for providing me with a copy of the song and its lyrics.

below. This may have caused a general sense of unease among some city dwellers, who preferred the anonymity provided by the soft yellow glow of gas or naphtha lamps. Electric streetlights dramatically transformed the Canadian urban landscape and the way Canadians experienced their environment. Nye argues that early American experiences with electricity were urban, public ones.[2] The same was true for Canada, where increasing numbers of people were moving into cities; here they first experienced electrification via electric transportation, lighting in public streets, in shop windows, at fairs and exhibitions. This chapter will explore how these public representations of electricity contributed to the structure of city environments during the early twentieth century, and question how the interpretation of these technologies varied in urban settings across the country.

I

Although the Canadian economy remained predominantly agricultural for much of the twentieth century, more than half of the population was urban by the 1930s.[3] From 1900 through 1910, thousands of Canadians moved westward in search of farm lands, but the more statistically significant trend was the expansion into cities; urban areas experienced an increase of 1,259,342 people, more than double the 575,986 new residents to rural

[2] Nye, *Electrifying America*, 382.

[3] The Census of Canada defines *urban* as "all incorporated cities, towns, and villages," which will be the definition adopted here. Due to the availability of relevant sources, there will be a greater focus on the larger metropolitan centres of Canada (namely Montreal, Toronto, Victoria, and Vancouver). See Dominion Bureau of Statistics, *Seventh Census of Canada, 1931*, vol. 1, *Summary* (Ottawa: J.O. Patenaude, I.S.O, 1936), 81.

areas.[4] Within two decades the number of people living in urban centres had exceeded those living in Canada's countryside; and for the first time — in Ontario at least — cities were no longer increasing in size principally due to overseas immigration, but instead because of rural depopulation.[5] The exodus to the cities was prompted in large part by amenities and work opportunities available in urban areas. Ease of transportation within the city, made possible thanks in large part to electricity, played an important role in making urban centres more alluring to those seeking work. The electric streetcar (and eventually the automobile) also contributed to the development of "satellite" towns that neighboured the larger metropolitan areas. Prominent among those who migrated from the hinterland to the cities were women who travelled in search of occupations other than the farm and domestic work available to them in rural areas.[6]

Those who chose to live in cities would have almost immediately experienced the effects of industrialization. By 1920, industrialization in Canada was already a decades-old process, although it did not take place in all parts of the country at the same time. Elements of industrialization included the centralization of work, the exploitation of natural resources, improved communication, quicker transportation, and increasing urbanization, in all of which electricity, especially hydro-electric power, played an important part. Also significant was the mechanization of industry; the transition from coal- and steam-driven machinery to electrical power meant that factories were safer

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[4] Dominion Bureau of Statistics, *Sixth Census of Canada, 1921*, vol. 1, *Population* (Ottawa: F.A. Acland, 1924), xxxi.

[5] J.M.S. Careless, "Some Aspects of Urbanization in Nineteenth Century Ontario," in *Aspects of Nineteenth Century Ontario*, eds. F.H. Armstrong et al., 72 (Toronto: University of Toronto Press, 1974).

[6] Dominion Bureau of Statistics, *Seventh Census of Canada, 1931*, vol. 1, *Population* (Ottawa: King's Printer, 1936), 157.

work environments, especially where highly flammable material, such as flour or paper, was produced.[7] But the real value of electricity in factories (at least in the eyes of factory owners) lay in its technological potential. Nye notes that

> The principal innovations – electrical time clocks, control devices, lighting, motors, electric machine tools, and furnaces – were not mere substitutes for their predecessors, and in combination they made possible entirely new modes of production, most notably the assembly line. They also had important secondary effects, such as shifts in plant location, new models of factory construction, and new kinds of shop-floor organization.[8]

Concurrent with this trend was the growth of integrated corporations, which demanded a new style of administration.[9] Much credit has been given to Frederick Winslow Taylor and his principles of scientific management for reshaping the way work was performed, but as Nye points out, real credit ought to be given to the electrical engineers who capitalized on the fortuitous intersection of technology and task by putting electric machinery to use wherever inefficiency could be eliminated, resulting in a "simultaneous transformation of management and production."[10] The highly precise machinery also meant that jobs were either eliminated or that workers needed to develop the relevant skills to operate the complex equipment.[11]

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[7] Robert Craig Brown and Ramsay Cook, *Canada, 1896–1921: A Nation Transformed* (Toronto: McClelland and Stewart, 1974), 90.

[8] Nye, *Electrifying America*, 188.

[9] Nye, *Electrifying America*, 188; see also Taylor and Baskerville, *A Concise History*, 335.

[10] Nye, *Electrifying America*, 188.

[11] The increased mechanization of industry was not without its detractors; artisans and small business owners heavily resisted these manufacturing sites. Taylor and Baskerville argue that "the extent to which [they] were able to countervail the power of large corporations through economic and political pressures has been the subject of continuing debate among historians and social scientists in the United States and Europe, as well as Canada." See: Taylor and Baskerville, *A Concise History*, 335; Brown and Cook, *Canada, 1896–1921*, 90.

The evolution of manufacturing centres that took place against the backdrop of the First World War, as factories were converted to produce munitions, provided a stimulus for the development of the central station industry, with hydro-electric stations in particular experiencing a growth spurt.[12] For the first fifty years of its existence, the Canadian electrical industry was in a constant state of flux. The earliest utilities were formed with the intention of running trams and streetcars, but "profits were slim and competition was fierce. Companies came and went, were bought up, merged or simply died, with dizzying speed."[13] Utility companies were expensive ventures, and faced heavy competition in manufacturing from traditional fuel sources, especially coal. Utilities in the late nineteenth century also found their potential areas of service blocked by technological obstacles; until Tesla's invention of the alternating current motor became widely available, their area of service was limited to the distance that direct current electricity could travel. By the war, however, most of the technological wrinkles had been smoothed out, and the Hydro Electric Power Commission's Niagara Falls project demonstrated the viability of hydro-electric power for industry. Also by this time, the industrial reliance on coal had begun to erode as costs for the fuel source began to rise and supplies became uncertain; utility companies took advantage of the situation by further exploiting the country's water resources to generate the electricity needed to power factories.

As the electrical industry began to stabilize, trends in ownership emerged across the country. By the start of the Second World War, a majority (seventy-four percent) of

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[12] Dominion Bureau of Statistics, *The Canada Year Book, 1924* (Ottawa: King's Printer, 1925), 374.

[13] Negru, *The Electric Century*, 18.

the total amount of electricity generated in Canada by central electric stations came from privately-controlled utilities.[14] In 1938, the Dominion Bureau of Statistics recorded that privately-controlled electrical utilities provided the majority of electric power to customers in Prince Edward Island, New Brunswick, Quebec, Manitoba, Alberta, and British Columbia. Some of these entities did (and continue to) work in conjunction with publicly-owned utilities. Despite the output of privately-owned power, the prevalence of public ownership distinguished Canada from the United States, where private ownership was "not only taken for granted but aggressively defended."[15] Ontario's HEPC provided a blueprint for other provinces to establish their own hydro-electric commissions, with New Brunswick, Nova Scotia, Manitoba, and Saskatchewan introducing government-owned electric utilities during the interwar years. Quebec, which had retained a long tradition of privately-owned utilities, experienced years of polarizing debate over public versus private power; it eventually introduced a provincial electrical commission in 1944.

The power capacity of Canada's electrical industry grew substantially during the interwar years. The total kilowatt hours generated by central stations increased fivefold (to 26,154,160 in 1938, from 5,497,204 in 1919), with a slight drop in the early years of the Great Depression.[16] The number of customers subscribing to electric power increased by 110 percent between 1920 and 1930, with domestic service customers accounting for eighty percent of that increase; however, "domestic service consumption was only eight percent of the total consumption of Canada."[17] Much of this power went to supplying

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[14] Dominion Bureau of Statistics, *The Canada Year Book, 1940* (Ottawa: King's Printer, 1940), 383.

[15] Patterson, *Transforming Electricity*, 45.

[16] Bureau of Statistics, *Canada Year Book, 1940*, 369.

[17] Bureau of Statistics, *Canada Year Book, 1940*, 367.

industry, with pulp and paper and mining industries being the primary consumers, but also manufacturing and commercial sites located in urban areas. Electric power helped to fuel the growth of cities, and electricity services, like transportation systems and street lighting, became symbols of municipal maturity. The manner in which Canada's urban centres flaunted these electrical advancements lends insight into early twentieth-century urban values.

II

Public transportation played an important role in the everyday lives of urban residents, as well as the structure and flow of city environments. The earliest public transportation system surfaced in Canada in the 1860s in the form of horse-drawn street railways, which allowed for increased mobility within city limits and for residents to begin expanding outwards from downtown cores. By the peak of the horse-drawn era in the late-1880s, Toronto had developed the most extensive network in Canada, with over ninety-five kilometres of track transporting roughly 60,000 residents every day.[18] After electrification of street railways began in earnest in the 1890s, some of Toronto's horse cars were stripped of their wheels and brought to Victoria Park, where they were fitted with sleeping quarters and rented to recreational campers for $1.50 per week.[19] By 1910, urban and radial electric transportation systems had replaced nearly all of the country's

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[18] Ruben C. Bellan, *Canada's Cities: A History* (Winnipeg: The Whitefield Press, 2003), 129.

[19] *Canadian Electrical News* 4, no. 8 (August 1894): 23.

horse-drawn units and further encouraged expansion of city limits. The shift from animal to electric power was poeticized by Elisha Gray in a poem called "Reminiscences and a Glimpse into the Future" published by *Canadian Electrical News* in 1899:

> In other days we took a car,
> Drawn by a horse if going far,
> And felt that we were blest;
> But now the conductor takes the fare
> And sticks a broom-stick in the air —
> The lightning does the rest.[20]

Gray's light-hearted imagery of electric streetcars being powered by lightning and broomsticks likely would have found a receptive audience among Canadians, many of whom were unaware of the inner-workings of the technology and may have viewed electricity as a mystical force. But what they did know was that the trolleys were fast; moving at a whopping sixteen to twenty kilometres per hour (considerably faster than the just-above walking speed of horse cars), electric streetcars were poised to alter urban travel fundamentally.

Known as trams, trolleys, or streetcars, these vehicles ran on tracks laid in principal streets in downtown centres, and also on streets linking cities with nearby towns. The latter were sometimes called inter-urbans. In Ontario, they were better known as radials; perhaps, as Robert Stamp suggests, to indicate "the manner in which the lines radiated out from the larger centres into the surrounding countryside."[21] Whatever the name, these vehicles were typically designed to carry upwards of forty passengers by use of electric power, often fed by a long pole or pantograph, on its roof, which came into

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[20] "Reminiscences and a Glimpse into the Future," *Canadian Electrical News* 9, no. 5 (May 1899): 92.

[21] Robert M. Stamp, *Riding the Radials: Toronto's Suburban Electric Streetcar Lines* (Erin, ON: Boston Mills, 1989), 7.

contact with an overhead wire. These wires became a distinguishing feature of cities with electric transportation (perhaps to the annoyance of those who preferred not to see their skyline interrupted by a maze of wires), and were daily reminders to urban residents that electricity was fuelling their city's growth. The significance of electric streetcars was greater than their role as commuter vehicles; prior to the rise of the automobile and motorbus, they were fundamental to the shaping of city centres and to the way Canadians experienced urban environments. The fact that they were electrically-powered was instrumental in early public acceptance and enthusiasm for the technology.

The first commercial electric streetcar in North America made its appearance in Toronto in 1884. Designed by Belgian-born Charles J. Van Depoele, the line carried passengers from Strachan Avenue to the Toronto Industrial Exhibition grounds. It was a fitting debut; just two years earlier, the fair was the first in Canada, and one of the first in the world, to illuminate its entire grounds with electric light. By the time the streetcar rode into the Exhibition grounds, organizers of the annual event had already embraced electric novelties as festive elements, and continued to showcase electric innovations as headlining attractions for years to come. The streetcar was active for eight years, and J.J. Brown notes that it was "the world's first practical street railway. The basic system of overhead wires, plus a trolley pole [...] quickly spread to all major systems of the world."[22] The Strachan line demonstrated the viability of electricity as a motive power and soon cities across Canada began to electrify their street railways. Most were small, with only a few kilometres of track transporting a handful of streetcars. Vancouver, Toronto, and Montreal, however, developed vast, integrated networks that connected the

[22] J.J. Brown, *Ideas in Exile: A History of Canadian Invention* (Toronto: McClelland and Stewart, c1967), 164.

inner-city with the burgeoning suburbs.[23] Inaugural runs were often turned into celebratory events led by local dignitaries and witnessed by crowds of spectators. When the Regina Municipal Railway first opened its doors to the public in July 1911 (timed to coincide with the Dominion Exhibition), hundreds lined up to watch the four streetcars transport public officials and provincial government representatives along its route through the fairgrounds. By the end of the day, over 7,000 people had ridden the rails, with average loads carrying fifty to sixty people at a time. [24]

Electric streetcar service was a visible act of city-building, and led to a transformation of the urban environment. This was particularly evident in Lethbridge, Alberta, where Canadian Pacific Railway yards had divided the city into two sections. By 1911, North Lethbridge was threatening to separate and form its own municipality. Seeing their dreams of a "boom town" begin to fade, officials located in South Lethbridge decided that a street railway linking the two sections would help to unite the city, and keep their development goals on track. To gain public approval, the railway had to be electric; by this time, electricity had already demonstrated its worth as a motive power, especially over horse-drawn or steam-powered streetcars. Electric trams were cleaner, quicker, and as long as the supply of power remained constant, more reliable as they allowed cities to establish scheduled stops, permitting travellers greater control of their day. They also symbolized municipal maturity by suggesting that the size of the city necessitated electrified travel. In that vein, in September 1912, the Lethbridge Municipal

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[23] Fred Angus, *Loyalist City Streetcars: The Story of Street Railway Transit in Saint John, New Brunswick* (Montreal: Railfare, 1979), 1.

[24] Colin Hatcher, *Saskatchewan's Pioneer Streetcars: The Story of the Regina Municipal Railway* (Montreal: Railfare, 1971), 11.

Railway, promoted as a "fast-track to major city status," began operation.[25] Ten streetcars, capable of carrying forty passengers each, connected residents of the North and South sections. Although the system was plagued with financial and technical problems from the start, the railway was in operation for over thirty years and achieved the aim set out by local officials: the city was saved.[26]

Despite being introduced at different times and under separate circumstances, similar patterns emerged across the country in response to the electrification of street railways. Almost immediately, local officials, journalists, and urban reformers began to advocate for extended and improved service within their municipalities.[27] But at the same time, some were critical of railway companies and suspicious of these new, fast-moving machines. Farmers located on the outskirts of Ottawa resisted the electrification of the street railway, claiming that the noise of the cars frightened their horses and that their wagons would get stuck in intersecting tracks. Some farmers tried to disturb the flow of traffic by laying hay on the rails to reduce the streetcar's traction, forcing it to a stop, or alternatively, by driving their wagons directly in front of a streetcar, causing it to creep along at the horse's walking pace. Fed up with these protests, the city passed a bylaw in 1895 prohibiting farmers from riding their wagons on the tracks.[28]

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[25] Galt Museum and Archives (hereafter GMA), File: P19811053000, Document: "The Canadian Railroad Historical Rattler," n.d.

[26] "City's Streetcar System Took Less Than a Year to Build," *Lethbridge Herald*, 3 April 1987, 3.

[27] Gilbert A. Stetler and Alan F. J. Artibise, *Power and Place: Canadian Urban Development in the North American Context* (Vancouver: University of British Columbia Press, 1986), 188; see also: "Hydro Radials," *Hydro Bulletin*, December 1916, 3.

[28] Anna Adamek, "Incorporating Power and Assimilating Nature: Electric Power Generation and Distribution in Ottawa, 1882 –1905" (master's thesis, University of Ottawa, 2003), 67.

Most urban residents, however, welcomed streetcars as modern additions to their city's infrastructure. But like other new technologies, the meaning of the streetcar was not clearly defined. An analysis of Calgary Transit's "Accident Register" suggests that the streets remained contested spaces between streetcars and other forms of traffic. Automobiles, horses and buggies, and pedestrians all had to share the street with electrified transit, as did stray farm animals, which were sometimes killed or maimed while crossing the tracks. Pedestrians in particular put themselves in harm's way by walking directly in front of streetcars, suggesting that they were unaware of the speed with which a tram could travel or were ignorant about the need to distance themselves from motorized vehicles.[29] Some critics wondered whether the "high speeds and nerve-wracking noise" of these electrified vehicles created ill-effects on the human body, a notion that was reminiscent of George Beard's concept of neurasthenia.[30] In the 1860s, Beard coined "neurasthenia" as an umbrella term to describe a litany of symptoms, such as insomnia, irritability, and depression, which he believed were caused by the pressures of modern life. Reports of accidents frequently appeared in local newspapers, further worrying city dwellers about the safety of streetcars. Pedestrians were being struck, passengers were sometimes falling out of running trams or injured after an abrupt stop, and numerous automobiles collided with streetcars.[31] Between 1894 and 1929, over 1,959 people nation-wide had been killed in a streetcar-related accident, and 82,681 had been injured. Passengers accounted for nearly half of those who had been injured, and 394 of

[29] City of Calgary Archives, Calgary Transit, Series: I, Box: 8, Files: 25 (1–4), "Accident Register, 1913–59."

[30] Angus, *Loyalist City Streetcars*, 20.

[31] City of Calgary Archives, Calgary Transit, Series: I, Box: 8, File: 25 (1–4), "Accident Register, 1913–59."

those who were killed.[32] The prevalence of accidents was so high that in 1917 an Ontario-based "Safety League" distributed literature to urban residents providing tips on how to avoid injuries.[33]

The unpredictability of Canadian winters further compounded the efforts of electric streetcar conductors to provide their passengers with a smooth ride. Snow was a particular nuisance because it could completely cover tracks, making it almost impossible for stopped streetcars to move forward or for moving streetcars to stop.[34] Passengers on the Calgary Municipal Railway got the ride of their lives one snowy afternoon, when their streetcar, travelling down a steep hill, failed to brake. Some jumped for safety from the swiftly descending vehicle, which came to a halt only after smashing into another streetcar. Both vehicles were damaged, but no one was injured.[35] Unlike horse-drawn streetcars, electrified trams could not be easily converted into sleighs for snowy conditions. The Ottawa Electric Street Railway Company (OESR) was one of the first in Canada to introduce snow sweepers along its routes. The progressively-minded owners of the company, Thomas Ahearn and Warren Y. Soper, purchased two snow sweepers from a New York inventor, Lewis Fowler, in 1891, a move that was closely watched by other street railway companies across the country.[36] Ahearn and Soper had already achieved recognition for bringing electric street lighting to Ottawa, and Ahearn in particular had

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[32] Dominion Bureau of Statistics, *The Canada Year Book 1939* (Ottawa: King's Printer, 1940), 658.

[33] "Don't Take Chances with Street Cars," *Canadian Electrical News* 26, no. 19 (1 October 1917): 53.

[34] "Electric Vehicles in Snow Drifts," *Hydro Bulletin* 3, no. 4 (April 1918): 107–08.

[35] Colin Hatcher, *Stampede City Streetcars: The Story of the Calgary Municipal Railway* (Montreal: Railfare, 1975), 25.

[36] Adamek, "Incorporating Power," 61.

developed some notoriety as an inventor and entrepreneur with multiple patents for electric devices, including one of the world's first electric ranges.[37] For Ahearn and Soper the sweeper was more than a solution to winter weather — it was "a powerful machine superior to nature that symbolized the technological and economic prowess of any company that owned such modern equipment."[38] The sweepers were equipped with rotary brooms constructed of rattan, which could effectively clear the tracks of snow and debris, making winter streetcar service safer and more reliable.[39]

But for some vocal opponents, the electric tram posed a bigger threat than personal injury — it presented a crisis of moral sensibilities. In cities across the country, enthusiasm for electric streetcars was dampened by the decision of companies to run their cars on Sundays. It generated public debates about acceptable behaviour on the Sabbath, and pitted religious leaders against those who advocated a more secularized Sunday. The Sabbath as a universal day of rest was protected by Canadian laws, and most companies were in full compliance with the legal and social obligations of the day. Only in Hamilton, Montreal, Vancouver, and Victoria were traditions of Sunday car service already in place prior to the electrification of street railways. Indeed, residents of these cities were also more likely to enjoy more opportunities for leisure on Sundays. In Montreal, for example, locals had access to American newspapers, while saloons and post offices remained open. On the west coast, labourers continued to work on Sunday, while those who did not work could shop, visit saloons (except in Vancouver), and take

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[37] John A. Cooper, ed., "Thomas Ahearn," *Men of Canada* (Montreal and Toronto: Canadian Historical Company, 1902), 22.

[38] Adamek, "Incorporating Power," 62.

excursions via steamboats.[40] But in the more traditional segments of Canadian society that followed strict observance of the Sabbath, religious leaders became agitated when street railway companies offered Sunday service, and they launched complaints to prohibit what they perceived as an affront to Catholicism.

Historians Christopher Armstrong and H.V. Nelles examine the crusade against Sunday streetcar service in Toronto in their book *The Revenge of the Methodist Bicycle Company*. They explain that the issue was taken up by evangelical Protestants "who regarded their quiet Sabbath both as the day the Lord had made and as a symbol of what they hoped to make Toronto — a progressive, modern, morally righteous Christian municipality."[41] Here we have an excellent example of competing notions of modernity: on the one hand, Protestant reformers argued that religion, not electric frivolities, formed the core of modernity; on the other hand, community leaders, such as Ahearn and Soper, embraced electricity as a symbol of municipal progress. Thus, when the Toronto Street Railway company announced in 1893 that it would run its cars on Sundays, it met with stiff opposition from leaders within the Protestant community, leading to a tug-of-war match between the operators of the company and religious leaders that lasted for years. Protestant reformers felt that the technology of electric trams (which they viewed as too fast, too noisy, and too flashy) had no role on the day of rest.[42]

Similar opposition popped up across the country. In Calgary, for example, the question of Sunday service arose before the municipal street railway began operation.

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[40] Sharon P. Meen, "Holy Day or Holiday? The Giddy Trolley and the Canadian Sunday, 1890–1914," *Urban History Review* 9, no. 1 (June 1980): 53–55.

[41] Christopher Armstrong and H.V. Nelles, *The Revenge of the Methodist Bicycle Company: Sunday Streetcars and Municipal Reform in Toronto, 1888–1897* (Toronto: Peter Martin Associates, Ltd., 1977), 6.

[42] Armstrong and Nelles, *Revenge*, 7.

Some religious leaders were quick to dismiss the idea altogether: "there is no reason why we should have Sunday cars now," Reverend Mr. Kirby of Central Methodist Church preached in his 1909 sermon. "The city is not congested, and everybody with two legs can walk out to the parks or the hills if they want fresh air, and the exercize [sic] will do them good."[43] In the case of Toronto, Armstrong and Nelles conclude that the fight against Sunday streetcar service formed part of a larger effort of certain members of the Protestant community to resist "the secularizing effects of urbanization and industrialization [...] and to exert social control over other elements in the community."[44] Although spirited, these fights were short-lived; whenever the issue was put to a vote, rate-payers across the country voted in favour of Sunday streetcar service, suggesting that the majority placed higher value on technological efficiency than on religious traditions.

Many users of streetcars found the vehicles improved their quality of life. Prior to the arrival of the automobile, the expansion of rail networks during their half-century heyday extended city boundaries in all directions, opening up the countryside to the city and making these urban centres more easily accessible for rural residents, especially those located on the outskirts of Canada's largest metropolitan areas. Contemporary ideology on city planning recognized the value of electric transportation in enabling businesses to be concentrated in city centres, while allowing workers to reside in surrounding districts.[45] In some cities, electric streetcars generated expansion; in Vancouver and Montreal, for example, tracks were laid in undeveloped areas, leading to

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[43] As quoted in Hatcher, *Stampede City Streetcars*, 15.

[44] Armstrong and Nelles, *Revenge*, 179.

[45] Frank Koester, *Modern City Planning and Maintenance* (Norwood: Massachusettes: Plimpton Press, 1915), 24–25.

the development of suburbs and the decentralization of the downtown core. In other areas, streetcars followed development; in Winnipeg and Toronto, for example, track construction responded to, rather than fuelled, existing urban expansion.[46] While electric streetcars allowed municipalities to redefine city boundaries, they also provided riders with a new sensory experience of the urban landscape. Patterns of city life would have unfolded from the windows of a moving tram, and the roads would have been filled with the sounds of the streetcars rattling along the rails (marked by an occasional clanging and piercing cry of the airbrake) as they traversed the city.

These streetcar networks had a demonstrable effect on the everyday lives of those who rode them: electric streetcars increased the distance people could reasonably travel within a day, which meant that workers could live further away from their job sites (thereby helping to fuel the development of the suburbs), and offered new opportunities for leisure and recreation. They also helped to redefine the meaning of community. In his study of the Metropolitan Street Railway, Stamp demonstrates that the extension of electric street railway service north of Toronto along Yonge Street had a profound effect on the area. The efficiency of the streetcar over traditional means of transport (a one-way trip from Richmond Hill took forty-five minutes against more than three hours via stage coach) ensured its success, and tied the countryside and the city closer together.[47] For one

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[46] Alan F. J. Artibise and Gilbert A. Stetler, *Canada's Urban Past: A Bibliography to 1980 and Guide to Canadian Urban Studies* (Vancouver: University of British Columbia Press, 1981), xxiii; See also Fred F. Angus, *Remember Montreal's Streetcars!* (Montreal: Canadian Railroad Historical Association, 1971); Bellan, *Canada's Cities*, 129–32; H. John Selwood, "Urban Development and the Streetcar: The Case of Winnipeg, 1881–1913, *Urban History Review* 3, no. 77 (February 1978): 32–41.

[47] Stamp, *Riding the Radials*, 23.

observer, the Metropolitan was the "spinal cord" of northern Toronto, "making it possible for all of us to live and move."[48]

Like other railway companies, the Met, as it became known among locals, offered new opportunities for exploration. In 1901, it opened Ontario's first "electric park" at Bond Lake, nestled between Richmond Hill and Aurora. The Lake was already popular among boaters in the summer and curlers in the winter, and the company purchased 200 acres of shoreline, where it held sporting events, concerts, and picnics.[49] For electric railway companies, these recreational ventures had the added benefit of increasing the number of passengers on the weekend and in the summer months, times when ridership would typically decrease.[50] The venture proved a hit, with 60,000 people visiting the area during its opening season. Even a ride in a streetcar could be transformed into a recreational activity, demonstrating electricity's ability to turn the ordinary into a spectacle. In 1911, the Calgary Municipal Railway purchased from Preston Coach and Company an "electric sight-seeing car" that could seat fifty people. The vehicle was forty-four feet long, painted white, and accentuated by thin red and gold lines. It had a canvas roof that could be removed in fine weather, and was decorated with 178 coloured incandescent bulbs. It made its first run in July 1912 to coincide with the company's third anniversary, and travelled from the Exhibition Grounds, around the city, and back to the grounds. The fare for the two-hour trip was twenty-five cents. [51]

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[48] As quoted in Stamp, *Riding the Radials*, 9.

[49] Stamp, *Riding the Radials*, 38.

[50] Stamp, *Riding the Radials*, 50.

[51] City of Calgary Archives, Calgary Transit Fonds, Series: III, Box: 61, File: 685 (Part One of Three), "The History of the Calgary Transit System," n.d.

For the first few decades of its existence, electric rail service was a point of pride for most communities, and the physical construction of streetcars reflected the character of the generation that supported it. These were glamorous vehicles. The typical exterior was punctuated by arched windows that graced the sides of the tram, which was often painted in a bold colour (to serve the dual purpose of decoration and visibility) that was further accented by paint detailing or cast-iron ornamentation. A streetcar's interior panelling often featured wood, like mahogany, red cherry or bird's-eye maple, that was smooth and polished, while the ceiling and sides would have been trimmed with additional wood or brass. Some cars were also fitted with incandescent lamps used during night service, and outfitted with electric heaters under the seats, which was a significant improvement from the layers of insulating straw used in horse-drawn vehicles.[52] These features also had the added effect of demonstrating the versatility of electricity to riders, and likely coloured their perception of the technology. Even mundane characteristics were revealing, and they pointed to the less glamorous aspect of riding the rails: the sexual division of public spaces. Historians Donald F. Davis and Barbara Lorenzkowski note that "climbing onto streetcars, women met the first reminder that they were entering a man's world; the steps were often too high for those short of limb, encumbered by small children, or dressed in long skirts."[53] Once aboard, female passengers would have been greeted by a male motorman (always a man — a reflection of both the transit industry and the technical nature of work involving electricity — until a shortage of

[52] Adamek, "Incorporating Power," 68.

[53] Donald F. Davis and Barbara Lorenzkowski, "A Platform for Gender Tensions: Women Working and Riding on Canadian Urban Public Transit in the 1940s," *Canadian Historical Review* 79, no. 3 (September 1988): 435.

workers during the Second World War prompted the hiring of female drivers) and a male conductor, who collected passengers' tickets.

Ridership until the war reflected traditional gender roles: men travelled in the morning and evening, to and from work, while women rode during the day to complete errands, including family shopping. Advertisements from the period reinforced these gendered "norms". Calgary Municipal Railway, for example, launched several print ad campaigns that spoke directly to each sex: "Going shopping?", women were asked. "Take a streetcar." And for "you men who drive your autos to work — street car riding is the efficient business transportation."[54] As a result of these gender roles, men and women seldom travelled at the same time, and if they did, women often remained in the front of the tram, while men sat in the back. But by the Second World War, this "de facto segregation of the sexes" came to a head as ridership skyrocketed thanks in part to increased employment. In Montreal, Toronto, Winnipeg and Vancouver, the number of passengers increased 84 percent; in Ottawa, ridership increased 170 percent; in Halifax, Kingston, St. Catharines, Sarnia, and Windsor, the number of passengers increased nearly 300 percent, and Oshawa recorded a 450 percent increase in the number of passengers riding the rails.[55] Davis and Lorenzowski maintain that male workers (now working more daytime shifts to meet the demands of war mobilization) and female shoppers were sandwiched in the streetcars, and an aggressive battle ensued over who would get to sit. The authors note that full employment also meant a rise of women workers who rode the streetcars, but maintain that the male riders pinned their frustrations solely on female

[54] City of Calgary Archives, Calgary Transit Fonds, Series: I, Box: 16, File: 48, "Newspaper Advertising," n.d.

[55] Davis and Lorenzkowski, "A Platform for Gender Tensions,"432–37.

Figure 1: Sightseeing streetcar in Calgary, Alberta, ca. 1912.[56]

[56] University of Alberta Libraries, Peel's Prairie Provinces, Prairie Postcards PC 006003, "Navassarxs Ladies Band," ca 1912.

shoppers.[57] These "gender tensions" highlight that the electric streetcar was more than a technology of transport; it was also a vehicle for the renegotiation of public etiquette and decency.

Any positive symbolism that Canadians had attached to streetcars had all but disappeared by the 1940s. Most trams were old, and little effort was put into design or ornamentation. They were now about frugality and function; although streetcar service experienced a revival during the Second World War, most companies were crippled by the Great Depression and made little effort to dress their cars, relying instead on patching deteriorating trams together with used parts to keep them serviceable. Competition from buses, introduced in the 1930s, began to weigh heavily on electric railways, as did the rise of personal transportation via the automobile. Streetcars were initially promoted for both business and pleasure; but the automobile, and the freedom it afforded drivers to travel wherever and whenever they pleased, forced companies into competition, and some tried to redefine the streetcar into a purely business vehicle. Calgary Municipal Railway's advertisement campaign of the 1930s was notable for urging its riders to "be a two-car family." In another ad, it declared that "automobiles are pleasure cars; they're not necessary to the average man every day in business."[58] Advertising campaigns could not save the streetcar, however, and by 1950, most major cities had converted their rails to rubber, signalling the end of the streetcar era. But the gradual unpopularity of the electric streetcar in urban areas was not about a failure in electricity; indeed, some cities, such as Toronto and Vancouver, continued to incorporate electrified transport in their transit

[57] Davis and Lorenzkowski, "A Platform for Gender Tensions," 432.

[58] City of Calgary Archives, Calgary Transit Fonds, Series: I, Box: 16, File: 48, "Newspaper advertising," nd.

schemes. Rather, it was the streetcar as a means of conveyance that the majority of Canadians found wanting.

III

Few innovations of the nineteenth century were as instrumental in changing the appearance of downtown as electric light. Traditionally, few streets in urban centres had any lighting, and those that were deemed worthy of illumination were typically lit by oil lamps, naphtha, or gas lighting. Maintenance of these units was a dirty job, traditionally performed by a "lamplighter" who would travel with a ladder and matches, in order to climb atop the wooden or iron posts and light the lamps, one by one.[59] But as cities grew and more streets were illuminated at night, lamplighting typically fell under the purview of Fire and Light Committees, which formed teams to maintain street lighting units. In late nineteenth-century Ottawa, eighteen men were responsible for the lighting, cleaning, and repairing of the city's 598 gas and naphtha street lamps. These were full-time jobs: in addition to the five hours spent each day cleaning and repairing lamps, these lamplighters spent roughly two hours to light the gas lamps and half an hour to extinguish them in the morning (if the light had not already burned out). Maintenance of the naphtha lamps was

[59] City of Calgary Archives, Calgary Transit Fonds, Series: III, Box: 61, File: 685 (Part One of Three), "Sketches of Early Calgary — The Old Lamplighter," n.d.

even more laborious, with workers spending three hours each day filling the units and two and a half hours just to light them.[60]

These early lighting systems were soon complemented, and eventually replaced, with arc lighting. The lamps were so bright that "the surrounding streets, still lit by gas, seemed to be in twilight."[61] Nineteenth-century innovations in electric light that had taken place in Europe and the United States found a receptive audience in Canada, where the most up-to-date lighting systems were quickly introduced, though early electric street lighting was often restricted to a few hours in the evening.[62] The financial resources of Canada's largest cities, home to the richest families with the social imperative to have "the latest and the best," contributed to these urban centres being the first to introduce electric streetlights.[63] Indeed, affluence provided the roadmap to electric street lighting in urban Canada, where the wealthier neighbourhoods, marked by large homes with big properties, tended to be electrified first.[64] Some upscale neighbourhoods were even installing underground lines, a feature that did not reach most city streets until after the Second World War.[65] By the turn of the century, electrically-lit streets served as a demarcation line between rich and poor. Areas lit by the bright, white light of electricity represented wealth, prestige, commerce, and success; conversely, areas lit by "older",

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[60] "The Lamplighter," *Ottawa Daily Citizen*, 18 August 1883, 4; Bellan notes that many of these lamps "usually burned out before dawn." See Bellan, *Canada's Cities*, 61n16.

[61] Schivelbusch, *Enchanted Night*, 115.

[62] White, *Power for a Province*, 3.

[63] Bellan, *Canada's Cities*, 129.

[64] Brown and Cook, *Canada, 1896 –1921*, 100.

[65] John Olmsted, designer of New York's Central Park, included underground wires in his designs for Victoria's Uplands neighbourhood in 1910.

duller forms of lighting technology — or worse, not lit at all — were dangerous, criminal, and poor. These urban districts serve as reminders that while early experiences with electricity may have been public, they were not necessarily egalitarian.

Some reform-minded enthusiasts advocated an extension of electric street lighting to force criminal activity out of the shadows. By the early twentieth century, most urban dwellers shared the impression that the city, especially specific zones, was prone to illicit activity.[66] An 1836 by-law granting the Montreal Gas Company permission to supply the city with gas lighting reflected this sentiment: the company was authorized to place lamps at certain points "so that ladies of the community might go safely along the streets at night without fear of molestation."[67] The transit networks that carried thousands of passengers into downtown areas on any given day resulted in increased pedestrian traffic, which demanded "a technological and regulatory response."[68] Electric streetlights, with their steady glow, could provide anxious pedestrians with the security they needed to feel safe walking down the street at night. Some utility companies exploited those trepidations. In one ad, Northern Electric proclaimed: "in all the long history of mankind we of the present generation are the first to enjoy real liberation from the darkness and lurking fear of night."[69]

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[66] For more information on the city as "a seat of vice", see: Michael Bliss, ed., *The Social History of Canada* (Toronto: University of Toronto Press, 1972), vi–ix; E. Barbara Phillips, *City Lights: Urban-Suburban Life in the Global Society*, 3rd edition, (New York: Oxford University Press, 2010); Paul Rutherford, ed., *Saving the Canadian City: The First Phase, 1880–1920* (Toronto: University of Toronto Press, 1974), ix –xiv; and Paul Rutherford, "Tomorrow's Metropolis: The Urban Reform Movement in Canada, 1880 –1920," *Historical Papers* (1971): 203–24.

[67] As quoted in "La Voie Lumineuse," *Entre Nous*, March 1932, 8.

[68] Mark J. Bouman, "The 'Good Lamp is the Best Police' Metaphor and Ideologies of the Nineteenth-Century Urban Landscape," *American Studies* 32, no. 2 (Fall 1991): 65.

[69] Library and Archives Canada (hereafter LAC), Northern Electric, "Electricity: Its Part in Canada's Industrial Future," (Montreal), np. See also: "How Electricity Helps Out in Modern Policing," *Live Wire*,

In the popular imagination, electric light was more than a practical substitution for gas or naphtha street lighting; it was a technology of control. Whoever controlled the lights controlled the movement of people. In some cases, the use of electric light to shine a spotlight on crime went beyond the metaphorical; "lights not only *aided* police; they *were* police."[70] In 1905, the *Canadian Electrical News* singled out the most intolerable aspect of city streets: "wherever there is a specially dark street or corner, there you will find a rendezvous for all the young hoodlums in town." The solution? "Make the street light, and the trouble will disappear." Toronto's *Evening Telegram* even suggested that, once installed, electric street lights would render policemen irrelevant — "the brilliant, shining lights […] would drive away crime, and altogether make [Toronto] an earthly paradise."[71] These may have been lofty goals, but brightly illuminated streets did inject urban residents with a shot of confidence to venture outdoors at night, and soon evening excursions became an acceptable form of entertainment.[72]

Away from the seedy underbelly of Canada's cities, characterized by prostitution and gambling dens, a more dignified type of public leisure emerged in the city centre in the form of movie palaces, shopping districts, and vaudeville houses. Electrically-lit streets added excitement to these areas, and became the focal point of entertainment-seeking urbanites. During the interwar years, the downtown had married daytime

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December 1924, 10; "Modern Street Lighting," *Hydro Bulletin* 15, no. 7 (July 1928): 235–41; "Improved Street Lighting System Prevents Crime, Protects Traffic," *Live Wire*, September 1928, 4; "Street Lighting and Floodlighting," *Hydro Bulletin* 17, no. 3 (March 1930): 75–77; "Let There be Light," *Hydro News* 33, no. 1 (January 1946): 3; "Good Street Lighting 'Pays Off' in Both Safety and Protection," *Hydro News* 33, no. 1 (January 1946): 9; "Safety Demands Good Street Lighting," *Hydro News* 33, no. 4 (April 1946): n.p.

[70] Bourman, "Good Lamp," 66 (emphasis in original).

[71] As reported in *Saturday Night* 25, no. 5 (11 November 1911): 1.

[72] Ward Harrison, O.F. Haas, and Kirk M. Reid, *Street Lighting Practice* (New York: McGraw-Hill, 1930), 26.

shopping with evening amusement as vaudeville-movie palaces were built next to department stores along main streets. Before most people had incorporated electric goods into their domestic lives, electricity had already become associated with consumption as stores strategically used lighting to advertise their products in display windows, and movie theatres drew in passersby with their glimmering signs.[73] The two often developed a symbiotic relationship as "ladies' matinee relied on department store shoppers, and the movies kept people downtown at night, allowing department stores to remain open late."[74] Electric light provided shops and cinemas with a competitive edge because of the technology's ability to draw attention and generate a crowd.[75]

Early commercial electric light installations often attracted curious onlookers in droves. In 1879, McConkey's Restaurant, famous for its ice cream, became one of the first in Canada to install an arc lighting system. The Toronto establishment hooked up two carbon arc lights to a direct current powered generator, and drew in such crowds that the restaurant was teeming every night.[76] But the most significant ballyhoo was the inauguration of a municipality's lighting system, and nowhere in Canada was there as much fanfare as in Berlin, Ontario (renamed Kitchener in 1914), when the lights were turned on for the first time. Part of the event's popularity can be attributed to the Hydro

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[73] For information on the relationship between shopping and cinema, see: Anne Friedberg, *Window Shopping: Cinema and the Postmodern*, (Berkeley: University of California Press, 1993). For the importance of electricity in shop windows see: "Brighten Up Your Window," *Hydro Bulletin* 4, no. 3 (September 1918): 83; "The Importance of an Attractive Shop Front," *Hydro Bulletin* 5, no. 4 (April 1919): 118; "Modern Street Lighting," *Hydro Bulletin* 9, no. 5 (July 1922): 202–09.

[74] Paul S. Moore, "Movie Palaces on Canadian Downtown Main Streets: Montreal, Toronto, and Vancouver," *Urban History Review* 32, no. 2 (Spring 2004): 12; see also Harrison, et al., *Street Lighting Practice*, 26.

[75] David E. Nye, *American Technological Sublime* (Boston: The MIT Press, 1994), 146.

[76] Brown, *Ideas in Exile*, 158; Mike Filey, *More Toronto Sketches: The Way We Were* (Toronto: Dundurn Press, 1993), 36.

Electric Power Commission, which promoted power at cost for every resident in the province. The Commission, which was born out of a public power movement that began in Berlin in 1902, harnessed the power of Niagara Falls to generate electricity for use across the province, and vigorously publicized its achievements.

The October 1910 event was attended by over seventy-five government officials from across southern Ontario, including Premier James Whitney, and future prime minister William Lyon Mackenzie King, minister of labour and member of parliament for Waterloo North. The HEPC was represented by its first chairman, Adam Beck. The visitors were greeted by Mayor Charles Hahn, and were escorted around town before being brought to the local skating rink for the official festivities. Upon entering, the 20th Regiment Band struck up "The Maple Leaf Forever," and the assemblage was greeted by banners strung along the ceiling that reflected the city's sentiments: "From Darkness to Light"; "Power at Cost"; and "Hydro Electric Power, the inexhaustible white coal of Ontario," among others. The rink was already crowded with an estimated 10,000 people, with thousands more reportedly being turned away at the door.[77]

Beck, a native of Berlin, was first to address the audience. Standing at the foot of the stage, he extolled the virtues of a public electrical utility and vowed that cheap and reliable electric power was the Commission's primary ambition.[78] "We shall not rest," Beck declared, "until we have no more coal oil, no more gas, and, I hope, no more coal."[79] The rink was then blanketed in semi-darkness in preparation for the official

[77] "Niagara Power Inaugural Demonstration at Berlin," *Globe*, 12 October 1910, 1.

[78] "Niagara Power," *Globe*, 12 October 1910, 3.

[79] The Kitchener Light Commission, *Genesis of the Ontario Hydro-Electric Power Movement* (1919), 9.

lighting ceremony. Hilda Rumpel, the young daughter of a local family, approached the stage. Draped in robes and with a crown perched on her head, an outfit intended to symbolize the Province of Ontario, she offered Whitney a decorated cushion upon which lay a small push-button device. Whitney took Beck's hand into his and together they pressed the button, and the entire rink was instantly brightened by hundreds of bulbs. Rumpel, too, glowed, with clusters of electric light beaming from her gown and tiara. The band picked up a tune, and the townspeople enjoyed a parade along brightly decorated streets in the downtown area, while politicians and businessmen were treated to an electrically cooked dinner.[80]

The event demonstrated the political implications of electricity, and distinguished Ontario from the rest of North America for spearheading the public power movement.[81] The lighting of Berlin with power generated by Niagara Falls located over 200 kilometres away also affirmed the technical superiority of alternating current over direct current for its ability to travel great distances, and further endorsed what H.V. Nelles calls "the myth of hydro."[82] He writes:

> The very magnitude and mystery of the tunnels, turbines, and, of course, the Niagara Falls themselves were enough to captivate the public imagination. Never before, the promoters of the developments reminded their audiences, had works of such gigantic proportions and scientific complexity been attempted anywhere in the world. In their efforts to explain the undertakings, publicists and newspaper reporters drew upon familiar agricultural images, such as 'tamed' and 'harnessed',

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[80] "Niagara Power", *Globe*, 12 October 1910, 3.

[81] "Why Canada Has Beaten the Yankees," *Live Wire*, February 1922, 14; "America Admits Ontario Leads World in Electricity," *Live Wire*, December 1923, 4; "Hydro is World's Greatest Electric Power Distributor," *Live Wire*, December 1923, 6; "Ontario Hydro System Leads the World," *Live Wire*, Midsummer 1926, 8.

[82] Nelles, *Politics of Development*, 217.

> and freely mixed in the military metaphors of 'conquest' and 'triumph' to convey the coordination and power required to accomplish such mythological 'labours'.[83]

The reverence held for the power of Niagara, combined with the mystery of electricity, ensured that Canadians would take notice of the lighting ceremony at Berlin. Although the town was not the first in Canada to be electrified, the festivities demonstrated that electric light was greater than a solution to a social need (adequate illumination at night), and became a community status symbol. Urban reformers and writers advocating an extension of electric power following the ceremony at Berlin exhibited an impatience for electrification that can best be described as an effort to catch up to the march of progress. Electric light was a sign of modernity, and municipalities referenced brightly illuminated shops and streets as a way to distinguish themselves from those towns still stuck in the pre-electric era.[84]

Inauguration ceremonies were repeated across the country, but once the initial novelty wore off and electric light became part of the everyday, attention shifted to the thousands of poles and tangled webs of wire taking over the landscape. Many newspapers were critical of these blights on city streets. In 1910, the *Toronto Evening Telegram* noted the paradox of electricity brightening the night, but its network of wires darkening the day.[85] It described one section of its downtown: "looking east along Queen Street, with the poles in approximate alignment at the foot, the tops spread out like a fan. One pole

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[83] Nelles, *Politics of Development*, 217.

[84] Harrison, et al., *Street Lighting Practice*, 14; "Sign Illumination," *Canadian Electrical News* 20, no. 4 (April 1911): 56 ; "Floodlight — The Magnet that Draws Business, *Canadian Electrical News* 30, no. 19 (1 October 1930): 55; "Modern Street Lighting," *Hydro Bulletin* 15, no. 7 (July 1928): 235–41.

[85] *Toronto Evening Telegram*, 30 September 1910, 10.

leans one way and one another. And they're loaded with wires."[86] The *Winnipeg Free Press* estimated that the city had an excess of 20,000 poles, and called for a swift reduction.[87] In 1931, the *Canadian Electrical News* published a one-page special called, "A New Year's Resolution," urging "all backward cities and towns throughout the Dominion [...] to tidy and brighten main streets.[88] Stories circulated in the press of pedestrians and curious children being electrocuted from live wires, revealing a duality to electricity: in offering Canadians a new way to live, it also presented them with a new way to die.[89] Children were warned to stay away from fallen wires and power companies issued pamphlets and fliers, aimed at young boys in particular, to stop vandalizing street lights, a common pastime for teenagers during the interwar years.[90] Southern Canada Power was more explicit in a chilling float designed for the 1926 Labour Day Parade in Montreal (figure 2). It featured a young boy lying lifelessly between two light poles, with a banner along the side that read: "This boy was not careful — are you? Never touch a broken wire."[91]

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[86] "What's Sauce for Goose Should be Sauce for Gander," *Toronto Evening Telegram*, 30 September 1910, 13.

[87] "Too Many Poles on Winnipeg Streets," *Winnipeg Free Press*, 3 August 1915, 5.

[88] "A New Year's Resolution," *Canadian Electrical News* 40, no. 1 (1 January 1931): 37.

[89] "Fatalities from Electric Shock by Climbing Poles," *Hydro Bulletin* 12, no. 9 (September 1925): 335.

[90] "Notice to School Children," *Hydro Bulletin* 6, no. 3 (September 1919): 147; "Wanton Destruction of Street Lights Costly and Serious to Ontario People," *Hydro News* 34, no. 6 (June 1947): 10–13; "Play Where it's Safe," *Hydro News* 34, no. 6 (June 1947): 14.

[91] "Notre Char Allégorique Dans La Parade de la Fête du Travail," *Entre Nous*, August 1926, 13.

In addition to being an eyesore and potentially dangerous, electric networks were notoriously unreliable.[92] Frequent power outages caused interruptions in lighting and street railway service. If urban residents ever took electricity for granted, they were certainly reminded of their dependency when the power went out. Homes and businesses lighted with electricity would have reverted to traditional forms of illumination, such as kerosene lamp or candle, while some factories were forced to shut down until service resumed.[93] Large birds flying into high tension wires were a particular nuisance for electric utility companies as they sometimes caused a short circuit, plunging neighbourhoods into darkness.[94] After a large heron caused a blackout in Vancouver, workers at BC Electric mounted the charred remains in the window of a local newspaper office with a sign hanging from its bill that read: "why the lights went out last night."[95] The most common reason for a power outage, however, tended to be poor weather; heavy rains, winds, or snow could wreak havoc on transmission lines.[96] Such was the case in Winnipeg in 1915 when a snowstorm cut off service to most of the city. The *Free Press* noted that some businesses benefited from the unexpected darkness by jacking up the prices of their candles. In an offbeat tone, the journalist even remarked that, "verily, it

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[92] British Columbia Provincial Archives (hereafter BCPA), BCER Fonds, Volume: 241, File: 539, Document: "Power Complaints"; BCPA, BCER Fonds, Volume: 482, File: 33/32, Document: "Complaints"; "Cross Country," *Macleans*, 15 April 1948, 72.

[93] "Hydro Paralyzed Throughout System," *Globe*, 17 June 1913, 1.

[94] Hydro Quebec Archives (hereafter HQA), Southern Canada Power Fonds, Box: 348, File: F15/2474, Document: "Encore un maudite oiseau," *SCP News*, September 1930, n.p.

[95] "Difficulties in the Way of Good Service," *Canadian Electrical News* 22, no. 17 (1September 1913): 55. Other animals were blamed for power outages. See: "Enormous Cat Darkens City," *Hydro Bulletin* 4, no. 3 (September 1918): 131; "Ground Hogs Upset Service," *Canadian Electrical News* 39, no. 17 (1 September 1930): 40.

[96] City of Edmonton Archives, RG 11, Class: 252, File: 17, Letter: Superintendent Wm. Barnhouse to D. Mitchen, City Commissioner, 5 July 1929.

Figure 2: The Southern Canada Power's 1926 Labour Day Parade float told a cautionary tale to anyone curious about the powers of electricity.

was a fine night for a murder" (thankfully, the police reported none had occurred).[97] Inconsistent electric service made some urbanites question the worth of electricity; as one elderly resident of Toronto told a *Macleans* reporter, "why it just goes flicker, flicker, flicker, like gas. So why change?"[98] But for the majority, electric light held symbolic value that made the occasional service interruptions worth the investment.

Exaggerated distribution of electric light became the fashionable way to display civic pride, and city officials across the country incorporated "Great White Ways" into urban schemes during the interwar years. [99] Nye refers to this use of light as "that most American spectacle," but Canadians, too, became fixated on using light displays as cultural landmarks.[100] A 1911 article in *Canadian Electrical News* declared that Toronto seemed "to have gone electric mad — and glad" with its use of electric lights along Yonge Street.[101] Developments in underground services during the interwar years helped to tidy downtown streets, and made ornamental street lighting trends fairly consistent (and persistent) throughout the country.[102] Masses of unsightly overhead wires were buried underground, and street poles were replaced with the iconic cast iron post, with its

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[97] "Electricity fails; City in darkness," *Manitoba Free Press*, 9 November 1915, 1.

[98] "Cross Country," *Macleans*, 15 December 1948, 61.

[99] The *Canadian Electrical News* published many stories about civic adventures in ornamental street lighting. See, for example: "Ornamental Street Lighting in Hamilton," December 1910, 40; "Illumination in New Hamburg Town," April 1911, 51; "Waterloo's Ornamental Street Lighting," April 1912, 23; "Electrical Canada from Coast to Coast," June 1912, 96; "Decorative Lighting in Winnipeg," December 1912, 73; "Street Illumination in Prince Albert, Saskatchewan," 15 June 1913, 122. See also: "Street Lighting Improvements," *Live Wire*, March-April 1925, 5; "Modern Street Lighting in Windsor," *Hydro Bulletin* 19, no. 1 (January 1932): 11–13.

[100] Nye, *Electrifying America*, 28.

[101] "Sign Illumination," *Canadian Electrical News* 20, no. 4 (April 1911): 56.

[102] Many of these ornamental lights (or their replicas) can be found in historic downtowns.

hanging clusters of tungsten lamps — usually five — in frosted glass globes. In 1927, Montreal converted Sherbrooke Street into its "White Way", adding "dignity to its surroundings."[103] But for one resident, the lights were just too much. In a poem reminiscent of the song, "Since the Hydro Came," J.L.A. of Montreal penned "Sherbrooke Street Lighted":

> Goddess of those who arm in arm, not caring,
> Could stroll unseen by passers-by,
> Thy day is done and Progress stark and staring
> Frowns on us now with baleful eye.
> Three thousand lamps have made the night
> Too bright for us, O Moon, too bright.[104]

If the author felt that the "three thousand lamps" were too bright, floodlighting must have been a particular nuisance. City officials, merchants, and advertisers found value in the ability of electric light to manipulate the cityscape at night.[105] One method was to direct large, powerful lamps against the exterior of a building to accentuate its architecture, height, and prominence within the city.[106] Floodlighting forced passersby to take notice, and could make a building that during the day blended in with its surroundings, pop out at night. It served as a new form of non-verbal advertising by relating to the observer that the structure held value, but more importantly, that the structure *housed* value — that the products or services inside the building were worth buying or investing in. More explicit was the electric sign — bulbs arranged to form words or highlight images — as an

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[103] "'Voie Lactée' Qui Est un Progrès Pour Montréal," *Entre Nous*, June 1927, 10.

[104] "Sherbrooke Street Lighted," *Entre Nous*, June 1927, 11.

[105] Nye, *Electrifying America*, 58.

[106] "Floodlighting of the Administration Building," *Hydro Bulletin* 14, no. 6 (June 1927): 286–87; "Floodlight — The Magnet that Draws Business, *Canadian Electrical News* 30, no. 19 (1 October 1930): 55; "Floodlighted Buildings Increasing in Numbers," *Canadian Electrical News* 30, no. 19 (1 October 1930): 40.

advertising medium.[107] In 1907, *Maclean's* magazine predicted that in the future, a "businessman" without an electric sign would be classified as "unprogressive."[108] Electric signs became more common during the interwar years, and had two discernible advantages: they commanded immediate attention from passersby, while also making businesses visible at a distance even at night.[109] Floodlighting, "Great White Ways," and electric advertising increasingly saturated the urban landscape, and helped to create a tacit association of the electric light with the city.

Images of the city at night became and continue to be a popular motif on postcards, posters, and paintings depicting urban centres. The electrified landscape was one of the most widely-recognized metaphors through which the city could articulate its cultural and commercial ambitions.[110] For early twentieth-century Canadians, the electric city represented progress, commerce, and success; in gazing at the cityscape at night, it would not have been unusual to feel that electric light represented civilization, with the surrounding countryside disappearing in the darkness, rendering it socially and economically irrelevant.

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[107] "Survey of Neon Signs," *Hydro Bulletin* 15, no. 10 (October 1928): 351–4.

[108] "Canada's First Business Show," *Maclean's*, March 1907, 111.

[109] "The Electric Sign," *Hydro Bulletin* 6, no. 4 (October 1919): 165–66.

[110] Tim Armstrong, *Modernism, Technology and the Body: A Cultural Study* (Cambridge: Cambridge University Press, 1998), 21.

IV

Electricity offered opportunity, not just in business, but in an increased standard of living, which included new options for recreation and leisure. Athletes benefitted tremendously from the technology as it enabled them to extend their playtime well after sunset.[111] Electric illumination also kept fairgrounds open at night, allowing Canadians to take advantage of yet another form of evening entertainment. Most cities across the country held industrial and agricultural fairs where visitors were exposed to the latest in scientific and technological developments, as well as new ideas about their world and their roles in it. These were scripted affairs that held many functions; exhibitions allowed city officials to stage an almost ideal, utopian world characterized by progress and order, and they also provided corporations a venue for showcasing their products and services.[112] The idea of "progress" — synonymous with modernity and efficiency — was frequently linked with consumer goods on display. The versatility of electricity made it ideally suited for fairground spectacle. Organizers blended the innovative aspects of electric light and power with traditional concepts of entertainment to create displays that would draw in crowds.[113]

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[111] Sports such as baseball, tennis, and football became popular as night sports with the coming of electric light. "Night Sports are Growing in Popularity," *Canadian Electrical News*, 21 (December 1912) 12, 42.

[112] For a general discussion of the staging of fairs and consumption of goods, see John R. Gold and Margaret M. Gold, *Cities of Culture: Staging International Festivals and the Urban Agenda, 1851–2000* (Aldershot: Ashgate Publishing Ltd., 2005), 14–15, and Robert W. Rydell, *All the World's a Fair: Visions of Empire at American International Expositions, 1876–1916* (Chicago: University of Chicago Press, 1984), 2.

[113] Gold, *Cities of Culture*, 14. See also David E. Nye, "Electrifying Expositions, 1880–1939," in *Fair Representations: World's Fairs and the Modern World*, Robert W. Rydell and Nancy E. Gwinn, eds., 140–51, (Amsterdam: VU University Press, 1994).

Figure 3: "Hydro Lightens the Way!"[114]

[114] "Hydro Lightens the Way!" Hydro News, 31 (April 1944) 4, n.p.

Electric displays helped to shape common perceptions of the technology's potential.[115] A poster for an 1889 carnival in St. John, New Brunswick, billed as "Canada's Unique Event," promised that "the electric exhibit will be a permanent attraction [and] will show all that is known of the wonderful power that is practically revolutionizing the world in the nineteenth century."[116] Discernible items, such as switchboards, lamps, and revolving Christmas trees were on display, as well as more imaginative objects, such as an electric owl, a flashing electric dome, and a "mysterious" electric fountain. In 1907, the Canadian Electrical Exhibition Company hosted a two-week exhibition in Montreal, where utility companies and manufacturers gathered to demonstrate their latest electrical contrivances to the general public. A reporter for *Canadian Electrical News* reflected that "one of the first things that impressed the visitor upon entering was the brilliant light that radiated throughout the whole building [...]. The light was brilliant, without flicker, perfectly steady and of daylight quality."[117] Visitors, perhaps while sipping a complementary electrically-brewed coffee, would likely have also been impressed by the sight of a large electric sign, operating at 60,000 volts, which blinked the word "Westinghouse."[118] Fifteen years later, the city of Kitchener put on an electrical show in the same rink in which HEPC power had been officially turned on in

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[115] See for example: "The Electrical Exhibition at Montreal," *Canadian Electrical News* 17, no. 10 (October 1907): 322; "Winnipeg's Electrical Display at the Western Fair," *Canadian Electrical News* 18, no. 8 (August 1909): 26; "Electric Display at the Canadian National Exhibition," *Canadian Electrical News* 20, no. 8 (August 1911): 40; "Canadian Industrial Exhibition, Winnipeg," *Canadian Electrical News* 20, no. 9 (September 1911): 22; "Electrical Display Held Prominent Place at CNE," *Canadian Electrical News* 29, no. 18 (15 September 1920): 32; "Electrical Exhibition in Kitchener, Ontario," *Canadian Electrical News* 39, no. 16 (15 August 1930): 74.

[116] LAC, poster, "Summer Carnival and Electric Exhibition to be Held at St. John, New Brunswick," 22 July 1889.

[117] "The Electrical Exhibition at Montreal," *Canadian Electrical News* 17, no. 10 (October 1907): 322.

[118] "The Electrical Exhibition at Montreal," *Canadian Electrical News* 17, no. 10 (October 1907): 322.

1910. Almost twenty thousand people visited the week-long exhibition, which featured all things electric: household displays, electricity for the farm and in the factory, and electrotherapeutic demonstrations.[119] These electric exhibits served the commercial interests of utility companies by helping to familiarize visitors with appliances and gadgetry, while at the same time making an electrical lifestyle seem like an attainable goal for Canadian families.

The importance of electricity was recognized at Canada's largest fair, the Canadian National Exhibition, in 1921 with the construction of the Electrical and Engineering Building, devoted to the display and demonstration of electricity in action.[120] Electric light remained a key component of the fair, and was used in street lighting, building lighting, special effects, signs, and stage illumination.[121] Visitors arriving through the Eastern Entrance in 1927 would have been greeted with a newly-constructed Roman-style archway, which was blanketed with a four million candlepower floodlighting installation.[122] For the next few decades, Canadians would have seen the latest in electrical gadgetry, such as radios, domestic appliances, and televisions, as well as industrial applications of electricity. They would have also seen more colourful displays, such as Telerox, "The Electrical Man" (figure 4). Telerox was a robot constructed by Westinghouse that had "a radio amplifier for a brain, electrical relays for a

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[119] "The Kitchener Electrical Exhibition," *Hydro Bulletin* 9, no. 3 (March-April 1922): 143–44.

[120] Canadian National Exhibition Archives (hereafter CNEA), "Canadian National Exhibition Association, 42nd Annual Meeting," *Official Catalogue* (1921), 25.

[121] "Lighting the Canadian National Exhibition," *Hydro Bulletin* 13, no. 10 (October 1926): 314; "Power Plays Widely Diversified Role During C.N.E.," *Hydro New*s 34, no. 10 (October 1947): 33.

[122] "Floodlighting of the New Eastern Entrance of the Canadian National Exhibition," *Hydro Bulletin* 14, no. 9 (September 1927): 356.

nervous system, and gears and pulleys for joints and muscles."[123] It performed basic tasks, such as answering a telephone and turning on lights. Telerox embodied electric potential. Visitors to the exhibit must have been impressed (or perhaps a little frightened?) with the machine's human-like capabilities. At least one person noted the potential farming applications for a robot like Telerox: it could completely automate the farmer's routine by providing instant feedback to any of the farmer's whims, such as feeding livestock or turning on floodlights to thwart burglars at night.[124] Other farming applications of electricity, in the form of milking machines, butter churners, and automatic feeders, were common features of fairs and exhibitions during the interwar years, and would likely have garnered the interest of farmers, who would have attended these urban fairs to learn of the latest in farming techniques. As they travelled from the dark, rural countryside and caught their first glimpse of the city at night, marked on the landscape by its halo of electric light, they may have felt like foreigners in a new world — a world largely unknown to them until well after the Second World War.

[123] CNEA, "Proclamation," *Official Catalgue* (1928), 36.

[124] "Machines with Man-made Brains," *Country Guide*, 2 April 1928, 13.

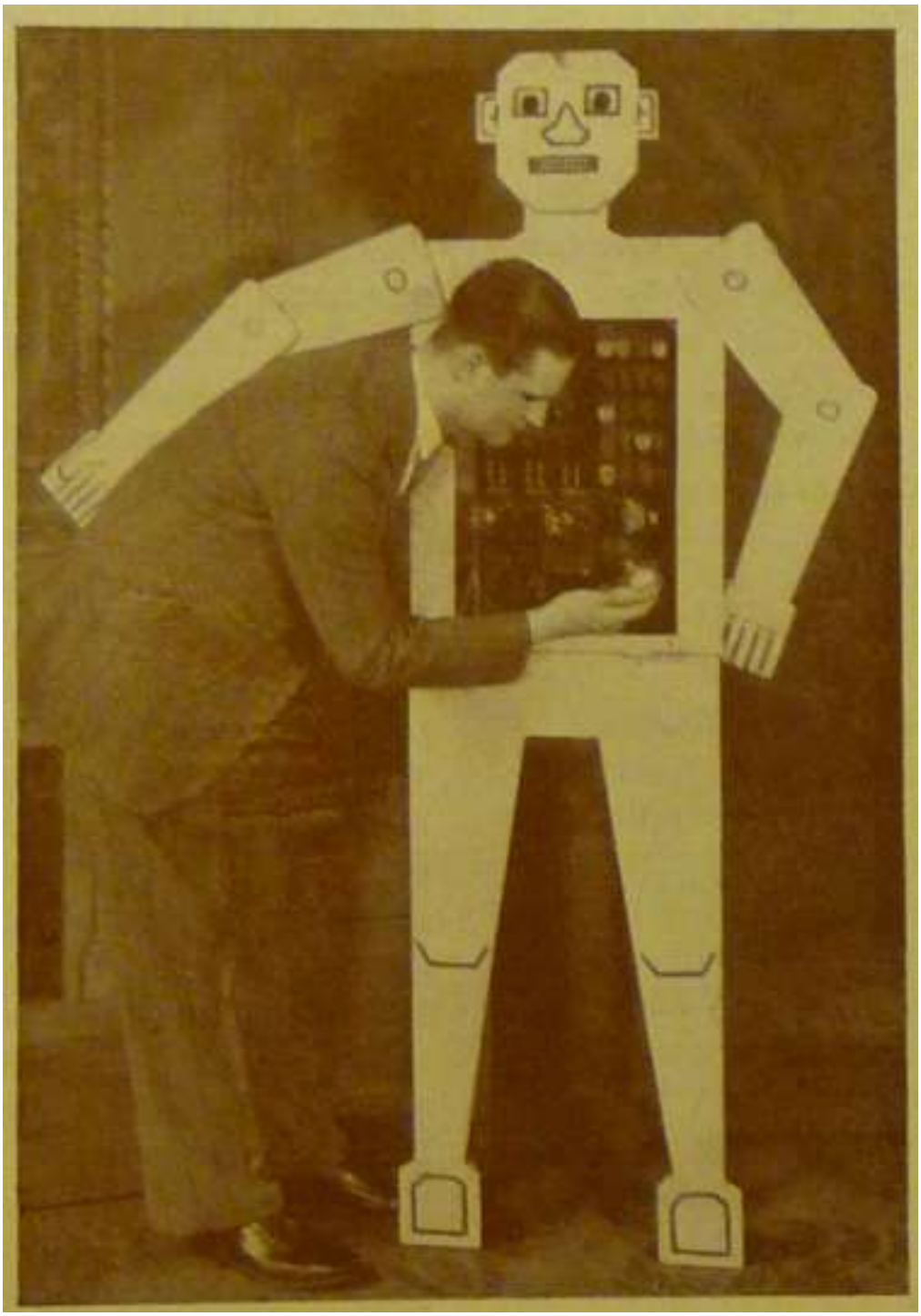

Figure 4: A Westinghouse engineer tinkers with Telerox's insides.[125]

[125] "Le Robot Électrique Prend Sa Place Au Soleil," *Entre Nous*, October 1929, 17.

Chapter Three:
"More Power to the Farmer": Electrification in Rural Canada

In the late 1940s, the Hydro-Electric Power Commission of Ontario released a promotional film called "More Power to the Farmer" featuring the Henderson family. Mr. Henderson takes the viewer on a tour of his electrically-outfitted farm, pointing to the power lines that led up to the chicken house, the pig house, and the stable. His prize possession was a light post in the middle of his yard, which brightened the outside area and "shows the way to the stable to do the chores." The viewer follows Mr. Henderson into his house where he encounters his wife, who is making use of electrical appliances to prepare dinner. As she wipes clean her shiny electric range, she says into the camera: "I never realized before that with electricity on the farm, we are just as comfortable as any city family."

Mr. Henderson looks intently into the camera as he reveals the HEPC's main message at the end of the film:

> Now you see folks some of the many uses around the farm hydro can be put to. I just couldn't farm anymore without it. I must be getting soft or something. But I'm getting along now, making more money. And let me tell you friends, the Mrs is a lot easier to get along with too. But honestly, I just don't know how she used to do all the work she did without electricity.[1]

The Power Commission's film is reflective of nation-wide advertising trends toward farming families. The "family farm," which had become symbolic of nineteenth-century frontier life in Canada, remained an influential concept in promotional literature for rural electrification throughout much of the twentieth century. One of the popularly held

[1] Canadian Museum of Science and Technology (hereafter CMST), Hydro Electric Power Commission, "More Power on the Farm," VHS, n.d.

notions of the family farm was its element of traditionalism — the belief that farming families were less likely to incorporate new ideas and technologies into their lives. For social reformers, this reluctance to change was regarded as backwards; for agricultural fundamentalists, agrarian life "is the natural life and because it is natural it is therefore good."[2] Utility companies and their boosters found themselves in the delicate position of promoting an updated and technologically reliant way of life, while at the same time supporting the traditional goals of the family farm. To sell their message, they often relied on personal testimonies (scripted or otherwise) that spoke to the farmer in dollars and sense, and pointed to necessity, profitability, practicality — but above all, a higher standard of living — as the core reasons for farm electrification.

Compared to the seemingly overnight electrification of cities, the electrical transformation of Canada's countryside moved at a glacial pace. Outside urban areas, life took on a different character, for years unaffected by electrical innovations. Despite the lack of electrical conveniences, an increased presence of machinery on farms suggests that farming families were not the "anti-modern" or "simple" country folk that cultural myths surrounding rural areas would suggest.[3] Electrification of Canadian farms took on

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[2] Donald R. Whyte, "Rural Canada in Transition," in *Rural Canada in Transition: A multideminsional study of the impact of technology and urbanization on traditional society*, eds. Marc-Adelard Tremblay and Walton J. Anderson, 2, 97–99 (Ottawa: Mutual Press, 1966).

[3] Whyte has argued that "one of the characteristics which distinguishes the urban from the rural way of life is a predisposition among urban people to accept change." Whyte is building on a premise outlined by Max Weber, "that persons engaged in agrarian pursuits are more embedded in traditionalism and are therefore less likely to initiate change.See Whyte, "Rural Canada," 96; Max Weber, *The Sociology of Religion* (Boston: The Beacon Press, 1963), xiii. For a discussion of the romanticization of the rural in Canada, see Ian McKay, *The Quest of the Folk: Antimodernism and Cultural Selection in Twentieth Century Nova Scotia* (Montreal and Kingston: McGill-Queen's University Press, 1994). See also Raymond Williams, *The Country and the City* (New York: Oxford University Press, 1975) for an analysis of the historical dichotomy between "urban" and "rural." Monda Halpern tries to correct this notion in *And on that Farm He Had a Wife: Ontario Farm Women and Feminism, 1900-1970* (Montreal and Kingston: McGill-Queen's University Press, 2001), 21. She writes: "Most generally, twentieth century rural life has been disregarded by many historians because of the prevailing assumption that country living is simple, virtuous, serene and

a different trajectory than in cities, and although some provinces introduced rural electrification schemes almost as soon as cities were electrified, most farms could not access electricity until the 1950s. This chapter will compare the electrification process between provinces and determine what electricity meant on the farm versus in the city.

I

By the close of the 1930s, widespread rural electrification was a hot-button issue in Canada.[4] British Columbia, Alberta, Manitoba, and Saskatchewan issued reports to examine the state of electrification on farms in each respective province, and promises of extending hydro-electricity to rural areas was making headlines in Ontario, Quebec, and the Maritimes. The challenge of equipping farms with electricity existed across the country, despite most Canadian farms not being uniform in purpose or structure. Regional variations in immigration patterns, climate, and resources ensured that farming developed a distinctly local flavour, making it necessary to mediate generalizations about the

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unchanging." Regarding farm machinery, it is clear that farming families incorporated new tools and techniques into their farming routines as financial and market conditions permitted. Some of these technologies (such as horse-powered reapers, binders, and rakes) may appear less important or "revolutionary" yet were instrumental in the process of farm modernization, and allowed for the expansion of agricultural production. External events that gave impetus to developments in industry also had a demonstrable affect on farm mechanization. The First World War, for example, created conditions for higher prices for farm goods, thereby providing farming families the means to purchase new equipment. Following the war, increased use of rubber, gasoline engines, and to some extent, electricity, allowed for further mechanization. See Helen C. Abell, "The Social Consequences of the Modernization of Agriculture," in *Rural Canada in Transition*, 178–227; Wynn, *Canada and Arctic North America*, 198.

[4] I will be using the terms "farm" and "rural" interchangeably to mean "farm". While one is not necessarily synonymous with the other, I have chosen to employ both terms to reflect the historical nature of each in the realm of electrification. Much advertising, literature, and promotional information from the twentieth century use both terms to mean the same things, so for the sake of consistency, I will do the same.

farming experience in Canada. However, despite the differing characteristics of farms and farm life, the majority of farmers across the country had the shared experience of belonging to the last major industry to be electrified.[5] This was a sharp contrast to Western Europe, where fifty to ninety percent of farms were electrified by 1940.[6] The disparity was mostly due to spatial considerations: European farms tended to be closer together whereas the distance between Canadian farms made rural electrification a difficult and costly venture.

In the absence of rural electrification schemes, the presence of electricity on farms was largely the result of enterprising farming families who derived power from an isolated plant — fuelled by either wind, gasoline, a combination of the two, or diesel — which could typically provide from a half to five kilowatt capacity. Wind had been harnessed for electric power since the turn of the century, but increasing demands for reliable power by the First World War meant that many farmers became dissatisfied with this option. The operating costs of a wind plant were considerably lower than gasoline, but the structure provided intermittent service at best.[7] Gasoline-driven electric plants required less initial investment, but had high operating costs and could only function for a few hours each day.[8] By 1920, farmers were using combination plants, which could consist of a wind mill in conjunction with a gasoline-powered motor to generate

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[5] David Nye notes a similar trend in the agricultural sector in the United States. See *Electrifying America*, 287.

[6] Manitoba Electrification Enquiry Commission, *A Farm Electrification Programme* (Manitoba: King's Printer, 1942), 65.

[7] "The Growing Use of Electricity on Farms," *Canadian Electrical News* 22, no. 12 (15 June 1913): 101; "Electricity by Windmills," *Country Guide*, 1 May 1928, 19.

[8] "The Growing Use of Electricity on Farms," *Canadian Electrical News* 22, no. 12 (15 June 1913): 101.

electricity. Within the following decade, a gasoline engine with an auxiliary storage battery could provide farmers with twenty-four-hour electric service.[9] Although the cost of generating electricity with diesel was relatively low, diesel-driven plants were best suited on larger farms that required a lot of power.

With the growth of the central station industry following the First World War, farms located near urban areas had the advantage of being supplied with electricity over high-tension transmission lines, which usually meant more consistent and reliable service than an isolated plant.[10] Theoretically, central station service was preferable to home-generated electricity because the farmer could receive an unlimited quantity of power (as long as he continued to pay his bill), without being concerned about peak load; the capital expenditure was usually less than constructing an isolated plant; and finally, the farmer did not have to worry about maintenance of the unit.[11] But practically, there were too many variables that could affect service to offer a reasonable comparison between plants and power lines. Writing for the Alberta Power Commission in 1945, A.R. Brown and Andrew Stewart maintained that "while the cost of a plant of a given size may be the same for all farms, the capital cost per farm of line construction depends on the density of farms, or, more accurately, on the number of farm connections per mile of line."[12] The capital expenditure required to construct transmission and distribution lines to rural communities was prohibitive for most utility companies, which were little disposed to

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[9] "Electricity in Rural Districts," *Canadian Electrical News* 32, no. 12 (15 June 1931): 145.

[10] For more information on the development of central station electrical systems in the Prairie Provinces, consult White, *Power for a Province*, 1–28.

[11] "Electric Service on the Farm," *Canadian Electrical News* 29, no. 11 (1 June 1920): 41.

[12] A.R. Brown and Andrew Stewart, *Farm Electric Plants in Alberta* (Edmonton: King's Printer, 1945), 9–13.

lose money in electrifying farmland. Also, consumer demand on farmland was so irregular (since farming routines were typically seasonal) that farmers wound up paying much higher rates than their urban counterparts.[13]

Any progress made toward widespread rural electrification during the 1920s was halted, and in some cases reversed, by the onset of the Great Depression. Subscribing to electric service was out of the question for most farming families and those that already did have electricity struggled to pay for it. Some utility companies cut off power to clients who could not pay their bills, and some city-dwelling families even reverted back to "pre-industrial" ways. In her study of Montreal housewives during the Great Depression, Denyse Baillargeon notes that these families abandoned their homes and moved to the countryside, where "without electricity or running water, they had to put their electric irons, toasters and washing machines in storage and go back to making by hand a number of products that they were used to buying ready-made."[14] Although newspapers and farming journals continued to espouse the benefits of electricity on the farm and in the homestead, the reality was that during the Great Depression few farming families could afford it.

By the close of the 1930s, the gap between urban and rural electrification in Canada was highlighted in the print media, and for many, the imbalance was pointed to as a significant cause of rural depopulation. As discussed in chapter two, rural residents were moving into cities at a rate that was nearly double the number of people moving into

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[13] Jonathan Vance, *Building Canada: People and Projects that Shaped the Nation* (Toronto: Penguin Canada, 2006), 206.

[14] In the Montreal-area alone, roughly 50,000 people moved back to farm lands during the 1930s. For more information, see: Denyse Baillargeon, "'If you had no money, you had no trouble, did you?': Montreal Working-Class Housewives During the Great Depression," in *Canadian Women: A Reader*, ed. Wendy Mitchinson, 261n31 (Toronto: Harcourt Brace, 1996).

rural areas.[15] The migration of farmers — but more significantly, their offspring — into the cities had been noted by social commentators since the late nineteenth century; in 1899, for instance, *Saturday Night* blamed the exodus on the press for its tendency to "throw an absurd glamour over city life."[16] Once the 1911 census confirmed the trend, rural dwellers became increasingly concerned that city life, with its prospects for employment and modern conveniences, was too powerful a lure for farming youth to resist. As Robert Craig Brown notes in his introduction to John Macdougall's *Rural Life in Canada*, rural residents became anxious "that the agricultural roots of their society were being eroded by the attractions of the new era."[17] By the time urban electrification became commonplace, bringing the "bright lights" of Canada's cities — along with all the modern conveniences that electricity promised — to its farms was quickly seen as a viable way of making farm life more appealing to Canada's youth.[18]

Developments in the United States helped to fuel the drive for rural electrification schemes in Canada. In 1935, the Rural Electrification Administration (REA) began to provide farmers with low-interest loans to cover the costs of electrically outfitting their farms.[19] Whereas the REA was a national initiative, rural electrification in Canada was a provincial imperative, and its process varied significantly from province to province.

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[15] Dominion Bureau of Statistics, *Sixth Census of Canada, 1921*, vol. 1, *Population* (Ottawa: F.A. Acland, 1934), xxxi.

[16] "Why do the boys leave the farm?", *Saturday Night* 12, no. 2 (18 March 1899): 2.

[17] Robert Craig Brown, introduction to *Rural Life in Canada: Its Trends and Tasks* by John Macdougall, (1913; repr., Toronto: University of Toronto Press, 1973), vii.

[18] Donald David Brown, *Random Recollections of Growing up on a Farm* (Victoria: Self-published, ca. 1955), n.p.; Saskatchewan Royal Commission on Agriculture and Rural Life, *Farm Electrification*, Report No.11, (1957), 17; Fleming, *Power at Cost*, 4.

[19] Nye, *Electrifying America*, *314*–17; for more information on the REA, see Marquis Childs, *The Farmer Takes a Hand: The Electric Power Revolution in Rural America* (New York: Da Capo Press, 1974).

Prior to the Second World War, the success of rural electrification was largely dependent upon the rural area's proximity to urban centres, with most farms electrified by 1939 being located at the outskirts of large towns and cities.[20] After the war, provincial governments promised comprehensive schemes to bring electricity to the farmer.

Rural electrification was a challenge for utility companies, which faced hefty construction costs to build the necessary framework that would bring electricity to farms. At the core of the challenge was distance; the expanse of land between farms, a characteristic especially true for prairie farms, also meant high operating costs to patrol the lines and increased risks associated with supplying power to scattered users.[21] At the start of the Second World War, Ontario led the provinces in the number of electrified farms, which was partly due to the HEPC offering grants-in-aid to help defray the start-up costs associated with rural distribution lines and equipment. By 1940, its contribution toward capital costs totalled $18,148,898.[22] While this financial investment helped to push ahead rural electrification in the province, the relatively high population density combined with the HEPC's use of municipal systems to bring electricity to the countryside also helped Ontario to become the forerunner of rural electrification in Canada by the end of the Second World War.[23]

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[20] HQA, Quebec Power Fonds, Box: 3464, File: F19/3320, 1a, *Notre Revue*, 4 (November/December 1940) 9, 5.

[21] Andrew Stewart, *Rural Electrification in Alberta: A Report to the Research Council of Alberta* (Alberta: Department of Trade and Commerce, 1944), 24.

[22] GA, Fred F. Parkinson Fonds, File: M5894, Document: "Reconstruction Project No.22. Rural Electrification," December 1943.

[23] Although Ontario led the way, most farms electrified by this time were located in the more densely populated regions of the province; it was not until extensions were made to transmission and distribution lines in the 1950s that electricity began to reach the more scattered segments of the population. See Fleming, *Power at Cost*, 18; 221–47.

In Quebec, where the number of hydro-electric installations surpassed those of Ontario, the extension of electricity to rural districts was relatively slow. Much of the power was sold to industrial customers involved in textile, pulp and paper, and electrochemical production.[24] Farms were more widely scattered throughout the province, and farming families were faced with higher service charges than in Ontario.[25] The province introduced the *Electricity Municipalization Act*, which provided the Public Services Board (an entity that had control over the production, transmission, distribution, and sale of electricity in Quebec) an advisory role over rural electrification. Following Ontario's example, the board recommended the province provide subsidies to rural municipalities for amounts up to fifty percent of the capital cost of electrification systems.[26] The board could also approve loans to municipalities of twenty-five percent of the capital cost for a thirty-year period, at four percent interest.[27]

The Maritimes developed its own idiosyncrasies. New Brunswick had almost twenty percent of its farms electrified by 1941, yet Nova Scotia appears to have been the most productive in the area of rural electrification with 8,580 (or twenty-six percent) of its 33,000 farms electrified by 1940. In 1937, the provincial government passed the Rural Electrification Act, which promoted the extension of electrical lines into rural areas by granting the Nova Scotia Power Commission subsidies to offset any losses from rural operations. Prince Edward Island lacked similar government support, and by 1940 had

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[24] Wynn, *Canada and Arctic North America*, 186.

[25] R.F. Bucknam, *An Economic Study of Farm Electrification in New York* (Ithaca, New York: Cornell University Experiment Stations, 1929), 51.

[26] "A Revolution in Agriculture," *Saturday Night*, 12 July 1930, 26.

[27] GA, Fred F. Parkinson Fonds, File: M5894, Document: "Reconstruction Project No.22. Rural Electrification," December 1943.

only 661 (less than one percent) of its 12,240 farms electrified.[28] A 1943 report by the Department of Agriculture Committee on Reconstruction noted that while the island had a "density of forty-three persons per square mile, the percentage of electrified homes [was] as low as Alberta, where the density of population [was] only 3.17 persons per square mile."[29] Despite having ample geographic conditions, the Committee blamed the provincial government for its low rural electrification rate.

On the other side of the country, British Columbia was experiencing a higher rate of rural electrification through the privately-owned British Columbia Electric Railway. The province came second to Ontario in the percentage of farms with electrical service (thirty-seven percent as of 1941), thanks to the relatively low rates charged by the company. However, the quality of service was poor, and most consumers limited their usage to electric lighting.[30] In 1945, the provincial government published a report examining the state of rural electrification in the province and determined that further incorporation of electricity into farm life would require a complete overhaul of the electric system. Government officials viewed rural electrification and the central station industry in towns, cities, and villages as interdependent, and concluded that an extension of rural electric service would require a progressive, and government-owned, central station industry.[31]

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[28] GA, Fred F. Parkinson Fonds, File: M5894, Document: "Reconstruction Project No.22. Rural Electrification," December 1943.

[29] GA, Fred F. Parkinson Fonds, File: M5894, Document: "Reconstruction Project No.22. Rural Electrification," December 1943.

[30] British Columbia, *Report of the Rural Electrification Committee* (Victoria: King's Printer, 1945), 9.

[31] British Columbia, *Report*, 9.

The Prairies presented the greatest technical difficulty for rural electrification schemes given the vast distances between farms; at the same time, the prairies, being more agriculturally focused than the other provinces, stood to gain the greatest economic and social benefit. Like the other geographic regions of Canada, the individual Prairie Provinces developed approaches to rural electrification unique to their own political, social, and technological circumstances. Electricity in Manitoba was initially provided by the municipally-owned City of Winnipeg Hydro-Electric System and the privately-run Winnipeg Electric Company. In 1919, the Manitoba Power Commission was established to supply electricity to all areas in the province not serviced by these two companies. A decade later, the provincial government agreed to pay the Commission up to fifty percent of the capital costs of constructing a rural electrification network to make electricity accessible to farming families. By 1955, Winnipeg Hydro and Winnipeg Electric were absorbed into the Commission, which, by that point, was supplying eighty percent of Manitoba's farms with hydro-electric power.[32]

Saskatchewan had the lowest percentage of farms electrified of all the provinces by the Second World War. For much of the province's early history, electricity was generated by municipally-owned utility companies, and was available primarily in the largest cities, such as Regina and Battleford. Because of the scarce water resources, electricity in Saskatchewan was derived from gas, diesel, and coal-fuelled generating stations. Proposals to integrate the municipal systems began in earnest in 1912, but an integrated network supported by the province did not exist until the 1950s.[33] The process

[32] J. E. Crozier and A. L. Burwash, *The Generation, Distribution, and Use of Electrical Power in Agriculture and Industry in Alberta, 1870–1955*, (Reynolds-Alberta Museum, August 1985), 66.

[33] White, *Power for a Province*, ii.

of rural electrification was slowed as a result, and it was further complicated by the high costs associated with transmitting electricity to the sparsely settled farm population as well as the political imperative of municipalities to view their utilities as a means to create revenue, rather than a service to be provided to residents.[34] The latter meant that all users, even those in urban areas, were faced with high power rates.[35] Only in 1944, when the Cooperative Commonwealth Federation came to power, did an industrious effort begin to implement a rural electrification program. In 1949, the government formed the Saskatchewan Power Corporation and within ten years laid thousands of kilometres of transmission lines across farm land. Under the public utility, the costs of electrical generation and transmission to rural areas were distributed among urban consumers, with farmers paying for start-up costs and electrical consumption. By 1958, 51,027 of the province's farms were electrified.[36]

Of all the provinces, rural electrification in Alberta most closely resembled the REA schemes of the United States, where farmers took on a more active role in the process. Unlike the cost-sharing practices of Saskatchewan and the government subsidization of farm electrification in Ontario and Manitoba, Alberta farmers formed cooperatives and applied directly to the Alberta Power Commission for subsidies to obtain central station electricity through the Rural Electrification Revolving Fund (RERF). Interest in electrifying Alberta's farms was heightened during the Second World War, especially following Andrew Stewart's 1944 report on rural electrification in

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[34] GA, Fred F. Parkinson Fonds, File: M5894, Document: "Reconstruction Project No.22. Rural Electrification," December 1943.

[35] Crozier, *Generation*, 67.

[36] Crozier, *Generation*, 68.

Alberta. Early in 1943, the provincial government had asked the Research Council of Alberta to undertake a study of farm electrification in the province to determine how it fared in comparison with the other provinces.

Stewart determined that electricity could be extended to at least thirty percent of Alberta's farms within a ten-year period. His report was timely, as wartime needs created an ideal environment for rural electrification, and his recommendations formed the basis for electrification schemes during the post-war years.[37] An increase in industrial power during the Second World War lifted Alberta from a period of stagnation during the 1930s and demonstrated that the province's resources — both exploited and untapped — were considerable.[38] Also, after the war, the province was littered with airfields and military camps that were connected to transmission systems built during hostilities. These bases were subsequently abandoned, and government officials eyed the transmission lines as ideal for farm electrification in their respective areas, thus repurposing the already-built technology.[39] Soon after Stewart's report, the Alberta Power Commission Act was passed, which created the Commission as a regulatory body to supervise electrical development in the province. Farmers interested in bringing electricity to their area could form a Cooperative of at least ten members, which could then borrow funds from RERF to help pay for construction and equipment. Each member was required to pay a minimum of 100 dollars toward the capital costs of farm electrification.[40] If a farmer

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[37] See Stewart, *Rural Electrification*; see also Crozier, *Generation*, 68.

[38] Crozier, *Generation*, 68.

[39] Alberta Power Commission, *Annual Report, 1951*, (Edmonton: Queen's Printer, 1952), 24.

[40] GA, Bow North Rural Electrification Fonds, File: M1642 — Pamphlets, 1953–59, Document: "Alberta's Rural Electrification Program," July 1959; GA, Bow North Rural Electrification Fonds, File: M1642 —

interested in electrifying his farm did not own his land, he could have the registered owner sign the lien for the loan on his behalf.

The Cooperatives would provide the power company with detailed maps of the proposed areas, including the locations and names of farmers desiring electricity, as well as those abstaining from the electrification scheme. Usually, the cost of receiving electricity was shared equally by the members, but a farmer residing a long distance away from the rest of the group may have been required to pay for the additional footage.[41] Utility companies built the power lines at cost, and usually employed local men to install the necessary equipment (for example, the transformer and meter) up to the farm gate. From there, responsibility lay with the farmer in properly connecting his buildings in accordance with Alberta wiring standards.

Farmers had to weigh the costs of joining an electric grid or continuing to rely on home-powered electricity generation. By the Second World War, home generating stations remained a popular option for farming families who sought to incorporate electric technology on their farms and in their homes without having to rely on the extension of central station electricity. Quite possibly the most recognizable product for such a purpose was the Delco-Light, a gasoline-powered electric motor, to which rural families could connect machinery or appliances. The decision to introduce a self-generating unit or to apply for central station electric service would not have been taken lightly; farming families had to consider what types of technologies (electric or

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Pamphlets, 1953–59, Document: "Rural Electrification," n.d.

[41] GA, Fred Parkinson Fonds, File: M5894, Document: "A Guide to Rural Electrification," 16 August 1955.

otherwise) had the most value on the farm and in the homestead, and contrary to expert opinion of the time, their priorities were not always financial.

II

"Do farmers want electric power?"

The Manitoba Electrification Enquiry Commission posed this question as part of its 1942 report into the state of rural electrification of that province. Given the context of the time, it was almost an inspired question. Much of the literature about electricity in the mid-twentieth century was highly favourable; so-called experts and agricultural reformers (especially those with a stake in electrical utilities) viewed electrification as a natural step toward the modernization of farm life. In their eyes, a farm without electricity was backward, outdated, and technologically deprived. Electricity was touted as the answer to all of the farmer's problems — but the voice of the farmer was often lost, and his opinion assumed. The farmer's response to electrification was varied and, despite all the publicity in favour of bringing electricity to farms, it was not always enthusiastic.

Electrical boosters, politicians, and utility companies frequently repeated that if farming families were against electrification it was because of the high costs associated with electricity.[42] In order for the initial expense of electrifying the farm to be worth the investment, farmers would have to incorporate all sorts of electrically powered appliances and machinery — which carried their own costs, along with monthly electricity fees —

[42] Joan Champ, "Rural Electrification in Saskatchewan During the 1950s" (unpublished research paper prepared for Saskatchewan Western Development Museum, December 2001), 4.

into their homes and barns.[43] But the decision to electrify their farms involved more than financial consideration; farmers had other technological options to consider. Electrical applications on the farm did not necessarily fulfil any particular void; while electric power could be harnessed to pump water, milk cows, churn butter, thresh grain, fill silos, and so forth, these remained chores that could be performed without electricity. In other words, incorporating electricity on the farm was not about performing a job with electricity or not performing the job at all — rather, it was about choosing between different ways of completing the same task.[44] For reasons that may be attributed to cost, personal preference, or loyalty to traditional methods, some farmers simply did not want to electrify their farms and needed to be convinced otherwise.

For their part, utility companies recognized that the only way rural electrification could be a profitable venture was if farming families fully adopted an electrical lifestyle. To encourage that end, they preached the gospel of consumption; as Jonathan Vance notes in *Building Canada*, "farmers were told that the only way to get cheaper power was to use more. If something could be plugged in, it should be, and the more often, the better."[45] Farmers learned about rural electrification from advertisements, radio campaigns, training schools, at travelling shows, fairs and exhibitions, and gained further information from local newspapers and specialty magazines such as *Farm and Dairy* and *Country Guide*. Occasionally, the print media would unabashedly promote rural electrification. In 1911, *Farm and Dairy* editorialized that "the electric age on the farm

[43] "Electricity in the Farmer's Home," *Canadian Electrical News* 26, no. 19 (1 October 1917): 65.

[44] Stewart, *Rural Electrification*, 54.

[45] Vance, *Building Canada*, 206; see also: Fleming, *Power at Cost*, 31.

has passed its dawn" and predicted that soon electricity would be "lighting farm buildings, running the farm machinery, and pumping the water for the family and the farm stock."[46] A *Maclean's* magazine article was even pithier: "the cowbell era is to give way to the push-button age."[47] It was a simple phrase, but reflected the widely-held perception that electrification meant modernization, and for electrical boosters, the only way a farm could be "modern" was if it housed the latest in electrical gadgetry. Advertisers of electrical goods promoted an automated lifestyle on the farm, and with phrases such as "I touched a button and it was the happiest moment of my life!" and "Push the button and have electricity anywhere," they reinforced the notion that electricity would completely transform rural life.[48]

Members of the electrical industry reasoned that in order for farming families to embrace electricity, it had to be portrayed as a *need* versus a *want*. This was in contrast to advertisements geared toward urban families (see chapter four), which typically presented electrical goods as a desire. The *Canadian Electrical News* warned manufacturers that farmers would not respond to advertisements that created "the impression that farms must be electrified for sentimental rather than industrial reasons."[49] It was not enough to promise that electric gadgets would eliminate drudgery or make the home and farm more pleasant — advertisers had to demonstrate that electricity was the fuel of the future and if farmers expected to retain financial and physical control of their

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[46] "Electricity for Farm Work," *Farm and Dairy*, 1 June 1911, 562.

[47] "Cross Country," *Maclean's*, 15 February 1943, 42.

[48] "I touched a button and it was the happiest moment of my life!", *Country Guide*, June 1930, 56; "Push the button and have electric light anywhere," *Farm and Dairy*, 15 June 1931, 264.

[49] "Electricity on the Farm," *Canadian Electrical News* 22, no. 13 (1 July 1913): 52.

operations, they would do well to take the necessary steps to bring electricity to their farms, or risk being left behind.[50] A 1930 advertisement for Delco-Light published in *Country Guide* exemplified this view. Entitled "Where ... should a farmer draw the line?", it depicts two sketched images divided by a white line. On the left, a man and woman, with sullen expressions, are huddled around a dim lamp; on the right, the same man and woman are seated, facing each other. The woman is crocheting while the man reads. Five bulbs hang from the ceiling above them. The accompanying text emphasizes how farmers must "draw a line" between necessities ("food, clothing, implements") and luxuries ("unproductive, ornamental" things he can do without). "On which side is electricity?", the ad questions, before arguing that many farmers are too quick to assume that it is a luxury:

> [F]armers who use Delco-Light emphatically say [it] is necessity [....]. They discovered it was something they needed, something productive, something profitable. And along with all this necessity that saves time and work, and actually increased their farm profits, they got — without any cost — all the luxuries made possible by electricity.[51]

The profitability of electricity was central to the argument that electric power was a necessity on the farm. A 1930 study of electricity in Manitoba recognized that "the great majority [of farmers] will not install electric service unless it can be shown, economically, in dollars and cents, that it is in their interests to do so and can get a return on the investment necessary to install the service."[52] Promotional material stressed that

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[50] "Where Central Station Service is Not Available," *Canadian Electrical News* 29, no. 11 (1 June 1920): 48.

[51] "Where…should a farmer draw the line," *Country Guide*, July 1930, 55.

[52] Ross, "History of the Electrical Industry," n.p.

electricity on the farm would increase yields, eliminate the need to pay for hired help, and in the end, pay for itself.[53]

Speaking at the 1913 annual Canadian Electrical Association meeting, Jonathan C. Parker insisted that "electricity on the farm will be […] a solution to one of the social problems in farm economics." The "social problem" that Parker was referring to was the decline of available farm labourers, and it was a contributing factor to the mid-century imperative to electrify farms. The movement of people from rural areas into urban centres was well-documented and many commentators pointed to the migration as evidence that farms lacked the modern amenities to keep people in the countryside. For Parker, "the value of electricity on the farm is in its solution of the labour problem [...]. The electric motor is not merely a device for supplanting manpower, but for freeing the farmer from his dependence on the man at all."[54] Electricity would become the farmer's twenty-four-hour "hired man."[55] *Farm and Dairy* echoed this sentiment in an article that espoused the benefits of machinery in reducing manual labour on the farm, and praised the electric motor in particular for providing "the only means to solve the present problem of scarcity of farm help."[56]

This idealized vision of the electrified farm, a place where machines and not people laboured, was brought to life at agricultural fairs and exhibitions. Those located in southern Ontario were likely the earliest to be exposed to electricity for farming purposes when the Toronto National Exhibition introduced arc lighting to its Livestock Building in

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[53] "Electricity on the Farm," editorial, *Hydro Bulletin*, August 1916, 5.

[54] "Electricity on the Farm," *Canadian Electrical News* 22, no. 13 (1 July 1913): 52.

[55] "Hired Man," *Hydro News* 36, no. 8 (August 1949): 16.

[56] "Comment on the more recent farm labour-saving machinery," *Farm and Dairy*, 1 June 1911, 1.

1892. The benefits of electric light in a farm setting were immediately noted: "electricity, which did away with the dangerous use of lanterns by herdsmen and attendants [...] also permitted visitors to go through the buildings during the evenings."[57] Threat of fire was common on farms, where farmers often relied on a kerosene or coal-oil lantern — "which he must carry from place to place" — to provide light while completing chores in hay lofts, stables, and grain bins.[58] Electric light extinguished the risk while also granting the farmer extra hours of illumination after sunset to tend to animals and domestic tasks.[59] It must have been an intriguing development, and indeed, electric light remained the most common use of electricity on farms into the 1960s.

To encourage more electrical consumption, utility companies and manufacturers created educational exhibits to display how the most up-to-date appliances and machinery could be put to use on farms.[60] With the passing of the Power Commission Act in 1911, the HEPC began a broad educational campaign for rural electrification, which involved travelling interactive demonstrations collectively known as the "Power Circus".[61] The inauguration festivities of electric light in Collingwood in April 1912 became the focal point of an HEPC exhibit, which consisted of a kitchen, a washing machine, a dining

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[57] CNEA, File: 1893 Annual Report — IEA, Document: "Annual Report, 1893," 10.

[58] "Electricity for the Farm House," *The Drumheller Mail*, 20 February 1919, 3.

[59] "Electricity on our Western Farms," *Canadian Electrical News* 25, no. 13 (1 July 1916): 23.

[60] "Demonstration at International Ploughing Match," *Hydro Bulletin* 13, no. 11 (November 1926): 347–49; "Application of Hydro Electric Power to Farm Work," *Hydro Bulletin* 14, no. 3 (March 1927): 85–87; "Operation of Feed Choppers," *Hydro Bulletin* 14, no. 11 (November 1927): 421–27; "Demonstration at National Plowing Match at Kingston," *Hydro Bulletin* 16, no. 11 (November 1929): 391–92; "Demonstration of Farm Equipment," *Hydro Bulletin* 17, no. 9 (September 1930): 387–93; "Display Coach of Stoves, Ranges to be Here Tuesday," *Drumheller Mail*, 2 July 1931, 4; "Farmer's Free Show," *Drumheller Mail*, 7 December 1949, 3.

[61] Fleming, *Power at Cost*, 32.

room, and a dairy room, "equipped with a cylinder churn, a butter worker, and a cream separator, the whole display being designed to represent a cross-section view of a farmer's residence."[62] The entire exhibit was then showcased in Barrie, and again in a three-day fall fair in Renfrew where eight cows were milked each day with an electric milking machine. Farmers watched as the milk was skimmed in a separator, and the cream then brought over to the kitchen display where it was added to electrically brewed coffee and served to onlookers.[63]

Provincial governments and utility companies became more actively involved in staging exhibitions and educational campaigns following the implementation of rural electrification schemes. In 1956, for example, the Saskatchewan Power Corporation introduced "Penny Powers", a female employee who travelled to fairs, schools, and community halls across rural Saskatchewan to demonstrate to farm women how to incorporate electrical technologies into their daily routines.[64] The corporation also provided its subscribers with a booklet called *Electricity on the Farm*, which "emphasized the role of electric power in making farming more profitable."[65]

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[62] Hydro Electric Power Commission, *Sixth Annual Report, 1912,* 168.

[63] Hydro Electric Power Commission, *Sixth Annual Report, 1912*, 170. The HEPC also created experimental farms, which housed the latest in electrical machinery, and invited farmers to visit these works sites to see electricity in action in the home and barn. See: "Hydro Power for the Farmer," *Hydro Bulletin,* August 1916, 8.

[64] Saskatchewan Royal Commission, *Farm Electrification*, 16.

[65] Saskatchewan Royal Commission, *Farm Electrification*, 12.

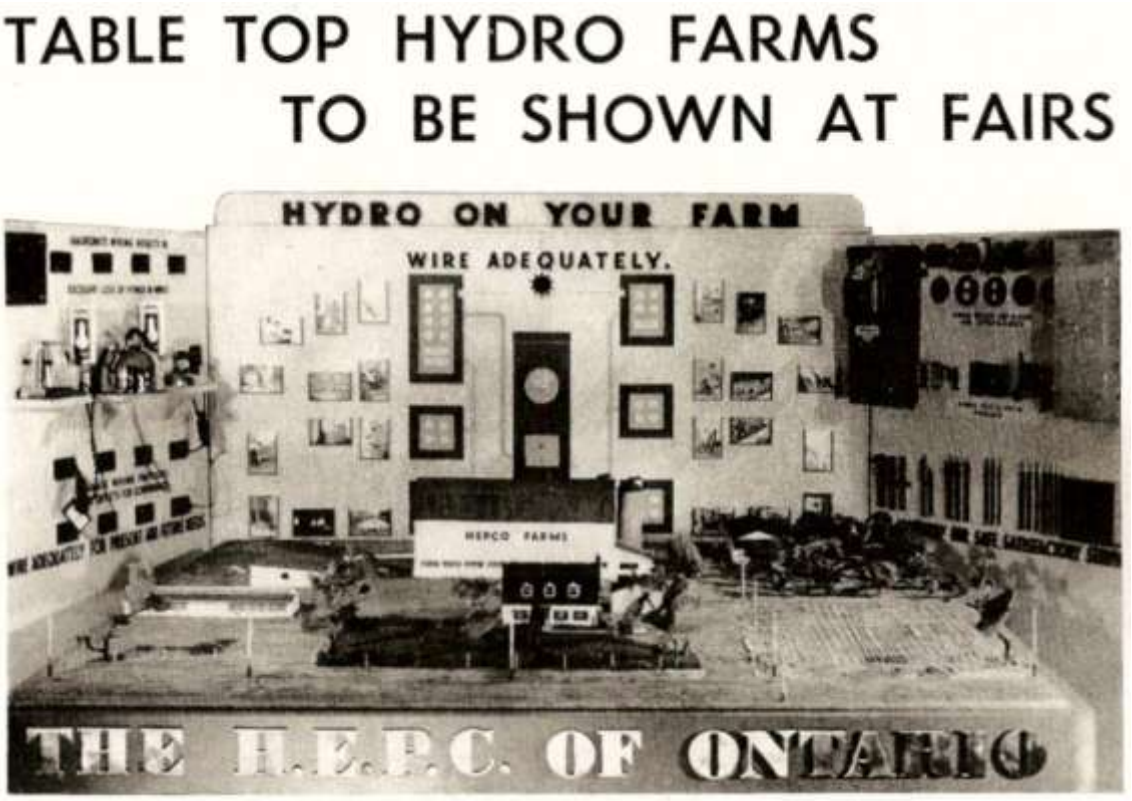

Figure 5: A travelling HEPC model exhibit designed to demonstrate the benefits of electricity on the farm. First displayed during Farmer's Week at the Ontario Agricultural College from 10–15 June 1946, it then made the rounds throughout southern Ontario.[66]

[66] "Table Top Hydro Farms To Be Shown at Fairs," *Hydro News* 33, no. 6 (June 1946): 13.

Alberta's Department of Agriculture issued its own pamphlet called *Rural Electrification*, designed to familiarize farmers with electric terms and equipment, while the Shawinigan Power Company published *Le Progrès à la Ferme*, a monthly magazine that showcased the potential uses of electricity on the farm.[67] Farmers were informed that the first step toward an electrified farm was adequate wiring "to derive [the] full benefits from all the modern electrical power appliances."[68] The cost of wiring a farm was dependent on how power would have been derived — farms connected to power lines would have seen much of the construction overhead included in their monthly bill; farmers who installed isolated plants would have paid up front for the plant and batteries.[69] However farms were to be serviced, the farmer was usually responsible for wiring his own buildings (or for hiring an electrical contractor to do so) and for purchasing electrical appliances and machinery. There was no mandatory training for farmers to learn the basics of electrical installation, and occasionally livestock paid the price.[70]

With the continued extension of distribution lines into rural districts, provincial Departments of Agriculture, under the Canadian Vocational Training Plan, introduced Rural Electrification Schools in 1952, designed to teach farmers how to wire their land properly. The schools typically ranged from one to two weeks in duration and were led

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[67] GA, Bow North Rural Electrification Fonds, File: M16442 – Pamphlets, 1953–59, "Rural Electrification," n.d.

[68] "Go-ahead Farmer Gets Grip on Electrical Future," *The Drumheller Mail*, 18 July 1946, 7.

[69] "Post-War and the Farmer," *The Drumheller Mail,* 14 September 1944, 7.

[70] Some animals were reported electrocuted from improperly grounded conduits. For more information, see: "Wanted — A Higher Standard for Electrical Installations in Farm Buildings," *Canadian Electrical News* 42, no. 5 (1 March 1933): 17.

by staff from local electrical inspection departments. For example, schools in Alberta were divided into key practical objectives: electrical theory and principles of electricity; planning wiring in buildings (such as houses, barns, and chicken and hog houses); motor study, led by a power company representative; examples and consequences of faulty wiring; and types of illumination, as well as care and maintenance of appliances.[71] These schools reflected a shift in expectations for farmers; prior to the Second World War, they were not expected to have much formal education, and schooling often ceased for children when they were old enough to contribute fully on the farm. But with "the mechanization of agriculture and the advent of agribusiness" by the 1950s, a "higher premium" was placed on education.[72]

In Quebec, the Shawinigan Power Company created courses designed specifically for youth to learn about the uses of electricity on the farm, and offered them to any student of a school within the Shawinigan Power district or any member of the *Cercles de Jeunes Agriculteurs* (a young farmers' association).[73] The courses, totalling sixteen hours spread over three years, were tailored to each gender, with boys being taught agricultural applications of electricity by an agronomist, and girls being taught domestic applications of electricity by a home economist.[74] For boys, the first year covered the basics of electricity and some principles governing the wiring of homes and buildings. The second year dealt with the pumping of water by electricity, and the main types of electric motors

[71] GA, Calgary Power Fonds, File: M1642 — Correspondence, 1955–56, Document: "Timetable for Rural Electrification Schools, 1955–56," n.d.

[72] Whyte, "Rural Canada," 63.

[73] "La jeunesse rurale," *Progrès à la Ferme* 1, no. 1 (August 1952): 4.

[74] "Les cours d'électricité," *Progrès à la Ferme* 10, no. 1 (April 1961): 1.

and their uses. In their third year, students learned the concepts of lighting and other applications of electricity to the farm.[75] Girls aged sixteen to twenty-two were taught over two summers how to cook, iron, wash clothes, prepare toast, and how to store food properly, among other domestic duties, with the use of electric appliances. According to Shawinigan Power, once their study was completed, the girls would return home with solid housekeeping skills: "*elles ont appris, par exemple, que l'électricité facilité les travaux journaliers et soulage la maitresse de maison d'un multitude des tâches*."[76]

The courses for young girls were based on a tradition in Canada of teaching girls domestic science. By 1920, Canadian women would have at least been aware — if not influenced by — the domestic science movement. The teaching of home economics in Canada had its roots in Quebec when Ursuline nuns opened a home economics school in Roberval in 1882.[77] Private institutions, such as the Young Women's Christian Association and the National Council of Women, were campaigning for domestic science training as early as 1891.[78] The first decade of the twentieth century was marked by a series of home economic school openings across the country, and the University of Toronto became the first university in Canada to offer a degree in Household Science.[79]

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[75] "Cours d'électricité," *Progrès à la Ferme* 4, no. 3 (September 1955): 3.

[76] Quotation translated by author: "the girls have learned that electricity helps make their work easier by relieving them of most tasks." See: "L'enseignement menager à l'école d'agriculture de Ste-Croix," *Progrès a la Ferme* 8, no. 3 (September 1959): 3–4.

[77] University of Guelph Manuscript and Archives Collection (hereafter UGMAC), Macdonald Institute – History, Box: Historical Sketches, File: Development of Home Economics in Canada, Source: Olive Crukshank, "Development of Home Economics in Canada," n.p.

[78] UGMAC, Macdonald Institute – History, Box: Historical Sketches, File: Development of Home Economics in Canada, Source: M. MCready, "A History of Home Economics in Ontario," n.p.

[79] UGMAC, Macdonald Institute – History, Box: Historical Sketches, File: Development of Home Economics in Canada, Source: Olive Crukshank, "Development of Home Economics in Canada," n.p.

Elementary and high schools also adopted domestic science courses. Louise Iverson, who grew up in Victoria, British Columbia, in the early part of the twentieth century, recalled being enrolled in a compulsory domestic science course in grade eight — while the boys took manual training like wood-working, the girls were brought into a "big room with gas plates all around a big table in the middle where the teacher did the demonstrating."[80]

Such schooling was necessary, explained an author from *Saturday Night*, to ensure that the family unit progressed to reflect modern, industrial conditions. Rural girls in particular were targeted as ideal students of domestic science courses, which intended to introduce them to the newest, and often more technologically reliant, housekeeping techniques.[81] The author reflected popular sentiment when he listed three objectives for teaching women domestic science: first, to educate them in scientific principles; second, to "add dignity" to housework through the application of scientific methods; and third, to "give the home its legitimate position and importance among social institutions."[82] Not everyone shared the same penchant for domestic science, however. In 1919, mothers in Nelson, British Columbia, expressed their resentment toward schools imposing themselves on what the women saw as their maternal right to teach their daughters housekeeping skills. Clare McAllister remembered her own mother claiming that domestic science "was an insult to [her] and a waste of money and foolishness."[83] Despite these small protests, domestic science gained in popularity across the country

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[80] BCPA, "Behind the Kitchen Door Oral History Project," File: 4088:0004, interview with Louise Iverson.

[81] UGMAC, REI MAC A 005, File: M.I. – History, Box: Historical Sketches, 1904–05, "Home Economics for Rural Girls."

[82] "The Housewife of Tomorrow," *Saturday Night* 26, no. 32 (4 October 1913): 40.

[83] BCPA, "Behind the Kitchen Door Oral History Project," File: 4088:0005, interview with Clare McAllister.

during the early decades of the twentieth century, and many Canadian women were exposed to its principles in varying forms in the classroom, and eventually, through the popular press and advertising.

As we will see in the next chapter, electric utility companies were fond of using domestic science techniques to demonstrate how electricity could be adapted for home use. And they frequently incorporated those techniques in public demonstrations and displays of electricity on the farm in order to highlight the higher standard of living that electric appliances could offer a farming family. But did farmers want electric power? To answer that question, the Manitoba Electrification Enquiry Commission interviewed every farmer in seven representative townships (totalling 500 interviews) located throughout the province, and also received submissions through the *Manitoba Gazette* from farmers interested in expressing their views toward electricity.[84] It concluded that eighty to ninety percent of Manitoba farmers did want electric power on their land. Almost fifty percent of those farmers had either expressed interest or made formal requests with the Manitoba Power Commission about obtaining electricity on their farms. Those who already had electricity were clear in describing how it had changed their lives: "[Hydro] saves time and labour by milking, pumping, washing and other farm jobs," wrote Joseph Grossman from Lorette, Manitoba. "Besides providing lights there are all the modern conveniences to make farm people more contented, all of which helps them to do their work more efficiently, especially in these days when men are no more available and production must be kept at a maximum."[85]

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[84] Manitoba Electrification Enquiry, *Farm Electrification*, 77.

[85] Manitoba Electrification Enquiry, *Farm Electrification*, 86.

Similar feelings were shared across the country, though not by everyone and not at the same time. Some farmers demonstrated resistance to rural electrification: they resented their land being torn up by power poles; they were angered by accidental electrocution of livestock; they refused to join cooperatives; they declined access to central station electricity; and they continued to work using other forms of power.[86] Farmers located on Saskatchewan's border with Manitoba voiced their discontent that their neighbours could receive electric service without having to pay a start-up charge.[87] Despite these protests, the coming of electricity to rural areas was often met with fanfare, and was even occasionally marked by the burial of traditional tools. Thirty families in Swalwell, Alberta, gathered together on 26 October 1944 to celebrate the arrival of electricity from the Canadian Utilities plant at Drumheller, and many threw old kerosene lamps, stoves, heated irons, and battery-operated radios into a six-foot deep hole next to the town's new 6,900 volt transformer.[88] With promises that electricity would increase farm profits, reduce operating costs, make farmers more "depression-proof", and reduce drudgery on the farm, it is easy to understand why farmers, who had waited so long for central station electricity, would have greeted its arrival with so much enthusiasm.[89] But, whether the long-term effects of electrification would meet their expectations remained to be seen.

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[86] See for example "Comment on the more recent farm labor-saving machinery," *Farm and Dairy*, 1 June 1911, 22; "Cattle Struck by Lightning," *Farm and Dairy*, 20 July 1911, 29; "Adequate Hydro Compensation Demanded," *Farm and Dairy*, 15 April 1931, 177; Bucknam, *An Economic Study*, 51.

[87] White, *Power for a Province*, 285.

[88] "Electricity Brings New Era to Farms in Swalwell Project," *The Drumheller Press*, 26 October 1944, 1.

[89] Manitoba Electrification Enquiry, *Farm Electrification*, 51.

III

The press associated life on the farm prior to the Second World War with drudgery and hard labour. While men toiled in the fields, women completed the daily household chores and tended to livestock, with only primitive technologies at their disposal. Rural electrification schemes promised to change all that; electricity on the farm would bring a completely automated life to the farmer and his family, and make living on the farm not just easier, but desirable.[90] Proponents of rural electrification insisted that the main benefit of electricity was its versatility: electricity "comes to the farm, not in a fixed size as the farm tractor does," claimed the Royal Commission on Agriculture and Rural Life in Saskatchewan, "but as a stream which can be drawn upon as needed."[91] In addition to illuminating the entire farm, it could be used in the home to toast bread, brew coffee, cook, iron, wash clothes, vacuum, sew, and refrigerate food, and it could be used on the farm to run machinery, pump water, churn butter, separate cream, milk cows, grind feed, saw, alert farmers to thieves or intruders, and provide heat for vegetation and livestock, among other applications.[92] A common assertion at the time was that only the farmer's imagination stood between him and a completely electrified farm.[93]

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[90] "Electricity on the Farm," *Canadian Electrical News* 20, no. 5 (May 1911): 97; "Comment on the more recent farm labor-saving machinery," *Farm and Dairy*, 1 June 1911, 1; "Lessening the Drudgery in the Farm Kitchen," *Farm and Dairy*, 28 January 1915, 70; "Electricity in the Home," *Farm and Dairy*, 3 June 1915, 315; "The Countrywoman," *Country Guide*, July 1945, 35; "L'automatisation," *Progrès à la ferme* 12, no. 3 (October 1963): n.p.

[91] Saskatchewan Royal Commission, *Farm Electrification*, 2.

[92] "Electricity for Farm Work," *Farm and Dairy*, 1 June 1911, 562; "Electricity in the Creamery," *Farm and Dairy*, 1 June 1911, 564; "Electricity for Farm and Home," *Canadian Electrical News* 22, no. 6 (15 March 1913): 33; "The Growing Use of Electricity on Farms," *Canadian Electrical News* 22, no. 12 (15

The cumulative effect of electrification was to increase standard of living, keep young people on the farm, and make farming a more profitable endeavor. Contemporaries glorified the arrival of electricity to the farm as a revolution that would fundamentally alter rural life, and historians have since supported that assertion.[94] As figure 3.1 demonstrates, the process of electrifying farms in the post-war years was fairly quick, yet farmers were slow to purchase electric appliances and machinery, suggesting perhaps that though electricity may have dramatically altered the lives of those who used it, as a social phenomenon rural electrification was more evolutionary than it was revolutionary. Also, when they did purchase appliances, it would appear that farm families adopted technologies that affected their standard of living first (figure 6).

June 1913): 101; "What Hydro-Electric is Doing on Seven Farms," *Farm and Dairy*, 3 June 1915, 1; "Hydro-Electric Power for Farm Work," *Farm and Dairy*, 1 July 1915, 589; "The Electric Bell," *Farm and Dairy*, 22 July 1915, 650; "Electric Cooking in Western Provinces," *Canadian Electrical News* 24, no. 15 (1 August 1915): 28; "Electric Machinery at Guelph, *Farm and Dairy*, 26 October 1915, 1026; "Electricity on Our Western Farms," *Canadian Electrical News* 25, no. 13 (1 July 1916): 23; "Electricity in the Farmers' House," *Canadian Electrical News* 26, no. 19 (1 October 1917): 65; "Electrically Operated Cream Whipper," *Hydro Bulletin*, January 1917, 17; "Hydro Power in the Milk Industry," *Hydro Bulletin*, January 1918, 23–27; "Artificial Light in Plant Growth," *Hydro Bulletin*, August 1918, 55–56; "Home Lighting," *Farm and Dairy*, 8 April 1920, 428; "Labor Saving Equipment in the Home," *Farm and Dairy*, 6 May 1920, 530; "Another 'Average' Farmer Finds it to his Advantage to Have Electric Light and Power," *Canadian Electrical News* 29, no. 11 (1 June 1920): 50; "Let Hydro Ring Your Doorbell," *Live Wire*, February 1921, 11; "Electric Cigar Lighter," *Live Wire*, September 1921, 12; "Plant Growth Stimulated by Electric Light," *Hydro Bulletin*, December 1923, 385; "Electroculture," *Canadian Electrical News* 32, no. 6 (15 March 1931): 49; "Grinding Feed by Electricity," *Farm and Dairy*, 1 September 1931, 6; "Rural Service," *Canadian Electrical News* 41, no. 3 (1 February 1932): 51;"How Hydro helps Rural Ontario," *Farm and Dairy*, June 1934, 16; "Today's Milk," *Hydro News* 34, no. 4 (April 1947): 4–6; "Hot Under the Soil," *Hydro News* 34, no. 9 (September 1947): 12; "Electricity Will Heat Your Hotbed," *Country Guide*, March 1950, 36; "Chicks Like the Bright Lights," *Hydro News* 38, no. 9 (September 1951): 14–15.

[93] Manitoba Electrification Enquiry, *Farm Electrification*, 29.

[94] "A Revolution in Agriculture," *Saturday Night*, 12 July 1930, 25; "Turn on the Juice," *Country Guide*, September 1930, 12; "Rural Electric Service," *Canadian Electrical News* 32, no. 12 (15 June 1931): 139; Manitoba Electrification Enquiry Commission, *Farm Electrification*, 51; Royal Commission on Agriculture and Rural Life, Report No.11, *Farm Electrification* (Regina: Queen's Printer, 1957), 1–2. See also: Champ, "Rural Electrification," 2; Fleming, *Power at Cost*, 4; Halpern, *And on that Farm*, 20; Halpern, "Such Outrageous Discrimination: Farm Women and Their Family Grievances in Early Twentieth-Century Ontario," in *Framing Our Past: Canadian Women's History in the Twentieth Century,* edited by Sharon Anne Cook, et al., 116 (Montreal and Kingston: McGill-Queen's University Press, 2001).

Feminist historians have weighed in on the process of rural electrification, and most have concluded that even if a farm were electrified, the farmer's wife did not experience an immediate benefit. They agree that everyday life for farm women was arduous — "consisting of cooking, washing, ironing, mending clothes, cleaning and caring for children, and work on the farm in the form of milking cows, making butter and cream, looking after poultry and caring for the vegetable garden"[95] — but they disagree that electric appliances had significantly lightened the load for these women. These historians blame the lack of domestic electrification on the farmer's propensity to mechanize his farm before his home, and from this assumption, they have concluded that little value was placed on women's work.[96] It was only with a "new attitude of men to their homes" that women could begin to benefit from labour-saving devices.[97]

Sociologist Max J. Hedley has argued that while the term "family farm" reflects the productive aspects on the farm, it obscures the reality of ownership, which typically "belongs to one individual, usually a male." He maintains that although influenced by his wife's opinion, the final decision-making regarding farming operations — including the

[95] Angela Davis, "'Country Homemakers': The Daily Lives of Prairie Women as Seen Through the Woman's Page of the Grain Growers' Guide, 1908–1928," in *Canadian Papers in Rural History*, vol. 3, ed. Donald H. Akenson, 163, (Gananoque, Ontario: Langdale Press, 1992).

[96] Marilyn Barber, "Help for Farm Homes: The Campaign to End Housework Drudgery in Rural Saskatchewan in the 1920s," *Scientia Canadensis* 9, no. 1 (June 1985): 3, 7–8; Champ, "Rural Electrification," 19; Marjorie Griffin Cohen, "The Decline of Women in Canadian Dairying," in *The Neglected Majority: Essays in Canadian Women's History*, vol. 2, eds. Alison Prentice and Susan Mann Trofimenkoff, 67, (Toronto: McClelland and Stewart, Ltd., 1985); Linda Rasmussen, et.al., *A Harvest Yet to Reap: A History of Prairie Women* (Toronto: The Women's Press, 1976), 42; Veronica Strong-Boag, "Pulling in double Harness or Hauling a Double Load: Women, Work and Feminism on the Canadian Prairie," *Journal of Canadian Studies* 21, no. 3 (Fall 1986): 45.

[97] "The Electrified Farm House," *Hydro Bulletin* 16, no. 5 (May 1929): 164.

investment of technology — was in the hands of the farmer.[98] Feminist historians have embraced this theory as fact, but in the absence of qualifiable data, it would be wrong to assume that farmers were loathe to mechanize their homes, especially when the data available suggests that in the case of rural electrification the opposite is true — that the farm home was indeed electrified before the farm yard. We know that nearly all farms with access to central station electric power had adopted electric lighting in the home, and followed that installation with smaller appliances for use in the home, the purchase of which was usually dependent on cost.[99] While national statistical evidence is scarce, provincial reports reveal that domestic uses trumped farming applications of electricity. Feminist historians have not looked at these statistics, and instead cling to ideological assumptions to support their theories. The available evidence does not bear out the point that they try to make.

Andrew Stewart documents that immediately following the war, hand irons, radios, washers, and toasters, were found on more than fifty percent of the farms in Ontario and Manitoba; hotplates, ranges, vacuum cleaners, and refrigerators were found on more than ten percent of those farms in each province.[100] This was in contrast to water pumps, which was the only "outside appliance occurring on more than ten percent of farms in either province."[101] These figures suggest that farming families placed greater

[98] Max J. Hedley, "Normal expectations': rural women without property," *Resources for Feminist Research* 11 (March 1982): 16.

[99] Stewart, *Rural Electrification*, 58.

[100] Stewart, *Rural Electrification*, 58.

[101] Stewart, *Rural Electrification*, 58.

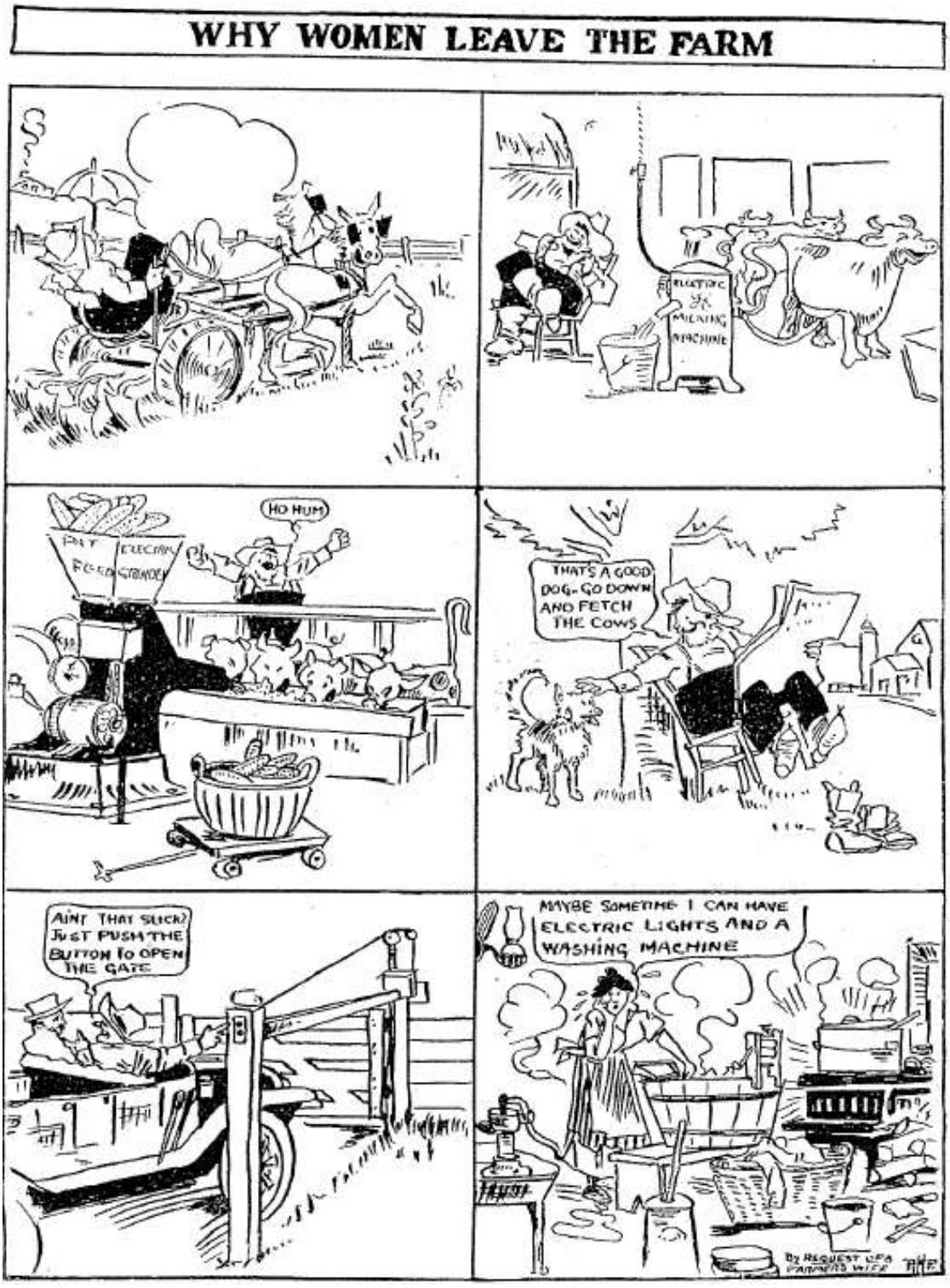

Figure 6: An artist's take on the inequality of labour saving devices on the Canadian farm[102]

[102] "Why Women Leave the Farm," *Hydro Bulletin*, April 1919, 116.

priority on domestic uses of electricity, probably to increase their standard of living, and possibly as a reflection of the value placed on woman's work. Ironically, while electrical manufacturers were advised against advertising their products as a want, when farmers did choose to electrify, they appeared to do so for that very purpose.

In its examination of rural electrification in Saskatchewan, the Royal Commission on Agriculture and Rural Life surveyed two towns, Milestone and Humbolt, to understand the broader social and economic implications of electricity on the farm. The Commission interviewed forty-one users in each area. When questioned what type of appliances and machinery they would like to purchase in the future, the majority of respondents listed domestic appliances — freezers and stoves — as their next desired purchase. In both areas, smaller electric appliances, such as irons, radios, and toasters, prevailed.[103] This was a trend that existed throughout the province; at time of writing in 1957, the Commission noted that approximately ninety percent of power consumption in rural Saskatchewan was for domestic use.[104] The Commission concluded that "because rural electrification makes possible many of the amenities previously found only in urban areas, it should have the effect of reducing the pressure on farm families to move to urban areas."[105] The accuracy of this prediction is questionable, especially given the 1951 Census association of increased farm mechanization with a drop in the number of people working in agriculture, and continuing trends of rural depopulation.[106]

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[103] Saskatchewan Royal Commission, *Farm Electrification*, 65.

[104] Saskatchewan Royal Commission, *Farm Electrification*, 69.

[105] Saskatchewan Royal Commission, *Farm Electrification*, 69.

[106] Dominion Bureau of Statistics, *Ninth Census of Canada, 1951*, vol. 10, *General Review and Summary Tables* (Ottawa: Edmond Cloutier, 1956), 34, 480.

The presence of electricity on the farm may have helped to bridge some gaps between urban and rural standards of living; however, historian Angela Davis argues that the telephone, radio, and the automobile had a more demonstrable effect on the quality of life in rural areas than kitchen technologies.[107] She maintains that for farm women "little was changed in terms of the work [they] were responsible for, and the new household technologies made no difference to their expectations. But with technological advances not directly related to the home, the impact on women was of quite a different order."[108] She suggests that the telephone, radio, and automobile were bridging technologies — unlike electric appliances, which were used in isolation, if they were used at all, the former emancipated women from the loneliness of rural life, and brought them in closer contact with other farm women.[109] In comparison to the opportunities available to city women for socialization (such as downtown shopping via the electric streetcar) Davis concludes that "the non-household inventions were […] of much greater significance to rural women than to urban women in improving the quality of daily life."[110] There is little doubt that farm women embraced the arrival of electricity, but Davis is right to question the relative impact that electric appliances had in their lives. For a better part of the twentieth century, domestic science experts and women's magazine writers told the same story to both rural and urban women — that electric technologies would liberate them from the drudgery of housework. As we will see in the following chapter, an examination

[107] Angela E. Davis, "'Valiant Servants': Women and Technology on the Canadian Prairies, 1910–1940," *Manitoba History* 25 (Spring 1993): 33.

[108] Davis, "Valiant Servants," 35.

[109] Davis, "Valiant Servants," 39.

[110] Davis, "Valiant Servants," 39.

of domestic electrification in urban Canada during the interwar years reveals a different reality.

Chapter Four:
The Domestic Workshop: Domestic Electrification in Urban Canada, 1920 to 1940

"Oh Wonderful Electricity!" praised Eustella Burke in a June 1927 issue of *Canadian Homes and Gardens*. "It has worked magic in the home." She went on to highlight how the latest in household technology was revolutionizing women's work: electric refrigeration made long-term preservation possible; electric heat eliminated guess work; electric dishwashers took over the arduous task of washing, sterilizing, and drying dishes; electric stoves automatically cooked meals to perfection. "For her and her helpers," Burke declared, "electricity replaces the physical labour with comparatively cheap mechanical energy."[1] Although writing to a primarily affluent audience, Burke's message was a common one at all levels of society during the interwar period: electricity would liberate women from the drudgery of household duties and give them time to enjoy leisurely pursuits.

Coupled with that notion was the idea that household technologies would elevate the status of homemakers: "electric helps […] give an added zest [...] to housekeeping, raising it to what it should be, a great profession."[2] This was an oft-repeated declaration about electric appliances, which usually centered on the kitchen. During the interwar period, electric distribution increased nationwide, and with it came a push for labour-saving devices. [3] Women became the primary targets of electrical manufacturers who

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[1] "The Magic of Electricity," *Canadian Homes and Gardens*, June 1927, 44.

[2] "The Magic of Electricity," 44.

[3] CMST, Ontario Hydro Domestic Appliance Collection, Franz M. Klingender, "Contextual and Material History Research: Ontario Hydro Domestic Appliance Collection," unpublished research paper, May 1993. In 1941, the Census of Canada began to keep statistics on the number of "household conveniences" used in Canadian homes, and in 1951, it began to keep records of the types of lighting facilities used in Canadian homes. The available statistics suggest an increased usage of electricity as a power source and an increased

rationalized the need for their products in the increasingly popular language of domestic science. “Precision”, “automatic”, “modern”, “effortless”, “revolutionize”, “faster”, “efficient”, “scientific” — these were all words commonly found in advertisements for domestic electrical goods during the interwar years. The kitchen was re-conceived as a domestic workshop, and electric appliances were the tools with which the modern housewife could efficiently perform her craft.

As families drifted toward the metropolitan centres of Canada’s provinces, more options to mechanize their daily lives became available to them. By 1920, every major Canadian city from Halifax to Vancouver had electrical utility companies supplying power to urban residents, and they, along with electrical manufacturers, began aggressively to promote electricity to Canadians. Their goal was not only to sell electric goods, but to promote the *idea* of electricity; they were marketing a lifestyle. Journalists revealed a shared boosterism for an electrical way of life; the pages of Canada’s popular women’s magazines from the 1920s through the 1940s are filled with articles promoting the use of electric appliances, often ensconced in domestic science terminology. At face value, it would appear that by the 1940s electricity had edged out gas as a domestic power source, but the reality was that the “electrical future” was far from determined. Canadian families were slow to introduce new products into their homes, and many held onto traditional tools in the face of modern, electrical technologies.

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usage of electric goods in the years leading up to the Second World War. For more information, consult Dominion Bureau of Statistics, *Eighth Census of Canada, 1941*, vol. 1, *General Review and Summary Tables*, (Ottawa: Edmond Cloutier, 1950), 420; Dominion Bureau of Statistics, *Ninth Census of Canada, 1951*, vol. 3, *Housing and Families* (Ottawa: Edmond Cloutier, 1953), 36-1– 36-5.

I

Electricity first arrived to Canadian homes in the form of illumination. Those living in urban areas would have already been familiar with the arc light, which had transformed street lighting since the 1870s. These were large units, with globes that could be more than three feet long, and hung imposingly over downtown streets.[4] Smaller arc lights were introduced in the 1890s for indoor lighting, but their glaring brightness made them impractical, and even dangerous, for domestic use.[5] Instead, most Canadians continued to rely on traditional forms of light, such as candles, kerosene, or gas mantles. It was Thomas Edison's incandescent lamp that allowed people to bring electricity into their homes. Unlike the arc light, which carried the characteristics of traditional forms of illumination — flickering, heat, burning elements — the incandescent lamp seemed a truly artificial, man-made construct that defied commonly held notions of lighting.[6] The filament locked inside the vacuum-sealed globe heated until it glowed, "throwing off a light at once mild and intense, smokeless, fireless, steady, seeming inexhaustible."[7] For the first time, fire and light (elements synonymous with each other from time immemorial) were separated, forever changing the way Canadians experienced light.[8]

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[4] CMST, Artifact Catalogue Number: 1992.1615.001, "Artifact Information Request Report – Lamp, electric arc".

[5] CMST, Artifact Catalgoue Number: 1992.1615.001, "Artifact Information Request Report – Lamp".

[6] Nye, *Electrifying America*, 2

[7] Nye, *Electrifying America*, 2.

[8] Nye, *Electrifying America*, 2.

A startling feature of Edison's lamp was its blunt whiteness, which contrasted with the soft, flickering yellow light of an open flame. It shared the same strength as gas jets at sixteen candlepower, but writers acknowledged that it gave a different appearance to indoor spaces — and people. An author for the *Globe* observed that at a recent gala illuminated by incandescent lighting, female guests bore a distasteful appearance: "This new light shows up the paint and the whiting preparations terribly. Some otherwise pretty girls […] were ghastly objects. The rouge on their cheeks, the white on their foreheads, the black round their eyes, and the pomade on their lips, which would not have been perceptible by candle or gas light, stood out in awful prominence."[9] Few doubted that the white light was suitable for utilitarian purposes, and the relative safety of the incandescent lamp compared to gas lighting, which could leak, give off noxious fumes, and cause explosions, was especially appealing to industries that manufactured flammable material, like newspaper, cotton, and flour.[10] However, some questioned the use of electric lighting for domestic purposes, "which had developed patterns of hearth and lamp that would be disrupted by this new brightness."[11]

In an effort to encourage the use of his lamp, Edison constructed what Charles Bazerman calls "an aesthetic of electric lighting." Bazerman maintains that Edison and his associates played a key role in the social acceptance of his light through rhetoric that reflected the aspirations and values of late nineteenth-century urban-dwelling American

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[9] "Round the Globe," *The Globe*, 8 August 1883, 3.

[10] Nye, *Electrifying America*, 5; Charles Bazerman, *The Languages of Edison's Light* (Cambridge, MA: MIT Press, 1999), 313; Bright, *Electric-Lamp Industry*, 21.

[11] Bazerman, *Languages of Edison's Light*, 313.

families: "consumption, cultivation, and upward mobility." [12] By the time Edison lit up New York City's Wall Street in 1882, he had established a presence and meaning of electric light, not only within American society, but within Canadian circles as well. Electric light was introduced to Canada in pre-packaged, Edisonian form — as the natural successor to gas light and the future of industry.[13] Private electrical utility companies began to crop up in metropolitan areas, serving domestic customers with Edison's direct current central generating system. In Toronto, for example, the Toronto Incandescent Electric Light Company boasted its use of the Edison system, which included a central lighting station, "having the capacity of 5,000 lamps," and customers that would pay only for the current that they used via Edison's meter system.[14] Some companies, such as the British Columbia Electric Railway, derived profits from domestic consumers by imposing minimum monthly fees and consistently high rates for usage.[15] Municipal utility companies could expect little profit from early domestic lighting and focused instead on industry; in Alberta, for example, "the need for a central generating station was often dictated by industrial demand for electric power."[16] Once industry was

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[12] Bazerman, *Languages of Edison's Light*, 313.

[13] As discussed in chapter two, Edison took great pains to shape the public mindset about how his electric light would transform the world. He created anticipation in the years leading up to his first public display of incandescent light, and when the reality of his construct matched his rhetoric, the media continued to preach his message that electricity would replace gas in almost every avenue of American life. For further information, see: Bazerman, *The Languages of Edison's Light*; Bright, *The Electric-Lamp Industry*; Ellis, *Thomas Edison: Genius of Electricity*; Friedel and Israel, *Edison's Electric Light*; Johnson and Covello, *The Social Construction of Risk*; Jonnes, *Empires of Light*; McNichol, *AC/DC*; and, Passer, *The Electrical Manufacturers*.

[14] "Operating the Edison System," *Saturday Night*, Holiday Number 1889, n.p.

[15] Blair Tothill, "Living Electrically: The British Columbia Electric Railway Company and the Development of the Domestic Electric Alliance Market in Victoria, 1919–1939" (MA Thesis, University of Ottawa, 1998), 14.

[16] Crozier and Burwash, *Generation, Distribution and Use of Electrical Power*, 99.

electrified, and the power lines set in place, utility companies could turn to residential customers as an extension of their network.[17] But until 1920 domestic electrification was an expensive venture, and only wealthy, urban households could afford costly electrical installations.[18] It was such a luxury that socialites would sometimes advertise "Electricity" across invitation cards so potential guests would be enticed to come and admire their new fixtures.[19] Electric light was a symbol of modernity and progress, and acted as a signpost of a family's wealth and prestige. Once it became more affordable after the First World War, however, electric light began to lose its cachet as a status symbol and became imbued with new functions and meanings.

Early electric fixtures were more about efficiency than they were about design. Electric light continued to retain its utilitarian purpose in certain "workshops" of the home — the kitchen, the laundry room, the garage — but it also evolved into an expressive medium.[20] "Fashion today demands more frequent changes in lighting fixtures," wrote Ellen Mackie in *Canadian Homes and Gardens*. "Like the theatrical stage, the home is a place of varying moods, activities and affairs upon the home stage."[21] Decorative shades, strategic positioning of lamps, and varying light intensities were all

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[17] Equally important to this extension was the switch to alternating current, which allowed for electricity to travel over long distances at a rapid rate.

[18] Many of these installations came from home-generated sources of electricity. Statistical information about this type of power supply was not available until 1951. At that time, the census reported that out of 2,155,035 urban localities, 1,360 had home generated electricity (or 0.06 percent) versus 2,138,840 (or 99 percent) that received their electricity from a power line source.

[19] CMST, Love, Leisure, and Laundry Research Material, Box: 2, "Early Electric Appliances."

[20] "Lighting the Kitchen, the Workshop, and Laboratory of the Home," *Canadian Homes and Gardens*, December 1927, 48; "To Throw New Light on Small Interiors," *Canadian Homes and Gardens*, April 1935, 32; and, Canadian General Electric Company, *Home of a Hundred Comforts*, pamphlet, ca. 1920s, n.p.

[21] "Lamps for a Change of Atmosphere," *Canadian Homes and Gardens*, September 1927, 24.

incorporated into room design to help colour the "mood" of the home.[22] The clearest sign that Canadians no longer regarded light fixtures as strictly utilitarian came in the late 1920s when they turned to electric lights to decorate their Christmas trees.[23] The availability of waterproof wires and sockets by the early 1930s allowed Canadians to extend their festive spirit to the exterior of their homes.[24] One author writing for *Canadian Homes and Gardens* remarked that outdoor Christmas lighting "makes possible an extension of Christmas warmth [and] deepens our conviction that Christmas is common property, to be shared alike, with family, friends, and the stranger passing by."[25]

Once interested in the domestic market, utility companies focused much advertising effort on enlisting Canadians as consumers. For many Canadians, cost remained a prohibiting factor. But equally important was the threat of danger posed by domestic electricity, especially in the early years — dangers that were seized upon by rival gas companies seeking to retain their stronghold in the domestic lighting market. Trained electricians were in scarce supply, and no national standard for electric installation existed until the 1920s. *Canadian Electrical News* was critical of the reality facing many families desiring electricity in their home: "at the present moment, the only

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[22] Popular women's magazines and promotional material were filled with articles and advertisements detailing how electric light could be used to decorate one's home. See for example: "Electric Lamps Decorate the Home," *Live Wire*, August 1921, 11; "Ornamental Lights," *Live Wire*, December 1923, 10; "Lighting the Modern Home," *Canadian Homes and Gardens*, April 1927, 46; "What is this Modernist Movement?" *Chatelaine*, March 1928, 6; "The Lamps of a Home," *Chatelaine*, April 1930, 23; "Light and Lighting," *Canadian Homes and Gardens*, January–February 1936, 58.

[23] "Electrical Christmas Tree," *Hydro Bulletin*, December 1917, 20; "Tiny Electric Bulbs," *Live Wire*, January 1921, 13; "Something New for the Christmas Tree," *Chatelaine*, December 1928, 30; "Light Up… Cheer Up!", *Chatelaine*, December 1932, 56; "Light up for a Merry Christmas," *Chatelaine*, December 1938, 55; "Christmas Decorations Without Fear," *Chatelaine*, December 1940, 47;

[24] "The Bulletin Board," *Canadian Homes and Gardens*, December 1938, 17; "Outdoor Christmas Lighting," *Chatelaine*, December 1940, 48.

[25] "The Bulletin Board," *Canadian Homes and Gardens*, December 1938, 17.

qualification that a man must have [to install electricity] is the possession of a screw driver and hammer."[26] *Canadian Architect and Builder* echoed that sentiment when it noted that electric wires were too often "improperly insulated, indiscriminately run, and often stapled to the walls," which increased the risk of fire, shock, or death.[27] Faulty electrical wiring was to blame for the injury suffered by John Young, an eleven-year-old Gravenhurst, Ontario, boy, whose hand had to be amputated after he received a shock from touching a bulb suspended above his bed.[28] Newspapers and magazines were rife with articles condemning improper installations, and many authors criticized the government for not taking adequate steps to protect the public from electrical dangers.[29]

These threats were renewed once electric appliances were introduced into the home. Almost as soon as electric lighting became available, inventors began to conceive of ways household current could be used to power domestic appliances. The high costs associated with installation and monthly dues were prohibitive for many families, but historian Fred Schroeder argues that the real obstacle to increased electric consumption was technological, in the form of permanent wiring. Until 1915, the only method of using a portable electric device was by plugging it into a light socket, which was typically

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[26] *Canadian Electrical News* 11, no. 11 (November 1896): 26.

[27] Luther Stieringer, "Modern Practice in Interior Wiring," *Canadian Architect and Builder* 9, no. 7 (August 1896): 127.

[28] "Young vs. Gravenhurst," *Canadian Electrical News* 20, no. 1 (January 1911): 35.

[29] The *Canadian Electrical News* was particularly critical of a lack in government regulations concerning electrical installations. See for example: "Is Your Wiring Safe?", *Canadian Electrical News* 12, no. 11 (November 1902): 195; "Electric Fires," *Canadian Electrical News* 15, no. 1 (January 1905): 13; "The Electricity Inspection Act," *Canadian Electrical News* 17, no. 3 (March 1907): 68; "An Ounce of Prevention," *Canadian Electrical News* 20, no. 1 (January 1911): 35; and, "Electric Shock Not Immediately Fatal," *Canadian Electrical News* 20, no. 3 (March 1911): 32.

found hanging from a drop-cord in the middle of the ceiling.[30] The socket's inconvenient position did not lend itself to easy use of appliances, nor did having to unscrew the bulb make use of appliances desirable. Extension cords, introduced to the market by 1902, made the sockets more accessible, but Schroeder notes that "the entire system could and did lead to an almost carnival festooning of cords in the home."[31] It also posed a new safety risk because of people indiscriminately plugging appliances into the sockets.

The federal government created a Chief Electrical Inspector position as part of its 1907 Electricity Inspection Act to provide general direction over electric installations across Canada, and several municipalities established positions like "Inspector of Domestic Wiring" and "City Electrician" to supervise domestic electrification initiatives, but in practice, these measures were narrow in scope and lacked regulatory powers.[32] The wall receptacle, introduced in 1915, helped to minimize the hazards associated with long over-hanging wires in the home. By 1917, the two-pronged plug and receptacle model that we are familiar with today became the accepted standard for North American homes (the three-pronged plug and corresponding T-receptacle was introduced in the 1960s).[33] While it did not eliminate electrical dangers — Canadians were warned not to overburden their outlets[34] — it did enable uniformity in plug design, allowed for lamps and

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[30] "Good Home Lighting," *The Live Wire*, August-September 1924, 6.

[31] Fred E.H. Schroeder, "More 'Small Things Forgotten': Domestic Electrical Plugs and Receptacles, 1881-1931," *Technology and Culture* 27, no. 3 (July 1986): 528–33.

[32] City of Calgary Archives, City of Calgary Electric System Fonds, Box: 5, File: 80, "By-Law #873"; City of Calgary Archives, Box: 5, File: 80, City of Calgary Electric System, "By-Law #877."

[33] CMST, Love, Leisure, Laundry Research Material, Box: 9, Binder: "Electricity in the 1920s House."

[34] "Better be Safe than Sorry," *Hydro Bulletin*, March 1918, 66–67; "Don't Overload a Circuit and Cause Fire," *Saturday Night*, 16 April 1919, 16; "Safeguarding the User of Electrical Appliances," *Hydro Bulletin*, May-June 1921, 118–20; "Ten Don'ts in Using Electric Equipment," *Hydro Bulletin*, January 1923, 23; "Electrical Accidents in Homes," *Hydro Bulletin*, January 1924, 1.

appliances to be used simultaneously, and made it easier for consumers to hide unsightly cords.

Standardization of technical design was further encouraged through the Red Seal Program, a North American effort to establish a minimum wiring standard in domestic environments. As part of the program, a national electric code was created, and electrical manufacturers agreed on standards for their products.[35] Newly constructed homes that achieved the Red Seal standard meant that adequate wiring was provided for larger appliances like electric ranges and water heaters, as well as a sufficient number of "convenience" outlets and switches.[36] By 1930, roughly one million Red Seal homes were built in Toronto, Winnipeg, and Vancouver combined, compared with only 28,000 in the United States.[37] Wiring standards proved to be a boon for electric utility companies, which relied on the program as a vehicle to promote domestic electricity. The *Canadian Electrical News* reported that Red Seal homes were electrified at a rate three times higher than non-Red Seal homes; "the average Red Seal house has $650 worth of electrical appliances, compared with $260 for the average non-Red Seal."[38] In Ontario, groupings of Red Seal homes were advertised as "Red Seal Communities," and model

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[35] "Red Seal Homes in Vancouver," *B.C. Electric Employees Magazine* 11, no. 11 (February 1929): 5.

[36] "Every New House is Wired for Hydro Now," *Live Wire*, March 1922, 7; "The New Standard of Electric Wiring," *Canadian Homes and Gardens*, July 1927, 22.

[37] "Promotional Work by the Electric Service Leagues," *Canadian Electrical News* 39, no. 13 (1 July 1930): 37.

[38] "Big Dividends Paid by Electric Service Leagues," *Canadian Electrical News* 31, no. 3 (1 February 1930): 82; "Manitoba Electrical Association Reports Added Business," *Canadian Electrical News* 32, no. 6 (15 March 1931): 51.

homes showcased the myriad ways electric goods could be incorporated into household regimes.[39]

The "electric home" was a novel marketing ploy embraced by electric utilities. BCER revealed its first fully-furnished, fully-wired house designed specifically to showcase the "wonders" of domestic electricity to potential customers on 11 October 1922. Located just west of Granville Street in Vancouver, the all-electric building was equipped with 197 outlets, which supplied power to electric appliances located throughout the home. To encourage female attendance, BCER paired up with women's organizations to lead the opening ceremonies. In a speech intended to inspire, W.J. White, president of the Local Council of Women, declared to the crowd that "the women of the country owed a great deal to the inventors of labour-saving appliances," before officially opening the doors. Over 10,000 visitors travelled through the home over the ten days that it was open, making their way through thirteen stations, each guarded by an attendant who explained the workings of the electrical equipment.[40]

Nearly forty years after Edison introduced his incandescent lamp, Canadians were being encouraged to "do it electrically."[41] Canadian women, especially, were targeted as ideal recipients for electrical appliances, with journalists, politicians, and advertisers billing electricity as the panacea to the problems of "woman's work." Mary Agnes

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[39] CMST, Love Leisure Laundry Research Material, Box: 9, Binder: "Electricity in the 1920s House."

[40] "Vancouver's Electrical Home," *BC Electric Employees Magazine* 5, no. 5 (August 1922): 13; "Thousands Visit First Electrical Home," *BC Electric Employees Magazine* 5, no. 8 (November 1922): 17; Tothill, "Living Electrically," 71.

[41] "Do it Electrically," *Canadian Electrical News* 24, no. 19 (1 October 1915): 70; *Canadian Electrical News* 30, no. 4 (15 February 1921): 49; "Electrify Every Room in Your New Home," *Live Wire*, April 1921, 10–12; "Hamilton Electrical Development League Starts a 'Do it Electrically Campaign,'" *Canadian Electrical News* 30, no. 22 (21 November 1921): 35.

Pease's 1931 article in *Chatelaine* provides a typical example in its language and style. She claimed that "King Electricity" was "the moving spirit" behind modern kitchens and that "without fuss or fatigue it does the work of several people speedily and perfectly."[42] She observed that:

> Every woman wants to eliminate drudgery in her house, and the age of invention in which we live has made this possible of realization without undue expense. The scientific use of space and the resultant conservation of human energy solve many housekeeping problems. The housewife of today who realizes that time is too valuable to be wasted, can lighten her daily tasks and speed up the whole performance of her routine by installing contrivances which will make her workshop efficient and also colourful and gay.[43]

Thanks in part to technical standardization and lower power rates, electric appliances were increasingly more accessible to Canadian families after the First World War, but the process of domestic electrification remained slow and uncertain.

[42] Pease, "New Magic," 32.

[43] Pease, "New Magic," 79.

Figure 7: Hydro Quebec built its version of a model home, "La Maison Electrique," in Montreal. This photograph of the all-electric kitchen was taken September 1923 and was typical of the types of appliances and kitchen layout visitors of electric homes would see.[44]

[44] Hydro Quebec Archives, Quebec Power Fonds, Box: 10075 (468), File: F19/701209 #11, "La Maison Electrique."

II

Prior to mechanization, the majority of housework was driven by muscle-power. The kitchen was no exception, where the process of cooking was practically a full-time job. Housewives often had help in the form of daughters, extended family members, and domestic servants who aided in the daily preparation of food. An oral history project orchestrated by the Museum of Civilization in Ottawa, in cooperation with the British Columbia Provincial Museum and the Provincial Archives of British Columbia, lends insight into how women and girls completed their kitchen duties. Between 1983 and 1984, sixty-five women were interviewed to provide reflections on growing up in Victoria from 1900 to 1930. The interviews were recorded and stored at the Provincial Archives of British Columbia. The women were asked questions about the layout of their homes, the types of technologies that they frequently used, what role domestic science played in their lives, and how they viewed their experience as housewives as compared to the experiences of their mothers and grandmothers. These interviews provide valuable anecdotal evidence about the everyday lives of Canadian women during a period of immense technological change.

The act of cooking proved an evolutionary process in connection with changes in technology. At the turn of the twentieth century, food was likely prepared on a wood and coal burning stove, which required much maintenance by the user. Wood had to be chopped and coal kept well-stocked; men and male children would often take over the

back-breaking task of chopping wood or shovelling coal to keep the fires burning.[45] Some families benefited from wood and coal delivery, although the task of sorting through those items was still labour-intensive. Lillian Marshall, born and raised in British Columbia, reflected on the role she and her siblings played in the food preparation process:

> It was always a major chore bringing in the wood. This is where we children always helped. The wood, of course, was dumped in front of the house just off the truck and it had to be carried in by armloads and brought downstairs and stacked […] My brother's main chore was to keep the woodbox full in the kitchen, otherwise, as far as the girls were concerned, they were expected to do the dishes and set the table, and things like that.[46]

She also recalled that the stove "was the central part of the kitchen."[47] This sentiment was echoed by Norah Collier and Frances Campion, who pointed to the dual role played by the stove: first, in feeding the family; and second, in keeping family members warm.[48] Campion recalled that it "could always keep things warm because the stove just kept on going."[49] The kitchen provided a social value that was reminiscent of pioneer houses where the hearth formed the heart of the home. The coal and wood stove was significantly smaller than the large open fireplace of the eighteenth century, but similar to

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[45] BCPA, "Behind the Kitchen Door Oral History Project," File: 4088:0009, interview with Phyllis Eltringham; BCPA, "Behind the Kitchen Door Oral History Project," File: 4088:0011, interview with Lauretta Holdbridge.

[46] BCPA, "Behind the Kitchen Door Oral History Project," File: 4088:0015, interview with Lillian Marshall.

[47] BCPA, "Behind the Kitchen Door Oral History Project," File: 4088:0015, interview with Lillian Marshall.

[48] BCPA, "Behind the Kitchen Door Oral History Project," File: 4612:0019, interview with Norah Collier; BC Provincial Archives, "Behind the Kitchen Door Oral History Project," File: 4088:0029, interview with Frances Campion.

[49] BCPA, "Behind the Kitchen Door Oral History Project," File: 4088:0029, interview with Frances Campion.

the hearth, women could tend to several fires within the stove at the same time. This allowed for greater versatility in preparing different kinds of food that required varied amounts of heat.

Gas ranges, usually constructed from steel or cast-iron, became increasingly more standard by the 1920s. They were introduced in the mid-nineteenth century in England, and made their way to Canada shortly thereafter. When introduced, the gas range may not have made the task of cooking any easier than its predecessors. Genvière Leslie writes that these early stoves "were awkward and dirty, and left a residue of ashes which had to be cleaned away."[50] However, the gas range continued to evolve throughout the interwar years into the more efficient and streamlined design that we are familiar with today and it proved a formidable opponent to the widely advertised electric range. The Windsor Hotel in Ottawa, Ontario, became the first in the world to prepare an electrically cooked dinner when Thomas Ahearn hosted guests there in 1892 to celebrate his advances with Ottawa's electric streetcar system.[51] Manufacturers spent the following two decades experimenting with electric cooking technologies. Advertisers and journalists praised the electric range for its simplicity in design and for making "cooking an exact science from which chance has been practically eliminated."[52] Despite these claims, the reality was that for many of the interwar years gas stoves were technologically superior to electric ranges, which tended to suffer from inefficient power supply.[53] One significant effect of

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[50] Genvière Leslie, "Domestic Service in Canada, 1880-1920," *Women at Work: Ontario, 1850-1930*, ed. Janice Action, 77 (Toronto: Canadian Women's Educational Press, 1974).

[51] Robert Haig, *Ottawa: City of the Big Ears* (Ottawa: Haig and Haig Publishing, 1975).

[52] "Electric Cooking in Western Provinces," *Canadian Electrical News* 24, no. 15 (1 August 1915): 28.

[53] Cowan, *More Work for Mother*, 94.

gas and electric ranges was their role in the separation of heating from cooking. The electric range especially lacked the warming capabilities supplied by the wood and coal range. This meant that families now had to search for alternative methods of heating their homes.

Aside from the changes in the physical cooking mechanisms, the process of cooking food in the early twentieth century was still quite similar to that of the nineteenth century. Recipes and food preparatory techniques were passed on from generation to generation. Families shopped for fresh fruit and meat regularly, if not daily; long-term storage of perishable foods was impossible until mechanical refrigeration was introduced to Canadian homes in the late 1920s. Most households made do with various forms of short-term preservation. Rural families could often benefit from constructing root cellars, which allowed for consistently cool food storage.[54] But the nature of urban living did not allow for such designs, thus making rural solutions untenable. Instead, in the 1860s, a domestic version of the ice-box began to evolve from commercial cooling facilities. The cabinet was easy to maintain. A block or chunk of ice was placed into a box that housed two compartments: one for the food and one for the ice. The box itself was insulated with sawdust. As the ice melted, cool air would circulate near the bottom, chilling foods stored below or next to the ice. The bottom of the device held a tray that gathered the melted ice water.[55] Anecdotal evidence suggests that the maintenance of the ice-box typically fell on

[54] CMST, Franz Klingender, "Contextual and Material History Research: Ontario Hydro Domestic Appliance Collection," unpublished report, 1993.

[55] CMST, Franz Klingender, "Contextual and Material History Research: Ontario Hydro Domestic Appliance Collection," unpublished report, 1993.

the husband's or male son's shoulders. Monda Hundleby recalls her father purchasing a fifty-pound block of ice twice a week; "in the real hot weather, he'd get it three times."[56]

Food had to be prepared from scratch. Cooking followed the rhythm of the seasons, and choice was often limited to locally grown meats and vegetables. Many families canned or preserved summer produce to enjoy over the bleak winter months. The effects of industrialization were soon felt in the realm of food production when new methods of preserving and preparing foods, combined with innovations in agriculture, allowed for the introduction of precooked and packaged foods.[57] The Canadian diet began to change, and with the incorporation of the gas or electric range and mechanical refrigeration into their daily routines, the nature of work in the kitchen began to change as well. Ruth Schwartz Cowan has labelled the trend of increased mechanization that took place after 1920 as the "industrial revolution in the home."[58] The same market forces that defined industry — standardization of work, technological mastery over the environment, efficiency — were seen at play on a smaller scale in Canadian households. Many of the processes of home care were now taking place outside the home; in other words, the home evolved from an area of production to an area of consumption. That is not to suggest that housework was no longer productive; rather, we ought to challenge traditional definitions of "productivity". As Canadian society became more focused on production (thus lending greater credibility to "paid" versus "unpaid" labour), domestic

[56] BCPA, "Behind the Kitchen Door Oral History Project," File: 4612:0015, interview with Monda Handleby.

[57] Strasser, *Never Done*, 29.

[58] Ruth Schwartz Cowan, "The industrial revolution in the home," in *The Social Shaping of Technology*, eds. Donald MacKenzie and Judy Wajcman, 181–201 (Milton Keynes: Open University Press, 1985).

work became undervalued for not "producing" anything.[59] A glaring representation of this distinction is in the "occupation" section of the 1921 Canadian census: "in the case of a woman doing housework in her own home, without salary or wages, and having no other employment, entry is 'none'."[60] Industrialization is often linked with work *outside* the home; thus, since housewives were not considered "gainfully employed," historians have glossed over the industrial changes taking place *within* the home, especially the kitchen.[61]

The kitchen, a high-traffic area in the early twentieth century, provides an interesting case study of technological change, especially in urban areas. In retrospect, many could have doubled as museums of technological evolution. It would not have been unusual for visitors to encounter a healthy mix of old and new: electric lighting, a gas range, a coal-fired stove, a wooden icebox. These inconsistencies were attacked by advertisers after the First World War, who promoted electricity "with an almost missionary zeal."[62] To be successful, electrical manufacturers had to create a new standard of housework by selling their goods as superior to traditional technologies, while at the same time recognizing a woman's authority in the kitchen as knowing what was best for herself and her family. That the home was the prerogative of women was a widely accepted principle by the turn of the century. Industrialization helped to legitimize

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[59] Leslie, "Domestic Service in Canada," 73.

[60] Dominion Bureau of Statistics, *Sixth Census of Canada, 1921*, vol. 1, *Population* (Ottawa: F.A. Acland, 1934), x.

[61] A notable exception is Cowan's work, *More Work for Mother*. See also Commachio, *Infinite Bonds of Family*, 37.

[62] CMST, Frank Klingender, "To Lighten the Burden of Womenkind: The Mechanization of Domestic Equipment, 1890-1960," Unpublished Historical Assessment, Fall 1994, 2.

the doctrine of "separate spheres", where men sought paid employment outside the home, and women remained within.[63]

The division of "work space" and "home" occurred gradually in the nineteenth century and became solidified in the twentieth. The societal expectations for men and women became polarized: men were subject to the breadwinner ideal, and their identities were tangled up in the paid labour performed outside the home; women, on the other hand, were identified with the home and their expected role as family caregivers. In her social history of the family in Canada, Cynthia Commachio argues that although the concept of separate spheres was often steeped in religious justifications — "their separate but complementary roles were supposedly designated by God and nature" — the ideology was in fact a construct of an emerging middle class trying to establish an identity distinct from the "'decadent' upper classes [and] from the 'great unwashed' below."[64] Home, and an adherence to "proper" gender roles, represented morality; any deviation from that norm was seen as unsavoury.[65] This construct was not lost on advertisers, who marketed electric appliances to reflect this attitude.

A 1927 advertisement for Moffat's Electric Range exemplifies how manufacturers situated their technologies in this sex-segregated world. The ad features a smiling woman cooking on a stove, below a caption that boasts "designed and perfected

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[63] There exists a well developed body of studies on the idea of "separate spheres" for men and women. See, for example, Ava Baron, ed., *Work Engendered: Toward a New History of American Labor* (Ithica, New York: Cornell University Press, 1991); Cynthia Commachio, *The Infinite Bonds of Family: Domesticity in Canada, 1850–1940* (Toronto: University of Toronto Press, 1999), 20; Ruth Schwartz Cowan, *More Work for Mother: The Ironies of Household Technology from the Open Hearth to the Microwave* (New York: Basic Book Publishers, 1983), 18–38; Joy Parr, *The Gender of Breadwinners: Women, Men, and Change in Two Industrial Towns, 1880–1950* (Toronto: University of Toronto Press, 1990).

[64] Comacchio, *Infinite Bonds of Family*, 20.

[65] Comacchio, *Infinite Bonds of Family*, 20.

by men."[66] Westinghouse took a similar approach in an effort to promote an electrical lifestyle: "to press a button or turn a switch that sets your electric servants to work requires no electrical knowledge," the advertisement proclaimed. "Because your Westinghouse appliances are engineered so thoroughly and built so dependably by men who know electricity so well, there remains nothing for you to do but enjoy them."[67] These ads point to a specific historical context when women's role as passive consumer was being encouraged in Canadian society, while at the same time reinforcing the idea that men were active producers of technology. Examined in combination with other advertisements from this period, they also reflect a trend toward articulating this consumerist ideal for women within the framework of scientific management — workers would become more efficient and content in their work through the use of labour-saving tools and techniques. The fragmentation of factory work into task-specific and time-managed routines helped make Frederick Winslow Taylor a household name in North America by the 1920s, and home economists took the spirit of scientific management, or "Taylorism", and infused it into their teachings of domestic science.

Female students at the MacDonald Institute in Guelph, Ontario, for example, were taught to apply a rational basis to household tasks, often with the use of gas or electric appliances. Pupils could take a variety of courses — Practical Cookery, Economics of the Household, Kitchen Planning, Household Physics, and Written Laundry — designed not only to teach them to scientifically approach housework, but also to reinforce woman's duty as housewife. The school offered a one-year homemaker course and was quickly

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[66] "To Everyone Who Appreciates Good Cooking," *Canadian Homes and Gardens*, April 1927, 58.

[67] "How much do you have to know about electricity to do this…," *Chatelaine*, 1 November 1946, 71.

dubbed the "Diamond Ring Course" for its obvious goal of preparing young girls for marriage.[68] Exams from the Institute provide insight into the school's pedagogical goals, while also calling into question the scientific merit of its home economics courses. For example, students enrolled in Practical Cookery in 1914 were examined on their ability to brew and serve two cups of filtered coffee properly.[69] Students writing exams in 1928 for Economics of the Household and Written Laundry were asked to "explain the essentials of how to make a satisfactory shopping list" and to "list the equipment you could have in the home laundry for stain removal."[70] Questions for a 1939 Household Physics exam may have proven a bit more challenging:

1. What do the Hydro Electric Power Commission guarantee customers as regards to supplying them from the Hydro-Electric Lines throughout Ontario? (B). What is meant by 'flat rate' for the heating of water by electricity? (C) What are the advantages of the booster?

2. Define — electron, proton, kWh, switch, ampere hour, battery, ampere, coulomb.[71]

Perhaps the most scientific for its resemblance of Taylor-inspired scientific management was Kitchen Planning. In a 1930 exam, students were asked to explain "the function of the modern kitchen" and to "discuss what is meant by the 'preparation route'?"[72] In a 1932 exam, students were given a drawing of a kitchen plan and were ordered to "draw

[68] UGMAC, Box: Historical Sketches, File:"Photocopies of documents relating to establishment, 1902–04," undated news clipping.

[69] UGMAC, RE1 MAC A0004, M.I. Director, Examination Papers, Box: 1, "Practical Cookery," 1914.

[70] UGMAC, RE1 MAC A0004, M.I. Director, Examination Papers, Box: 3, "Economics of the Household," 1928 –9.

[71] UGMAC, RE1 MAC A0004, M.I. Director, Examination Papers, Box: 1, "Household Physics," 1939.

[72] UGMAC, RE1 MAC A0004, M.I. Director, Examination Papers, Box: 1, "Kitchen Planning," 1930.

necessary equipment" and pin their sketches into desired areas to make the most efficient use of the space.[73]

Kitchen planning was also the most popularized domestic science ideal in the media. Magazines were riddled with articles that described the most efficient way to design kitchen space, often with the incorporation of the most up-to-date appliances. The goal of a well-planned kitchen was to streamline food preparation and clean-up by eliminating unnecessary steps. This led to authors advocating smaller kitchens to reduce foot traffic, with a rectangular or classic U-shape kitchen being the ideal. The latter "allow[ed] two long walls, one for the preparation of the food, the other for the clearing process."[74] Appliances were to be "placed so that work may progress from one step to the next without loss of time and effort."[75] Many writers argued that a proper work sequence would go "far toward removing much of the drudgery of kitchen work."[76] Richard A. Fisher, an architect writing for *Canadian Homes and Gardens*, criticized the "walking marathons [of] Grandmother's kitchens" and argued instead for careful planning to cut down the number of unnecessary steps.[77] Evan Perry, a long-time contributor for the same magazine, defined use-sequence in "modern" kitchens as: "(a) receiving supplies; (b) storing supplies in cabinets or refrigerators; (c) preparing and mixing foods; (d) cooking; (e) serving; (f) cleaning up, and; (g) restoring dishes and foods."[78]

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[73] UGMAC, RE1 MAC A0004, M.I. Director, Examination Papers, Box: 4, "Kitchen Planning," 1932.

[74] "The Planned Kitchen," *Canadian Homes and Gardens*, October–November 1934, 45.

[75] "The Planned Kitchen," 45.

[76] Richard A. Fisher, "Miracle in the Kitchen," *Canadian Homes and Gardens*, April 1938, 35.

[77] Fisher, "Miracle in the Kitchen," 35.

[78] "New Materials, New Methods," *Canadian Homes and Gardens*, January–February 1936, 38.

By the mid-1930s, property owners were encouraged to renovate their dwellings with the National Employment Commission's (NEC) job creation scheme, the Home Improvement Plan (HIP). Women in particular were targeted as ideal beneficiaries of the HIP for improvements to their domestic work environments. Although portable appliances were ineligible for funding, recipients could be awarded between 1,000 to 2,000 dollars (and eventually 3,000 dollars) for renovations such as painting, enlarging rooms, installing kitchen counters and enlarging cupboard space.[79] Margaret Hobbs and Ruth Roach Pierson note that as part of its strategy, the government encouraged housewives to pursue renovations in line with the latest in kitchen planning: "work stations were to have their own drawers and cupboard space for utensils and dishes in compliance with the scientific axiom that 'each tool should be located near the work process of which it forms a part'."[80]

"Modernize!" *Chatelaine* urged its readers in 1936. It was, the magazine claimed, "the theme of the nation since the government made it possible."[81] Indeed, the goal was modernity, and "'modernization' became the synonym for home improvement" during the 1930s.[82] Although intended for the "average home owner," Hobbs and Pierson maintain that the HIP loans would barely have been able to cover the costs of the intended renovations. In the end, the program may have been "beyond the budget of ordinary Canadians," however it did provide evidence of increased state interference into

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[79] Margaret Hobbs and Ruth Roach Pierson, "'A kitchen that wastes no steps…': Gender, Class, and the Home Improvement Plan, 1936–40," *Social History* 21, no. 41 (1988): 10.

[80] Hobbs, "A kitchen," 29.

[81] "Modernize!" *Chatelaine*, December 1936, 71.

[82] Hobbs, "A kitchen," 21.

the nation's private lives. The premise of the HIP was to provide much-needed work during the Great Depression, but by reaching out to "women only in their capacity as dependent home workers," the government encouraged the further segregation of women into the private sphere.[83] It also defined women as the consumers of household technology, and the home as a female technical domain.

The latter message was embraced by utility companies and electrical manufacturers throughout the interwar years. They sold that message mostly through print advertising, a medium that matured into an industry in the decades following the First World War. Advertisements are a helpful source for tracking the technical evolution of domestic electric goods and for gauging potential uses for those products. They are less helpful for understanding public perception of these appliances, but a close evaluation of their content does suggest a level of desire among Canadian women to ease the burden of housework. The advertisements examined in this chapter come primarily from *Canadian Homes and Gardens* and *Chatelaine*, the two leading women's magazines in Canada, and were often paired with articles praising the virtues of efficiency and modernity. By situating their technologies and the women who used them within the larger social structure of scientific management, they formed what Roland Marchand calls a "social tableaux."[84] In his seminal work *Advertising the American Dream*, Marchand maintains that these types of ads did not reflect society as much as they reflected a popular desire within that society; in his words, they were more about "social

[83] Hobbs, "A kitchen," 10.

[84] Roland Marchand, *Advertising the American Dream: Making Way for Modernity, 1920–1940* (Berkeley: University of California Press, 1985), 165.

fantasy than social reality."[85] The repetition of the goal for domestic efficiency through text and image helped to "define the boundaries of public discussion" regarding housework. [86] Scientific management laid the groundwork on which advertisers situated electric technologies because women were already well conditioned to embrace objects that fostered domestic efficiency.

Advertisements for electric appliances frequently depicted the "modern housewife" as a woman who incorporated the most up-to-date technologies in her housework regime. A 1933 ad for Moffats Electric Range declared that "modern science has combined with industry to banish household drudgery, and add so much to comfort and convenience, that only when these aids to efficiency are utilized can a beautiful new home be called modern."[87] Westinghouse took out a two-page advertisement in *Canadian Homes and Gardens* in 1935, which featured a streamlined kitchen under the heading, "Like a glimpse into the modern home of tomorrow." Westinghouse's home of the future was described in the lexicon particular to its day: "this kitchen, as beautiful as it is, is primarily the 'workshop' of the modern home […] designed for efficiency, for the saving of steps and for freedom from the toil that once accompanied household tasks."[88] A 1937 ad for a General Electric Range maintained that "with a General Electric automatic range you only have to put the food into the oven, set one or two dials — and you're free to go out for the rest of the day. The oven will turn itself on, maintain correct temperature and

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[85] Marchand, *Advertising the American Dream*, 165.

[86] Marchand, *Advertising the American Dream*, xx.

[87] "A Moffat completes the modern home," *Canadian Homes and Gardens*, December 1933, 3.

[88] "Like a glimpse into the modern home of tomorrow," *Canadian Homes and Gardens*, June–July 1935, 2–3.

turn itself off when the food is cooked." A reading of these advertisements suggests that modernity was equated with technological proficiency. A household without advanced equipment, therefore, was not only antiquated, it could even be conceived of as "backward."

Moffat's took the notion that "modern homes are judged by their electrical equipment"[89] one step further by suggesting that modern *women* would be judged by their electrical equipment. "The woman who is ultra modern in spirit should be fascinated always by the new," the 1935 ad reads. "She will best express her type in the newest style notes. She will sense future trends, anticipate fashion and set her friends an example of smart modernity."[90] The advertisement features a sharply dressed woman chatting with friends in front of her shiny new Moffats electric range. Another Moffats advertisement declares that "every woman wants to adorn her kitchen with a beautiful as well as a useful piece of equipment."[91] Advertisements such as this one suggest that appliances were as much about form as they were about function. By promoting their products in this light, manufacturers were telling women that the kitchen need not be strictly utilitarian; it should also be beautiful as well. Electric appliances were elevated to status symbols. Frigidaire exemplified that ideal in a full-page 1931 advertisement, which featured a woman taking pleasure in the kind of "refrigerator that will make the Woman Next Door take notice."[92] The refrigerator was particularly well-suited for what

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[89] "Modernize and economize," *Chatelaine*, May 1932, 80.

[90] "Beauty that dares to be new," *Chatelaine*, June 1935, 5.

[91] *Canadian Homes and Gardens*, March 1927, 115.

[92] "Strikingly beautiful in sparkling porcelain," *Chatelaine*, May 1931, 91.

Marchand calls "technological idolatry" for its role in safeguarding a family's health through food preservation.[93]

Magazine writers and advertisers highlighted several benefits for the woman with an electrically-stocked kitchen. Foremost was the notion that electric appliances would afford housewives more time to pursue leisurely activities outside the home.[94] *Canadian Homes and Gardens* suggested that with "the magic of electricity," the modern woman "leaves the dishes in a machine, pops the dinner into an oven, [...] and jumps into a roadster with never a thought except for the [...] round of golf which she is away to enjoy for an afternoon!"[95] Articles and advertisers created an idyllic world for a housewife to dream about — one where she could control her time, and by extension, her life. But instead of evading gender roles, electric appliances entrenched them; while electrification would create a new kind of housewife, she would also be a busier one.[96]

With electric appliances, there was no need for domestic help; in fact, advertisements forecast that the domestic servant would be replaced with the electric servant. A 1920 BCER ad reads that "the push button servant replaces the maid." It

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[93] Marchand, *Advertising the American Dream*, 270–74; see also City of Calgary Electric System Fonds, Box: 12, Series: II, File: Public Relations: Newspaper Ads, "The health of your family will be protected in an electric refrigerator," n.d; "Make the Most of Your Refrigerator," *Chatelaine*, August 1931, 22; "The Mechanical Refrigerator," *Chatelaine*, June 1932, 25; "Your Electric Refrigerator," *Chatelaine*, July 1932, 22.

[94] Cowan, *More Work for Mother*, 63 –8. See also "Exit the Drudge. Enter the Fairy Beautiful," *Chatelaine*, April 1928, 37; "The Electric Mixer," *Chatelaine*, January 1932, 22; "The banishment of drudgery and uncertainty," *Chatelaine*, May 1934, 69; "Better living...and money ahead!," *Canadian Homes and Gardens*, March 1938, 43; "It's a great life...free from household cares!" *Chatelaine*, May 1939, 4; "General Electric appliances give you more time," *Chatelaine*, July 1940, 36.

[95] "Next Month with Canadian Homes and Gardens," *Canadian Homes and Gardens*, May 1927, 13.

[96] "Cooking is a science in this model kitchen," *Canadian Homes and Gardens*, June 1927, 4; "Electricity de Luxe," *Canadian Homes and Gardens*, July 1927, 38; "Singing in the Kitchen," *Chatelaine*, March 1928, 53; "Choose modern gifts," *Chatelaine*, June 1931, 78; "Putting the presents to work," *Chatelaine*, January 1932, 22; "Work becomes play in the General Electric kitchen," *Chatelaine*, April 1936, 3; "Why Moffat gives you everything you want," *Chatelaine*, April 1936, 79.

continues that "maids are hard to get […] women everywhere are doing their own housework, thousands of them with the help of electrical appliances."[97] In the 1920s, General Electric introduced its Hotpoint line of electric appliances under the tagline: "Servants for the Home." The idea of the electric servant was the very embodiment of the domestic science message that housework could evolve into a precision craft with the aid of task-specific tools.[98] The use of the word "servant" was quite deliberate, given that prior to the First World War "the general maid-of-all-work" was a highly sought after employee among Canadian households. The rate of domestic service declined in proportion to the increase in urban living: "in 1891 domestics accounted for forty-one percent of the female work force, and were by far the largest single group of workers; by 1921, domestics represented only eighteen percent of all employed women." [99] Other factors besides urbanization led to the decline of domestic service, including its low social status, its long hours of work combined with a lack of freedom, and the availability of other forms of work after the First World War.

Thus, whereas the women of the late nineteenth and early twentieth century would have benefited from a pool of domestic servants, urban housewives after 1920 faced a shortage of helpers. Leslie notes that "when the domestic servant left the home, she left the housewife behind to operate her new household gadgets alone."[100] Electrical manufacturers and utility companies were quick to capitalize on the shortage of domestic servants by advertising their technologies in the scientific language of household

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[97] "The Push Button Servant Replaces the Maid," *Western Women's Weekly* 3, no. 17 (3 April 1920): 8.

[98] "Evolution of Electrical Appliances," *Live Wire*, May 1919, 6–8.

[99] Leslie, "Domestic Service," 73–75.

[100] Leslie, "Domestic Service, 115.

management. These were timely advertising campaigns: at the same time that these appliances were being pitched to women as desirable labour-saving tools, urban housewives across the country were engaged in more daily tasks than those experienced by their mothers and grandmothers, and they probably would have been attracted to the labour-saving promises of electric technologies.[101] In efforts to increase domestic power consumption, provincial and municipal utility companies launched numerous advertising schemes, with many aimed at housewives.

Chief among these were the building of showrooms, usually located in urban centres, to display the most up-to-date electric gadgetry (see figure 8). The BCER was quick to recognize the value of providing customers with access to portable appliances: "bearing in mind that our business is in the supplying of electricity, it is obvious that any means we employ to further the sale of this commodity is of benefit not only to the company, but to everyone in its employ."[102] Utility companies adopted several tactics to increase foot traffic through their stores. The BCER mailed invitations to local housewives, encouraging them to peruse the store's collection of electric appliances, while the City Electric Light Department in Edmonton attached a showroom to the office where customers ordinarily paid their electric light bills.[103] Those interested in purchasing a new appliance could pay in instalments by having the cost of the item added to their

[101] Ruth Schwartz Cowan, "The Industrial Revolution in the Home: Household Technology and Social Change in the Twentieth Century," *Technology and Culture* 17, no. 1 (January 1976): 10.

[102] W. E. Dawson, "Why a Showroom?," *British Columbia Electric Employees Magazine* 6, no. 4 (July 1923): 4.

[103] BCPA, BCER Fonds, Vol. 321, File: 6/26, "Letter Inserts," December 1916; "Electric Appliance Business in Edmonton," *Canadian Electrical and Engineering News* 26, no. 19 (October 1917): 60.

monthly bills, which proved lucrative for the Alberta company.[104] In Amherst, Nova Scotia, meanwhile, local church groups and patriotic organizations were invited to use the Canada Electric Company's showroom and its electric appliances to hold luncheons and afternoon teas.[105] There were no direct selling initiatives during these events; the company's goal was simply to expose community members to its range of electrical tools.

The BCER was particularly fond of using contests as a method of bringing women and families into their showrooms. In 1924, it sponsored a doll-naming contest for girls under twelve, which brought over 200 families through the store. The company invited the girls (along with their parents) to the showroom to guess the name of a doll; the girl who came closest to guessing the correct name won the toy.[106] The following year, the showroom introduced a series of "Oldest Appliance Contests"; it named a particular appliance (in 1926, for example, it was a stove) and challenged housewives to admit possessing the oldest version of that technology. The customer with the oldest model won the most up-to-date version, and the company benefited from a source base

[104] "Electric Appliance Business," *Canadian Electrical and Engineering News* 26, no. 19 (October 1917): 60.

[105] "Canada Electric Company's Close Customer Contact," *Canadian Electrical News and Engineering* 42, no. 12 (15 June 1933): 65.

[106] Tothill, "Living Electrically," 61.

Figure 8: This electric showroom was a display for the Quebec Power Company, 1928. Visible in the picture are electric lamps and ranges.[107]

[107] HQA, Quebec Power Fonds, Box: 10075, (468), File: F19/701209#12, "Quebec Power Company Showroom, 1928."

of prospective customers for new machines.[108]

In an effort to appeal directly to housewives, many utility companies hired women trained in domestic science to work in their showrooms as part of "Home Institutes." While men were generally employed as salespeople, home economists taught female customers the basics in electrical gadgetry, providing advice on how to incorporate electric appliances into daily housekeeping routines. "Electricity is very new to women," wrote Margaret A. Stewart, a home economics specialist from Toronto. "They have not become by habit, as men have in industry, adjustable to change […]. They need to observe appliances in use and be given an opportunity to actually operate electrical devices and appliances for themselves."[109] Working from that assumption, home institutes were designed to make women "electricity conscious" in their attitude toward adopting new tools into their workshops.[110] One method of raising this consciousness was through the use of cooking schools, taught in the showrooms, at central locations, or at city fairs and exhibitions.[111] Attendees would watch as home economists prepared food on electric ranges and learn how electric refrigeration could be put to daily use.[112]

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[108] Tothill, "Living Electrically," 62.

[109] Margaret A. Stewart, "The WHAT, HOW, and WHY of a HOME INSTITUTE in a City Electric System," *Canadian Electrical News* 40, no. 16 (1 September 1931): 43.

[110] Stewart, "The WHAT, HOW, and WHY," 44.

[111] "Calgary Power Company Holds Successful Electrical Exhibition," *Canadian Electrical News* 32, no. 10 (15 May 1931): 52; "Get New Ideas!", *The Drumheller Mail*, 24 April 1930, 4; BC Provincial Archives, Volume: 311, File: 4/24, "Made in Victoria Fair," Letter from Edmund Walker to S.J. Halls, 13 April 1916.

[112] "Refrigeration and Cooking School," *The Drumheller Mail*, 21 May 1931, 4; BC Provincial Archives, Volume: 371, "Electric Cooking School," Letter to S.J. Halle from ?, 19 May 1926; BC Provincial Archives, Volume: 405,"Memo from M.C. Trueman to Staff," 15 March 1930; BC Provincial Archives, Volume: 405, "Letter to Manager to W.C. Brown," 1 March 1930.

It is difficult to determine what effect, if any, these initiatives had on the purchasing decisions of Canadian women and their families. From the records that are available, we know that these types of demonstrations were consistently well attended throughout the interwar years, which suggests that even if people did not own electric appliances, they were at least curious about them.[113] This curiosity may be attributed to the advertising power of Canadian utility companies, which when combined with that of electrical manufacturers such as General Electric, Moffats, and Westinghouse, left little wiggle room for electricity's main rival: gas. Gas as a fuel source for heat and light had been available to Canadians since the mid-nineteenth century, and by the 1920s, gas products were common fixtures in Canadian homes. But gas companies faced heavy competition from the latter groups that aggressively promoted their goods and services through print and radio advertising, door-to-door selling, parades, essay contests, travelling shows, electric homes, and fairs.

The relative success of the Canadian electrical industry's advertising power can be partly discerned through an examination of available statistics. While these numbers and percentages cannot paint a complete picture of domestic electrification, they do reflect some purchasing trends of Canadian families. For example, in 1932, the *Electrical Retailer and Contractor* published a special feature on the Canadian electrical merchandising field, which included a chart that listed the domestic appliances in Canadian homes by the end of 1931. The journal determined that out of 1,484,209 homes

[113] The BCER was particularly good at keeping records of attendance. To cite two representative examples: BCPA, BCER Fonds, Vol. 311, File: 4/24, letter from S.J. Halls to Edmund Walker, 13 April 1916 regarding "Made in Victoria" fair, which describes over 7,000 people in attendance. See also BCPA, BCER Fonds, Vol. 372, File: 15/22, letter from a "Sales Engineer" to S.J. Halls, 19 May 1926, which details that during a four-day electric cooking school over 10,000 people were in attendance. The letter writer declares that to "capitalize upon the interest shown" the Light and Power Sales Department were going to put on another school the following month.

wired for electrical goods, only 109,342 (or 7.4 percent) had an electric refrigerator.[114] In comparison, 1,398,735 homes (or 94 percent) of wired homes had an electric iron. As the — albeit incomplete — numbers from figure 9 suggest, by 1931, Canadian families who had their homes electrically wired had not yet fully integrated electric appliances into their kitchens, and were more likely to purchase smaller goods (such as the iron, toaster, or radio) than they were bigger items, such as refrigerators or ranges.[115]

To elaborate on the information from the chart, we can turn to the pages of the national census. The Dominion Bureau of Statistics had customarily recorded housing characteristics since the inception of the census, but in 1941 it introduced the first Housing Census of Canada, which documented the presence of specific items in Canadian homes — with electric lighting, mechanical refrigerators, and type of range or stove being of particular interest. The numbers pointed toward the electrification of Canadian homes, but the process was slow and uneven. By 1941, 69.1 percent of Canada's dwellings were fitted with electric lighting; by 1951, the number jumped to 87.8 percent and of that percentage, 99.4 percent were located in urban areas.[116] Not surprisingly, rural dwellings, especially those located in the Prairie region, had far fewer "modern" amenities than did their urban counterparts. In 1941, only in British Columbia

[114] As reported in "A Large Field yet for Domestic Appliances," *Canadian Electrical News* 41, no. 9 (1 May 1932): 31.

[115] Chart summarized from table published in "A Large Field yet for Domestic Appliances," *Canadian Electrical News* 41, no. 9 (1 May 1932): 31.

[116] Table XXI. Occupied dwellings showing a number and percentage lighted with electricity for Canada and the provinces, 1941 and 1951. Dominion Bureau of Statistics, *Ninth Census of Canada, 1951*, vol. 10, *General Review and Summary Tables*, (Ottawa: Queen's Printer, 1956), 384.

Canadian Domestic Appliance Field — 1931

Domestic Appliance	No. of Homes in Canada With	No. of Homes in Canada Without	Percent With
Ranges	261,599	1,222,610	17.6
Refrigerators	109,342	1,374,867	7.4
Radio Sets	967,800*	1,325,120*	42.2
Irons	1,398,735	85,474	94
Toasters	597,247	886,962	40.2
Percolators	122,631	1,361,578	8.2
Hot Plates and Grills	298,763	1,185,446	20.1

Figure 9
(*these numbers are based on the total number of homes in Canada)

and Ontario did more than half the rural homes report having electric lighting; by 1951, Manitoba, Quebec, New Brunswick and Nova Scotia were added to the list.[117]

These statistics serve as a reminder that while electricity may have superseded other forms of illumination by the Second World War, there were still many Canadians, especially in rural areas, who relied on traditional forms of lighting such as gas or kerosene (see figure 10). The same held true for refrigeration and cooking facilities. In 1941, census takers began to document what type of unit — if any — Canadians used for refrigerating (mechanical, ice box, or none) and cooking their food (electric range, gas range, wood or coal range, or an oil stove). As figure 11 demonstrates, the numbers of each technology varied widely between the regions as well as the immediate geographic location of each household (primarily urban versus rural). By 1951, 46.7 percent of Canadian dwellings had some form of mechanical refrigeration, while 33.3 percent had no method of refrigeration at all. Of those with mechanical refrigeration, 79.5 percent lived in urban areas, while 69 percent of those without lived in rural areas.[118] Ontario had the highest percentage of households with mechanical refrigeration at 62 percent, while Newfoundland had the lowest with only 7.5 percent.[119] Unfortunately, neither the 1941 nor the 1951 census differentiated between the kind of mechanical refrigeration — gas or electricity — available in Canadian households, but secondary source evidence suggests

[117] Dominion Bureau of Statistics, *Eighth Census of Canada, 1941*, vol. 1, *General Review and Summary Tables* (Ottawa: King's Printer, 1950), 401.

[118] Dominion Bureau of Statistics, *Ninth Census of Canada, 1951*, vol. 3, *Housing and Families* (Ottawa: Queen's Printer, 1953), 36–1.

[119] Dominion Bureau of Statistics, *Ninth Census of Canada, 1951*, vol. 3, *Housing and Families* (Ottawa: Queen's Printer, 1953), 36-1–36-5.

Lighting Facilities in Occupied Dwellings for Canada — 1941 and 1951

1941				1951			
Population Group	**Total Occupied Dwellings**	**Electricity**	**Gas, Kerosene**	**Population Group**	**Total Occupied Dwellings**	**Electricity**	**Gas, Kerosene**
Total	2,575,744	1,780,667	795,077	Total	3,409,295	2,967,035	442,260
Rural	1,158,851	412,629	746,222	Rural	1,254,260	826,835	427,425
Urban	1,416,893	1,368,038	48,855	Urban	2,155,035	2,140,200	14,835

Figure 10: Dominion Bureau of Statistics, *Ninth Census of Canada, 1951*, vol. 10, *General Review and Summary Tables* (Ottawa: Queen's Printer, 1956), 384.

Occupied Dwellings Showing Refrigeration and Cooking Facilities — 1951

Locality	Total	Refrigeration			Cooking Facilities			
		Mechanical (electric or gas)	Ice Box	None	Electric Range	Gas Range	Wood or Coal	Oil Stove
Canada	3,409,295	1,594,980	621,100	1,136,585	975,655	723,785	1,485,055	178,885
Rural	1,254,260	326,865	102,860	784,920	163,475	47,395	987,100	38,800
Urban	2,155,035	1,268,115	518,240	351,665	812,180	676,390	497,955	140,085
NF	70,980	5,355	710	64,240	3,220	--	61,545	2,670
Rural	41,245	620	150	40,055	240	--	37,985	285
Urban	29,735	4,735	560	24,185	2,980	--	23,560	2,385
PEI	22,455	4,285	3,290	14,285	1,545	330	18,655	1,800
Rural	16,880	2,165	1,695	12,455	290	275	15,460	775
Urban	5,575	2,120	1,595	1,830	1,255	--	3,195	1,025
NS	149,555	45,565	23,685	77,725	17,350	3,300	106,725	21,350
Rural	71,125	14,200	4,015	51,055	2,150	125	63,680	4,655
Urban	78,430	31,365	19,670	26,670	15,200	3,175	43,045	16,695
NB	114,010	29,710	20,185	61,455	12,250	6,010	81,710	13,350
Rural	62,225	9,715	3,200	47,135	1,440	730	57,190	2,390
Urban	51,785	19,995	16,985	14,320	10,810	5,280	24,520	10,960

PQ	858,785	401,020	232,250	211,145	143,260	242,070	387,960	79,415
Rural	255,385	57,725	32,675	154,405	15,065	2,025	224,960	9,495
Urban	603,400	343,295	199,575	56,740	128,195	240,045	163,000	69,920
ON	1,181,125	728,670	236,150	208,065	572,640	307,020	227,605	11,435
Rural	340,870	152,375	42,910	140,210	113,800	26,340	191,600	5,550
Urban	840,255	576,295	193,240	67,855	458,840	280,680	86,005	5,885
MB	202,400	94,675	27,655	74,750	98,855	7,240	92,410	1,165
Rural	83,690	22,135	3,205	53,655	12,830	565	68,645	750
Urban	118,710	72,540	24,450	21,095	86,025	6,675	23,765	415
SK	221,455	48,995	15,860	149,615	31,150	9,845	172,110	4,815
Rural	151,750	17,465	4,760	122,810	3,705	6,490	137,915	2,660
Urban	69,705	31,530	11,100	26,805	27,445	3,355	34,195	2,155
AB	250,750	87,230	19,620	139,115	17,100	104,735	124,795	2,190
Rural	125,325	20,640	4,135	96,540	4,800	9,465	108,240	1,795
Urban	125,425	66,590	15,485	42,575	12,300	95,270	16,555	395
BC	337,780	149,475	41,695	136,190	78,285	43,145	161,540	40,695
Rural	105,765	29,825	6,115	66,600	9,155	1,355	81,425	10,455
Urban	232,015	119,650	35,580	69,590	69,130	41,790	80,115	30,250

Figure 11: Dominion Bureau of Statistics, *Ninth Census of Canada, 1951*, vol. 10, *General Review and Summary Tables* (Ottawa: Queen's Printer, 1956), 386.

that electricity had already edged out the gas-powered technology by the end of the Second World War.[120]

However, this was the not the case with cooking technologies. Almost half of the nation's dwellings (44 percent) reported a coal or wood stove, 29 percent housed an electric range, and gas ranges followed closely behind at 21.2 percent. Even in Ontario, which led the provinces in many areas in terms of domestic electrification, gas ranges were more prevalent than electric with 26 percent of the dwellings housing one, versus 17.6 percent that had electric. Only in Manitoba did more households (49 percent) report more electric ranges than a coal or wood stove (45.6 percent). Electric and gas range users were overwhelmingly located in urban areas (83 percent), except in Prince Edward Island and Saskatchewan, where gas range users in rural areas outnumbered those in urban areas; but the percentage of households with those ranges was quite low, at 1.5 percent and 4.4 percent respectively.

What do these numbers mean? Given the amount of publicity and promises made to Canadian housewives about the labour-saving benefits of electrical technologies, and the high attendance records of electrical demonstrations, we could reasonably assume that electric appliances would have received a favourable response when introduced to market. But the statistics suggest that the main attraction of electricity proved to be in a steady and reliable supply of light.[121] Canadian families were slow to introduce electric technologies into their homes, and especially into their kitchens. The costs associated

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[120] Cowan, "How the Refrigerator Got its Hum," 214.

[121] Sue Bowden and Avner Offer found similar trends in Great Britain. For more information see: "The Technological Revolution that Never Was," in *The Sex of Things: Gender and Consumption in Historical Perspective*, eds. Victoria De Grazia and Ellen Furlough, 244–267 (Berkeley and Los Angeles: University of California Press, 1996).

with purchasing, operating, and maintaining appliances, as well as the availability of alternative means of performing a task, would have greatly influenced a family's decision to purchase a new technology. If it was cheaper to perform a task a traditional way, then it would have been difficult to justify spending extra money on a new gadget or appliance. Also, we should not disregard the possibility that unlike in rural areas, for some families a housewife's time simply was not valued enough to warrant investment into electric appliances.

These numbers also indicate that the everyday lives of Canadian women during the first half of the twentieth century were subject more to continuity than change. For example, thirty years after the electric range was introduced, most women were still using a coal and wood stove. And while access to the latter would have eliminated the back-breaking task of chopping wood or shovelling coal, it was a job typically carried out by men and children, not women. Thus, although the apparatus was different, for housewives, their duty to cook for the family and clean up any mess would have remained. Anecdotal evidence reveals that even the electric lighting used by the majority of urban housewives would have done little to reduce her workload; the daily maintenance of gas or kerosene lamps usually fell upon the shoulders of young girls in the family or domestic servants.[122]

The electrical lifestyle campaign would have resonated most with urban, middle- to upper-class families that employed domestic servants. By the end of this period, many affluent families had adopted the use of "day servants," rather than live-in staff, to make up for the decline of domestic servants. Their disposable income afforded these

[122] BCPA, Behind the Kitchen Door, File: 4088:0012, interview with Lillian Milne; BCPA, Behind the Kitchen Door, File: 4088:0014, interview with Kathleen Tobin; BCPA, Behind the Kitchen Door, File: 4162: 0023, interview with Priscilla Bethel.

households the opportunity to fully equip their dwellings with electric appliances "to ensure the efficiency of their day staff."[123] As a result, one historian has argued that wealthier homes were on the leading edge of technological diffusion by acquiring new appliances soon after their appearance on the market.[124] But the introduction of these time-saving devices was not necessarily considered a positive change for those who used them; a servant interviewed in a 1923 article in *Canadian Electrical News* claimed that "if she washes, irons, and cleans electrically, she is released in half the time, but her mistress instead of allowing her to benefit by the efficiency of the method invariably expects her to spend the extra time scrubbing the cellar steps or taking the children to the park."[125] This was a reality also faced by women who completed their own housework, and reflects a thesis explored by Ruth Schwartz Cowan in her book *More Work for Mother*. Cowan argues that any decreased hours of labour from the use of time-saving appliances often meant an increase in other types of duties that were expected of housewives — most notably in childrearing and shopping.[126]

But fifty years later, only electric light had made any significant headway into the Canadian market. At the turn of the century, Canadians embraced electricity as a revolutionary force in daily life. An increasingly powerful group of electrical manufacturers fuelled the drive for domestic electrification, yet women's magazines also reflect an acceptance of this new "electrical lifestyle," as well as a desire to participate in

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[123] CMST, Love, Leisure and Laundry Fonds, File: Klingender, "To Lighten the Burden," 47.

[124] CMST, Love, Leisure and Laundry Fonds, File: Klingender, "To Lighten the Burden," 47.

[125] *Canadian Electrical News* 32, no. 12 (15 June 1923): 42.

[126] Cowan, *More Work for Mother*, 178 –9

the recalculating of gendered spaces through technological means. While electrification may not have fulfilled its promise to "work magic in the home," the ad campaigns and accompanying articles may have at least given women the illusion of progress and emancipation — achieving a placebo effect that could have stimulated a desire for electric gadgets. This desire was articulated in advertisements depicting an idealized post-war electrical world. Advertisers told housewives to ready themselves for the transition to peacetime: "you will want your after-Victory kitchen to be just as labour-saving, just as beautiful, as electricity can make it! Plan to take full advantage of every General Electric appliance for better living."[127] Northern Electric insisted that "tomorrow's living will be on the lighter and brighter side."[128]

An article in *Hydro News* demonstrated that, as they stood on the precipice of peace, Canadians still held faith in the power of electricity to change their lives: "today we are standing at the gateway to an astonishing realm, so fantastic and so limitless in possibilities that it staggers the imagination. The applications of electricity bid fair to dominate the entire post-war world, reaching into virtually every phase of human endeavour [...]. Electronics will play an all-embracing role in that streamlined 'world of tomorrow,' which we have come to envisage as a sort of earthly paradise — a highly mechanized, scientific universe run by electricity..."[129]

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[127] "What will it be like?" *Chatelaine*, November 1944, 87.

[128] "Tomorrow's living will be on the lighter and brighter side," *Chatelaine*, May 1945, 82.

[129] "A World of Wizardry," *Hydro News* 31, no. 2 (February 1944): 4.

Chapter Five:
"Nature's Tonic": Electric Medicine in Urban Canada

Electric light in the home brought with it expectations of improved personal health. Manufacturers of light bulbs touted proper lighting as essential to preventing eye strain, especially among children.[1] But utility companies and journalists took the idea even further by suggesting that poor lighting could affect a person's entire disposition. S.H. May, writing for *Canadian Homes and Gardens*, affirmed that inadequate illumination was "responsible for a great deal of the mental and physical disease which always seems to be with us."[2] Canadians had long believed in the healing benefits of sunshine, and many were convinced that electric light emitted rays that could mimic the rays of the sun.[3] Utility companies capitalized on those beliefs and framed their advertisements around the therapeutic benefits of electric light.[4] In November 1931, General Electric encouraged consumers to "capture the vitality of sunny summer" by bringing "the health-giving rays of summer sunshine" into their homes. With the General Electric Sunlamp,

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[1] "Light — The Boon of Today," *Western Women's Weekly* 6, no. 6 (13 January 1923): 12; "The Value of Indirect Lighting," *Saturday Night*, 25 November 1924, 28; advertisement, *Chatelaine*, January 1931, 40; "Guard Your Eyes With E.M.L.," *Chatelaine*, October 1931, 60; "Look to Your Lamps," *Chatelaine*, September 1938, 63; "Eyes are Priceless. Light is Cheap," *Chatelaine*, October 1940, 9; "Lamps and Lighting," *Canadian Homes and Gardens*, November 1942, 22.

[2] "Light and Lighting," *Canadian Homes and Gardens*, January-February 1936, 58.

[3] William J. Fielding, *How the Sun's Rays Will Give You Health and Beauty* (Girard, KS: Haldeman-Julius, 1930), 18.

[4] See for example, "Speaking of Lamps," *Saturday Night*, 25 October 1919, 23; "Bransun Health Lamp," *Chatelaine*, May 1930, 62; "Laco Mazda Lamps," *Chatelaine*, January 1931, 40; "Future Lights Will be Curative," *Macleans*, 15 May 1931, 64; "Forging a New Tradition," *Chatelaine*, January 1934, 13; "For Personal Luxury," *Canadian Homes and Gardens*, November 1939, 28; "Progress in Lighting," *Canadian Homes and Gardens*, April 1939, 88; "Health conditions by General Electric germicidal lamps," *Macleans*, 1 February 1947, 23.

"resistance to cold and other seasonal ills is strengthened, children grow sturdier, and adults feel the vitalizing effect of the ultra-violet rays."[5]

The idea of electric light as the guardian of health reflected a lingering belief in the medicinal properties of electricity. The notion reached its apex at the turn of the twentieth century, when a group of medical practitioners calling themselves electrotherapeutists championed the theory that electric current could revitalize a run-down body. Much of what these practitioners believed was reflected in a late-nineteenth century treatise entitled "Electricity, Its Mode of Action Upon the Human Frame." Written by J. Adams, a self-styled "medical electrician" from Toronto, the document speculated that contemporary afflictions, such as sleeplessness, jaundice, paralysis, and impotence, were caused by the excesses of modern life.

Adams argued that electricity was "nature's own most appropriate remedy for restoring the Human Frame to Health."[6] He was one of many Canadian practitioners who wrote extensively about the medical applications of electricity, and who believed that electricity was the very medicine necessary to re-invigorate the body. Paradoxically, electricity, responsible for powering the modern world, was also the culprit in depleting society of its energy. Medical electricians claimed that by using nature's own tonic as a therapeutic agent, they could restore the human body to optimum health. By 1900, the idea that electricity could act as a curative was a popular one among mainstream medical practitioners and laymen alike. With electricity giving power to so many aspects of Canadian life, some believed that this "mysterious force" could give power to their own

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[5] "Capture the vitality of sunny summer," *Chatelaine*, November 1931, 55.

[6] J. Adams, *Electricity, its Mode of Action Upon the Human Frame, and the Diseases in Which it has Proved Beneficial* (Toronto: Dudley and Burns, ca. 1870), 1.

bodies as well. Those who sought electrical cures for countless symptoms and afflictions (both real and imagined) reflect another, more obscure layer in the public experience and interpretation of electricity. At a time when most Canadians' experience with electricity was limited to public settings — at fairs, or in the form of street lighting and streetcars — some urban residents were exposing their bodies to a more intimate relationship with electric power.

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Living conditions in nineteenth-century urban Canada were filthy. The increase in population that accompanied industrialization meant that free space was at a premium, and aside from the well-to-do, most city dwellers resided in cramped quarters.[7] Housing standards were virtually nonexistent until the twentieth century, and overpopulated living spaces contributed to the spread of illness.[8] Outside, the skyline was interrupted by smokestacks spewing thick smoke and "noxious fumes" into the air, while a lack of proper waste disposal resulted in animal and human excrement being mixed in with the dirt of the mostly unpaved streets.[9] Historian Graeme Wynn vividly describes how this waste "dried in the sun to be pulverized by passing traffic and blown about in the air, and

[7] Terry Copp, *The Anatomy of Poverty: The Condition of the Working Class in Montreal, 1897–1929* (Toronto: McClelland and Stewart, 1974), 88.

[8] Roy Porter, *The Greatest Benefit to Mankind: A Medical History of Humanity from Antiquity to the Present* (London: Harper Collins, 1997), 399.

[9] Michael Bliss, *Plague: A Story of Smallpox in Montreal* (Toronto: Harper Collins, 1991), xii.

lay beneath winter snows to produce a fetid stench in the spring."[10] Inadequate neo-natal care resulted in alarmingly high instances of infant mortality, and the overpopulation, pollution, poor diet, and appalling factory conditions that characterized industrial towns meant that the majority of urban residents faced low life expectancy rates.[11]

The degree to which industrialization helped or hindered standards of living is difficult to assess, but to contemporary observers, "industrialism jeopardized health."[12] Industrialized life left many Canadians in emotional distress, with more and more complaining of nervous disorders.[13] Some may have felt they were suffering from "neurasthenia" — an umbrella term that covered a multitude of symptoms, including (but not limited to) constipation, exhaustion, depression, indigestion, rheumatism, fever, and general aches and pains. George Beard, a New York-based doctor, coined the term, and linked its symptoms to overstimulation. In his 1880 publication *American Nervousness*, he wrote that modernity, in the guise of new technological devices such as the telegraph, the railway, and the electric light, was creating a crisis in human health. Beard maintained that the consequences of these new technologies — instant communication, speed, glaring brightness — posed more physical and emotional demands than any

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[10] Graeme Wynn, *Canada and Arctic North America: An Environmental History*, (Santa Barbara: ABC-CLIO, 2007), 155.

[11] Porter, *The Greatest Benefit to Mankind*, 399; Copp, *Anatomy of Poverty*, 99; Jean-Claude Robert, "The City of Wealth and Death: Urban Mortality in Montreal, 1821–1871," in *Essays in the History of Canadian Medicine*, eds. Wendy Mitchinson and Janice Dicken McGinnis, 37 (Toronto: McClelland and Stewart, 1988).

[12] Porter, *Greatest Benefit to Mankind*, 400; for a more in-depth analysis about standards of living during this time consult Copp, *Anatomy of Poverty*.

[13] Wendy Mitchinson, "Hysteria and Insanity in Women: A Nineteenth Century Canadian Perspective," *Journal of Canadian Studies* 21, no. 3 (Fall 1986): 87.

person could reasonably withstand.[14] By 1888, Daniel Clark, medical supervisor of an asylum in Toronto, remarked that his "class of patients [was] growing larger day by day in this nerve-exhausting age."[15]

The city also bred contagious diseases, such as typhoid and tuberculosis, which critics argued were preventable, and they called on municipal governments to enact public health reform.[16] Increased state involvement in the prevention of disease reflects what Wendy Mitchinson and Janice Dickin McGinnis describe as an artificial separation in medicine between prevention and cure. They maintain that medicine had always been characterized by these two facets, but by the end of the nineteenth century, the former "had become the domain of public health officials, [while] cure, the more dramatic and individualistic aspect of health care, was left in the hands of private physicians."[17] The relationship between medicine and the public became more closely intertwined, as citizens came to rely on government regulation for everyday matters, while establishing an increased reliance on doctors to heal what ailed them. It was not uncommon for Canadians to seek treatment from doctors practicing in a variety of fields: orthodox, allopathic, and homeopathy, for example.[18] Even though it was illegal to practice medicine without a licence, governing bodies such as the College of Physicians and

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[14] Armstrong, *Modernism*, 92; John E. Senior, "Rationalizing Electrotherapy in Neurology, 1860–1920," (PhD diss., University of Oxford, 1994), 5.

[15] Daniel Clark, "Neurasthenia," paper read to Ontario Medical Association Meeting, June 1888.

[16] Iva Lloyd, *The History of Naturopathic Medicine: A Canadian Perspective* (Toronto: McArthur and Co., 2009), 54; Copp, *Anatomy of Poverty*, 88.

[17] Wendy Mitchinson and Janice Dicken McGinnis, eds., *Essays in the History of Canadian Medicine* (Toronto: McClelland and Stewart, 1988), 10.

[18] Wendy Mitchinson, *The Nature of their Bodies: Women and their Doctors in Victorian Canada* (Toronto: University of Toronto Press, 1991), 22.

Surgeons were largely ineffective at enforcing rules and regulations until well into the twentieth century. Electrotherapy thrived in this environment, where the line between doctor and quack was blurred. Because orthodox doctors were unable to treat most ailments successfully, many people turned to fringe medicine — including electrotherapy — in their quest for a cure.[19]

Theories about electricity and medicine had gained currency among European physicians since the eighteenth century, and Canadian doctors, most of whom were trained outside the country, were probably well-versed in electrotherapeutic techniques.[20] Ideas about medicine flowed freely across national borders, and with the majority of medical texts being written by European and American practitioners it should not be surprising that Canadian doctors were influenced by works produced outside Canada. As a result, much of the literature referenced in this chapter comes from these international sources, most of which are housed at the Bakken Museum in Minneapolis, the world's largest repository of medical electricity texts. Nineteenth-century Canadian physicians were not averse to the international influences in their field; in fact, Mitchinson notes, "it allowed Canadian physicians to feel they were part of a world-wide scientific community and not a parochial profession."[21] These practitioners were also likely aware of Beard's writings, along with those of his colleague, Alphonso D. Rockwell, with whom he

[19] Colin D. Howell, "Elite Doctors and the Development of Scientific Medicine: The Halifax Medical Establishment and Nineteenth Century Medical Professionalism," in *Health, Disease, and Medicine: Essays in Canadian History*, ed. Charles G. Roland, 106 (Toronto: Hannah Institute for the History of Medicine, 1984).

[20] Mitchinson, "Hysteria and Insanity, 88.

[21] Mitchinson, "Hysteria and Insanity, 88.

published *A Practical Treatise on the Medicinal and Surgical Uses of Electricity.*[22] Their book, which went through multiple editions, was received favourably by the medical profession in Europe and North America, which embraced their conclusions that electrotherapy provided a powerful sedative, could treat most nervous disorders, and provided pain relief.[23]

Electrotherapy was based on the concept that electricity was the body's natural life force and, if necessary, could be replenished — or, more accurately, recharged — by an external energy source. The idea of a "life force" had its roots in vitalism, the belief that "life is governed by forces peculiar only to living beings."[24] That electricity was the body's life force became more accepted in the eighteenth century after Galvani introduced his theory of animal electricity. Nearly a century had passed since the Italian professor stimulated frog's legs with electrostatically charged metal before the medical community began to reconsider the existence of electricity in the body. Volta's dismissal of Galvani's theories in favour of metallically generated electricity had sufficiently distracted scientists until the 1840s when Emile du Bois Reymond, a German physician, observed evidence of electrical potential in living tissue.[25] He established the practice of

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[22] The *Canada Lancet* frequently reviewed and referenced foreign books, and made numerous mentions of Beard and Rockwell's treatise. For more information, see: "When are involuntary seminal emissions pathological?," *Canada Lancet* 12, no. 4 (December 1879): 112; "Fallacies regarding electricity," *Canada Lancet* 13, no. 3 (November 1880): 66–9; "Electrotherapeutics," *Canada Lancet* 13, no. 6 (February 1881): 161–67; "Electricity in the Treatment of Specific Diseases," *Canada Lancet* 14, no. 5 (January 1882): 129–32.

[23] George M. Beard and Alphonso D. Rockwell, *A Practical Treatise on the Medical and Surgical Uses of Electricity*, 7th ed. (New York: William Wood and Company, 1866), 216–225.

[24] Jacalyn Duffin, *History of Medicine: A Scandalously Short Introduction*, 2nd ed. (Toronto: University of Toronto Press, 2010), 41.

[25] Today we know that both Galvani and Volta were partially correct: bimetallic contact in a moist environment can generate electricity, and an electric reaction can occur from contact between animal tissue and metal. Although Galvani's theory that muscle contraction resulted from electric fluid is false,

electrophysiology, the use of electricity in diagnosis.[26] In the nineteenth century, physiology, "the study of the function of living beings,"[27] was steeped in empiricism, and rather than rely on the traditional and subjective patient description of symptoms, du Bois Reymond introduced batteries and electrodes into his medical practice in order to actively diagnose a patient's illness.[28] Electrophysiology also allowed for more localized diagnosis; doctors applied current wherever the patient experienced pain and recorded the body's responses — "muscular contractions, blinks of the eye, [and] facial twitches" allowed the doctor to draw "appropriate inferences concerning the patient's underlying nervous conditions."[29]

By the end of the nineteenth century, electrotherapy evolved into a method of treatment with electric technologies. Electrotherapeutists, or "medical electricians", rationalized the practice as the logical offspring of electrophysiology. In doing so, these practitioners were trying to lend scientific credibility to their techniques, and the medical community, for its part, agreed that electricity could prove a beneficial therapeutic agent. But electric medicine remained on the outskirts of orthodox medicine, and impressions of it were influenced — and in some cases overpowered — by an active public imagination that considered electricity a mystical and mysterious force. This cross-fertilization of

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electricity does manifest itself in the body as bioelectric current; however, unlike the current used to power technological devices, which is created by charged electrons moving through a wire, bioelectric current consists of charged ions that move through the nerves. See Pera, *The Ambiguous Frog*, xxv.

[26] Wesley Mills, "Animal Electricity," in *An International System of Electrotherapeutics: For Students, General Practitioners and Specialists*, ed. Horatio R. Bigelow, G-67 (Philadelphia: The F.A. Davis Co., 1894); William F. Hutchinson, "The Present Status of Electricity in Medicine," paper presented to the Rhode Island Medical Society, 1879, 14–16.

[27] Duffin, *History of Medicine*, 40.

[28] Andreas Killen, *Berlin Electropolis: Shock, Nerves, and German Modernity* (Berkeley: University of California Press, 2006), 54.

[29] Killen, *Berlin Electropolis*, 54.

medicine and culture proved both a help and hindrance to electrotherapeutists: it made it easier for medical electricians to sell their services to the public, but it caused doubt among regular practitioners, who viewed with suspicion those who advertised electricity as a cure-all.

II

Few Canadians in the late nineteenth century understood the human body; fewer still understood electricity — Thomas Edison, after all, was still trying to perfect the light bulb.[30] This widespread ignorance of how the body functioned, coupled with an idealistic notion of electric potentiality, led to a growing curiosity about the role of electricity in life. The popular imagination embraced electricity as a symbol of modernity, and in their writings physicians hailed the power source as the new-age way to cure man by machine. The intersection of electric medicine and culture also provides a unique perspective on the everyday lives of Canadians, who increasingly viewed their bodies in scientific, rather than religious, terms.[31] Rapid industrialization and urban development contributed to a remapping of the human body as one that functioned like a machine, powered by the

[30] Medical thinkers had long been trying to understand the inner workings of the human body. For more information see Roy Porter, *The Greatest Benefit to Mankind: A Medical History of Humanity from Antiquity to the Present* (London: Harper Collins, 1997).

[31] Carl Berger hints at this evolution in *Science, God, and Nature in Victorian Canada* (Toronto: University of Toronto Press, 1982). Although his focus is on the Victorian pursuit of natural history, he describes that two factors, primarily the rise of geology and Darwin's theory of evolution, led Canadians to reconsider the role of God in designing nature, and by extension — I would argue — themselves.

electrical energy of the air.[32] Atmospheric electricity "is the great promoter of life," argued the French electrotherapeutist Jean-François Caplin in 1857, "and exists in all the productions of nature, either vegetable or animal."[33] That electricity manifested itself in the air as atmospheric electricity was an accepted scientific notion since the time of Benjamin Franklin, but with Faraday's mid-nineteenth century discovery of electromagnetism, physicians worldwide began to reconsider the role of electricity in the human body. Some drew from the technologies of electricity to understand the body, describing it as a "bundle of nerves" with electricity as its life force.[34] MacKay Jordan, a Vancouver doctor, theorized that the eye was the "main artery through which light and life enter[ed] the body."[35] For these physicians, electricity was not the work *of* God, but acted *as* God by breathing life into inanimate objects and restoring health to diseased tissue.

To help explain electricity's role in the human body, doctors often turned to the "body as battery" metaphor, where diseases resulted from "disturbances breaking up the electrical polarities of the [human] system."[36] Indeed, the most common complaint of a nineteenth-century battery was polarization, caused by an accumulation of hydrogen on

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[32] J. O. N. Rutter, *Human Electricity: The Means of Its Development, Illustrated by Experiments* (London: John W. Parker, 1854), 156, 167; Henry Lake, "Is Electricity Life?," *The Popular Science Monthly*, February 1873, 478–83; Killen, *Berlin Electropolis*, 67.

[33] Jean-François Caplin, *The Electro-Chemical Bath, for the Extraction of Mercury, Lead, and other Metallic Poisonous and Extraneous Substances from the Human Body* (London: William Freeman, 1857), 59.

[34] Jane Arthurs and Jean Grimshaw, eds., *Women's Bodies: Discipline and Transgression* (New York: Cassell, 1999), 31.

[35] "Electricity: The Source of Life," *Western Women's Weekly* 1, no. 14 (14 March 1918): 5.

[36] O. K. Chamberlain, *Electricity: Wonderful and Mysterious Agent* (New York: John F. Trow, 1862), 2.

the electrode, which resulted in a loss of power.[37] Thus, if the body was like a machine, it stood to reason that the human system could become polarized and drain the body's battery.[38] Others described the body as operating by electrical circuits: the brain received and distributed electricity via the nerves, which acted as wires. American physician Edward Foote compared the relationship between the brain and nerves as a "telegraph system" in which it was "impossible for one to be disturbed without exciting the sympathy of the other."[39] The medical community's use of technological euphemisms to explain the body trickled into mainstream society. Historian Carolyn De La Pena maintains that "folk beliefs, unsettled medical knowledge, and an ill-defined technology, combined to create a space for electrical enthusiasm where phrases such as 'recharging my batteries' and 'short circuiting' crept into everyday speech."[40]

Evidence suggests that enthusiasm for electrical technologies was pronounced in the late nineteenth century, and electric medicine reached its apex by 1900. It was a sign of the times that Canadians could find electric belts and electric vibrators on sale in the daily press, along with ads for nostrums claiming to possess all the healing qualities of electricity.[41] It was, in De La Pena's words, a "Golden Age of Electrotherapy."[42]

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[37] Michael Brian Schiffer, *Power Struggles: Scientific Authority and the Creation of Practical Electricity Before Edison* (Cambridge, MA: MIT Press, 2008), 75.

[38] Senior, *Rationalizing Electrotherapy*, 6.

[39] Edward Foote, *Medical Common Sense; Applied to the Causes, Prevention and Cure of Chronic Diseases and Unhappiness in Marriage*, (Boston: Wentworth, Hewes, 1858), 6.

[40] Carolyn Thomas De La Pena, *The Body Electric: How Strange Machines Built the Modern American* (New York: New York University Press, 2003), 108.

[41] Museum of Healthcare at Kingston, File: Patent Medicines, Advertisements: "Electricity is Life" (electric pills) and "$100 Proclamation" (electric oil), n.d. See also "Briggs' Genuine Electric Oil," *Ottawa Citizen*, 7 November 1883, 1.

[42] De La Pena, *The Body Electric*, 99.

Canadians could also receive treatment from electrotherapeutic institutions or from physicians like Abner Mulholland Rosebrugh, an eye and ear specialist who combined his regular services with electric therapy. Rosebrugh, a vocal proponent of electrotherapy, wrote extensively about the need to teach the principles of electricity in medical schools. In the 1880s, he wrote a series of articles on electrotherapy for the *Canada Lancet*, the country's foremost medical journal, in which he argued that "the administration of electricity is quite within the power of every physician."[43] He also published at least one treatise, "A Handbook of Medical Electricity," in 1885, and designed a portable battery for electrotherapeutic uses.[44]

But most regular practitioners remained ignorant of electrical techniques; thus, developments in electric medicine were primarily left to electrotherapeutists. One such individual was Professor S. Vernoy, an American-trained practitioner, who founded the Vernoy Electro-Medical Institute in Toronto in 1876, which remained open until the turn of the century.[45] Vernoy advertised "radical cures" to men suffering from "nervous diseases, sexual and spinal weakness" as well as chronic ailments including but not limited to acne, gout, and rheumatism. Sufferers could receive treatment at his Jarvis Street location or "be treated at their homes if desired."[46] Alternatively, patients could treat themselves by purchasing his "Improved Family Switch Battery," a wood-encased

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[43] A.M. Rosebrugh, "Electrotherapeutics," *Canada Lancet* 13, no. 8 (April 1881): 232.

[44] J.T.H. Connor, "'I am in love with your battery': Personal Electrotherapeutic Devices in 19th and Early 20th Century Canada," unpublished research paper presented to the Ontario Museum Association, London, Ontario, 26 October 1986.

[45] Charles Pelham Mulvany, et al., *History of Toronto and County of York, Ontario* (Toronto: C. Blackett Robinson, 1885), 7.

[46] "Professor Vernoy's Electro-Therapeutic Institution," *The Globe*, 31 January 1880, 4.

battery from which patients would apply current to their bodies using zinc plates.[47] All sufferers had to do was flick a switch and they could become their own medical electricians. Vernoy was also a prolific writer, publishing countless pamphlets such as *A Handbook and Guide to Domestic Electropathy* in 1884 and *Electro-cure: The Principles and Methods of Curing Disease* in 1905. Both were written to teach interested parties about the healing powers of electric medicine. He also published *The Electric Age,* a quarterly that "extolled the virtues of electrotherapy."[48]

Female sufferers could receive treatment in the adjacent building, where Jenny Trout, a graduate of the Women's Medical College of Philadelphia and Canada's first licensed female doctor, along with Amelia Tefft and Emily Stowe, also a female medical pioneer and champion of women's rights, offered electrical treatment to women suffering from countless diseases.[49] At their Toronto Electro-Therapeutic Institution, patients could receive general electrification through galvanic baths or more localized treatment for specific afflictions, such as acne or spinal weakness.[50] But for Trout and Tefft, "no organs of the human system are more liable to derangement than those situated in the pelvic basin."[51] In 1877, the two women published a handbook called *The Curative Powers of Electricity Demonstrated,* which detailed the diseases to which electricity could prove most beneficial. They claimed that:

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[47] UWO Medical Artifact Collection, Inventory no. 2004.005.01.01, "Prof. Vernoy's Improved Family Switch Battery," http://rabbit.vm.its.uwo.ca/MedicalHistory/Default.aspx?type=showItemFrameset&itemID=2138 (accessed March 2010).

[48] Connor, "'I am in Love with Your Battery'," n.p

[49] Connor, "'I am in Love with Your Battery'," n.p.

[50] *Globe*, 15 December 1877, 4.

[51] Toronto Electro-Therapeutic Institution, *The Curative Powers of Electricity Demonstrated* (Toronto: Monetary Times, 1877), 17.

> No one complaint contributes so largely to female suffering as PROLAPSUS UTERI, OR FALLING OF THE WOMB. The womb being the grand nucleus of womanhood, sympathizing with every part of the body, communicating with the brain through the medium of the spine, and sympathetic – when diseased or displaced must necessarily produce those terrible sufferings of body and mind only known to woman. If this complaint results from weakness, or relaxation, no permanent relief can be obtained till the vital energies are restored and muscular contraction fully established.[52]

The most appropriate way to restore the "vital energies" was through electrotherapeutic treatments, which patients could seek at the institution — an impressive structure, with space for out-of-town patients, a dining room, and parlour — or call for a doctor to treat them at home.[53]

Tefft also paired up with Vernoy, and together they offered full courses on electro-physiology, electro-diagnosis, and therapeutics to anyone seeking instruction in these areas in order to treat themselves. Upon graduation, students would receive a diploma as proof of their competence to treat disease with electricity.[54] The lack of regulation apparent in these types of institutions was fiercely opposed by some physicians, who pointed to them as prime examples of quack medicine administered by charlatans. Doctors such as Rosebrugh tried to disqualify self-styled specialists by offering electric treatment in conjunction with their regular services, but despite their best intentions, they actually helped to legitimize electrotherapeutic institutions and electrotherapy. The presence of a medical battery in a doctor's work space would have made it more acceptable to seek similar treatment from another practitioner. Since most Canadians could not clearly distinguish between "doctor" and "quack" (hindsight is a gift

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[52] Toronto, *Curative Powers*, 18.

[53] Toronto *Curative Powers*, n.p.

[54] "Electricity, Nature's Chief Restorer," *Globe*, 18 August 1877, 4.

wasted on the present) there would have been no reason for them to suspect that these institutions or medical electricians were anything but legitimate, especially when electrotherapeutists themselves probably firmly believed in the "curative powers of electricity." But how, exactly, could electricity cure? What types of treatment could a patient receive?

Despite the proliferation of advertisements and pamphlets touting the benefits of electrotherapy, none precisely defined what it was. Electrotherapeutists often filled in this lack of information with imagination, by using vague — but promising — language, which assured the public that electricity was "nature's greatest healing agent," and that electric current would "restore vigor to the system."[55] Medical textbooks intended for physicians and students provide the clearest explanation; the principle behind electrotherapy was to administer treatment by applying electric current to a patient's limbs.[56] The current, these authors argued, could be used to treat almost any malady by either relieving pain or stimulating health through muscle contraction.[57] The method of administering current varied, but medical electricians relied most often on three forms of treatment: static or frictional electricity; galvanism; and faradic electricity.

Static or frictional electricity was introduced in the eighteenth century with the development of the Leyden Jar. "When a charge was applied to the inside surface of the Leyden Jar, it meant that the outside surface, which was insulated from the inside, had an equal but opposite charge," Tom McNichol writes. "When the inside and outside surfaces

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[55] "The Vernoy Electro-Medical Battery," *Toronto Star*, 23 June 1905, 46.

[56] S. H. Monell, *Rudiments of Modern Medical Electricity* (New York: Edward R. Pelton, 1900), 17.

[57] Rutter, *Human Electricity*, 36.

were connected by a conductor, the circuit was completed and a charge released."[58] Some forms of the Leyden Jar were still in use by the nineteenth century, but different forms of generating static electricity for medical use were becoming more common. One such example was the plate machine, which used friction between glass and rubber to generate an electrical disturbance that was stored in a receiver and released on a patient.[59]

Galvanism involved the use of a continuous current, whereas faradism relied on the principle of induction to generate current.[60] In both cases, a battery was the technological means of administering therapy. A patient undergoing galvanic treatment at a doctor's office may have been confronted with a mahogany-encased battery capable of administering more than fifty volts. These devices typically included a rheostat, which allowed the medical electrician to increase or decrease the voltage, as well as electrode-cords, which were attached to the patient. As noted with Vernoy's Family Switch Battery, these devices were also available for home use. Historian John Senior notes that today "these forms of treatment would not be considered valid for the purposes [for which] they were originally developed."[61] But at the time, administering electrotherapy in these forms made perfect sense, especially if one believed, like Galvani, that electricity was naturally occurring within the body. In reference to faradism, Lapthorn Smith, a Montreal-based gynaecologist, noted that his patients continued to experience relief from their symptoms

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[58] McNichol, *AC/DC*, 11.

[59] William F. Hutchinson, "The Present Status of Electricity in Medicine," paper presented to the Rhode Island Medical Society, 1879, 8–9; Homer Clark Bennett, *The Electrothereapeutics Guide, or A Thousand Questions Asked and Answered* (Lima, OH: National College of Electrotherapeutics, 1907), 112–13.

[60] J. Mount Bleyer, "Galvanism," in *An International System of Electrotherapeutics: For Students, General Practitioners and Specialists*, ed. Horatio R. Bigelow, A-202–A-203 (Philadelphia: F.A. Davis, 1894); George J. Engelmann, "The Faradic or Induced Current," in *An International System*, ed. Bigelow, A-128–A-129; Hutchinson, "Present Status of Electricity," 9–13.

[61] Senior, *Rationalizing Electrotherapy*, 1.

long after treatment. He reasoned that "the tissues and fluids of the body act as an induction apparatus, or, rather, as a storage battery, which continues to emit an electric current for some time afterward."[62]

A popular form of electrotherapy in the 1870s was generalized treatment via the electric bath. Among many ailments, it was used to treat debility, anaemia, rheumatism, gout, and fever, and was also considered the ideal treatment to remove metallic toxins, such as mercury or lead, from the body.[63] In his *Electro-Therapeutic Handbook*, Edward Trevert asserts that it "provide[d] a most agreeable and convenient way of applying general electrification to the whole body."[64] The electric bath was the technological alternative to the long-held custom of bathing in mineral spas, except some electrotherapeutists claimed that the electric version was superior — indeed safer — because the patient was not breathing in hot air, thus reducing the chances of cardiac or respiratory problems.[65] There were two common forms of electric baths: the incandescent light bath (figure 12) and the electric water bath (figure 13).

In the former, the patient would remove his clothes and sit on an insulated stool. The medical electrician would encase him within a specially designed cabinet that would expose only the patient's head. The walls of the cabinet would be lined with incandescent (or sometimes arc) lamps and the patient would receive treatment from the heat emitted

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[62] Lapthorn Smith, "Disorders of Menstruation," in *An International System*, ed. Bigelow, G-163.

[63] George M Schweig, *The Electric Bath: Its Medical Uses, Effects and Appliance* (New York: G.P. Putnam's Sons, 1877), 27.

[64] Edward Trevert, *Electro-Therapeutic Handbook* (New York: Manhattan Electrical Supply Company, 1900), 81.

[65] Thomas Dowse, *Lectures on Massage and Electricity in the Treatment of Disease* (Bristol: John Wright, n.d.), 440.

by the bulbs.[66] Robert Bartholow observed that the "patient is more or less highly charged with electricity, which is silently received without pain…the face [is] flushed, the action of the heart is quickened, and the pulse is more rapid. A general sense of tingling in the skin is experienced, and an abundant perspiration breaks out over the body."[67] The method was designed to sweat out any toxins and to allow the light to penetrate the skin and purify the blood. Medical electricians could order or build their own cabinets; special collapsible baths were also available to administer treatment in a patient's home.[68]

The incandescent light bath retained its usefulness for years. In a 1932 article for *Saturday Night*, Isabel Morgan describes the "magnetic effects of … [the] modern cabinet bath." Instead of sitting on an insulated stool, she was told to lie down on a cot that slid into the cabinet, with her head exposed and face shielded from the heat and light with a cold towel. She wrote that the lights gave an intense heat and that "the local exercisers (round flat pads of felt attached to a slow alternating current) bring a slightly prickly massaging movement [and] as the heat begins to take effect the body becomes bathed in its own moisture — a sign that the pores are becoming active and that the body is throwing off the various impurities that lodge in the most immaculate skin."[69] The principle behind the light bath retained its late nineteenth-century meanings; however, the

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[66] See for example, Justin Hayes, *Therapeutic Use of Faradic and Galvanic Currents in the Electro-Thermal Bath* (Chicago: Jansen, McLurg, 1877), 7–14; Bennett, *Electrotherapeutics Guide*, 94; R.V. Pierce, *The People's Common Sense Medical Adviser in Plain English: Medicine Simplified* (Bridgeburg, ON: World's Dispensary Medical Association, 1924), 884–85.

[67] Robert Bartholow, *Medical Electricity: A Practical Treatise on the Application of Electricity to Medicine and Surgery* (Philadelphia: Henry C. Lea's Son, 1881), 212.

[68] Bennett, *Electro-Therapeutic Guide*, 92.

[69] Isabel Morgan, "Baths of Light," *Saturday Night*, 14 May 1932, 16.

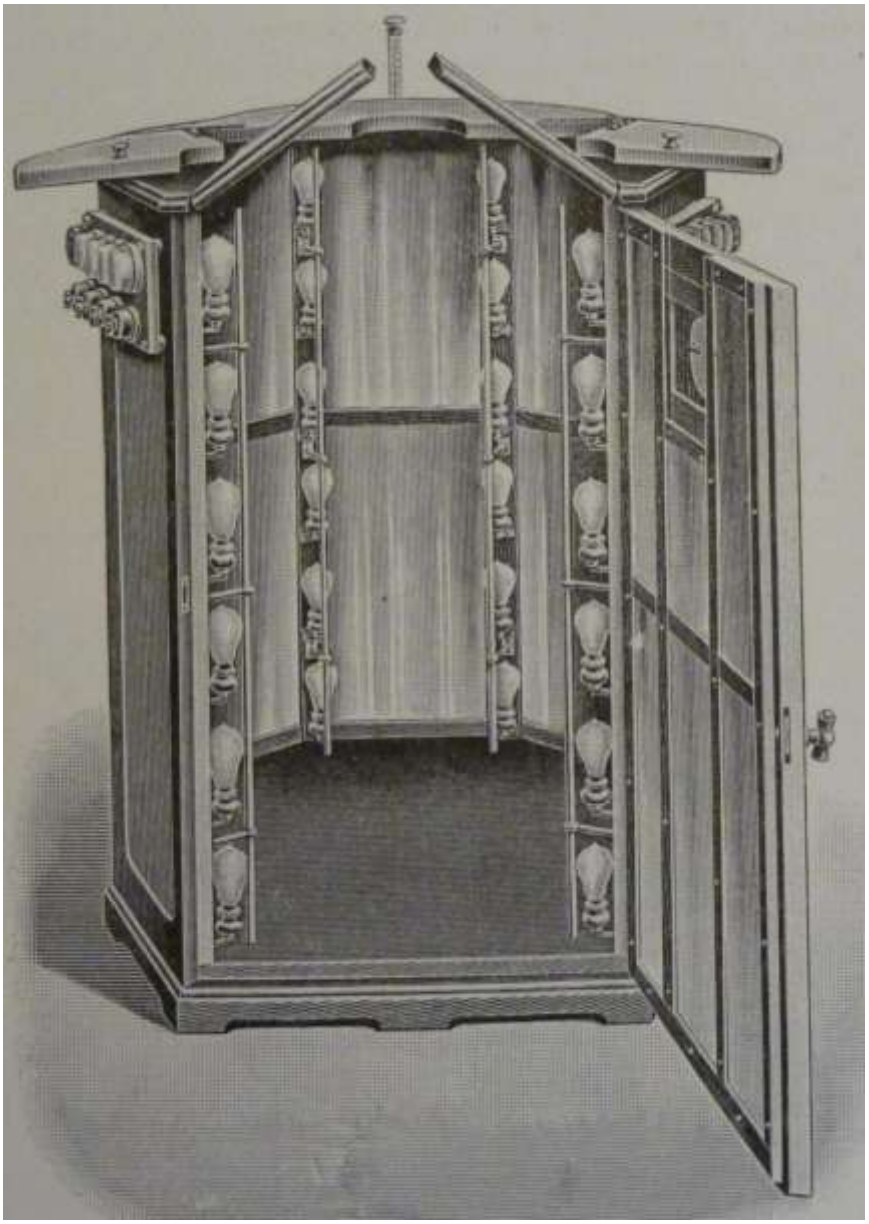

Figure 12: A sketch of the electric light bath, ca. 1900[70]

[70] Dowse, *Lectures on Massage*, 441.

venue had changed. Instead of an electrotherapeutic institution, Morgan received treatment at a spa, suggesting that this form of electrotherapy evolved into a luxury treatment rather than a medical cure.

The electric water bath was probably the most daring form of electrotherapeutic treatment. A bathtub, typically constructed of porcelain or wood and usually five and a half feet long, was filled with enough water for the patient to be covered up to the shoulders and kept at a temperature of ninety degrees Fahrenheit.[71] The medical electrician would place one electrode on the back of the patient's head and another under the patient's feet. Copper was the preferred metal for the plates since it would not corrode, but sometimes plates made from zinc were used instead. Occasionally, the medical electrician would place a smaller plate on the patient's hips or knees if he had expressed any aches or pains specific to those areas.[72] The principle of this bath was that the water would act as a conductor and the patient would only receive a portion of the current that the medical electrician would supply from an electro-static generator or galvanic battery.[73] According to one user manual, once the current was turned on, the patient would feel a prickling sensation at the ankles or knees.[74] There was also a chance that the patient would experience a slight metallic taste as the current grew stronger. Depending on the affliction, the treatment would usually last between ten to fifteen

[71] Schweig, *The Electric Bath*, 8, 14–15; Trevert, *Electro-Therapeutic Handbook*, 81; Bennett, *The Electrotherapeutics Guide*, 96.

[72] Trevert, *Electro-Therapeutic Handbook*, 82.

[73] Bennett, *The Electro-Therapeutic Guide*, 96; Engelmann, "The Faradic or Induced Current," A-157.

[74] Trevert, *Electro-Therapeutic Handbook*, 84.

minutes, with twelve baths being given over the course of one month.[75] The generalized treatment of the electric water bath was mostly prescribed to soothe nervous disorders, although a May 1873 article in the *Canada Lancet* questioned: "if the curing of constipation were the only thing we could do with it, would it not be deserving of high praise?"[76]

By the 1880s, Canadians could seek more localized treatment. With the aid of special attachments, electric current could be passed over any part of the body where the patient experienced pain. Women were frequent recipients of these methods of treatment within the relatively new medical specialty of gynaecology, and with the increased popularity in electricity as a form of treatment, gynaecological electrotherapeutics became an important research topic.[77] Mitchinson maintains that gynaecology was "based on the assumption that woman was predisposed to disease and that the culprit was her reproductive system."[78] Most doctors during this period regarded a woman's menstrual cycle as a barometer for her health; in 1892, American physician Henry Chavasse noted that with first menstruation, a woman's "mental capacity both enlarges and improves."[79]

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[75] Schweig, *The Electric Bath*, 21; Trevert, *Electro-Therapeutic Handbook*, 84.

[76] "Medical Electricity," *Canada Lancet* 5, no. 9 (May 1873): 521.

[77] Andrew F. Currier, *Under What Circumstances Can Electricity be of Positive Service to the Gynecologist* (New York: The Danbury Medical Printing Co., 1891); George J. Engelmann, "Fundamental Principles of Gynecological Electrotherapy," *Journal of Electrotherapeutics*, May 1891, 1–46; Willis E. Ford, "The Methods of Administering Galvanism in Gynecology," *Transactions* (1892); Augustin H. Goelet, *The Electrotherapeutics of Gynecology* (Detroit: Geo. S. Davis, 1892); Chauncy D. Palmer, "The Gynecological Uses of Electricity," undated booklet, ca.1894; Betton Massey, *Conservative Gynecology and Electrotherapeutics*, 3rd ed. (Philadelphia: The F.A. Davis Co., 1900); Francis H. Bermingham, "Electrotherapeutics in Some of the Diseases of the Genito-UrinaryTract," *American Journal of Surgery*, June 1909, 2–3; Herman E. Hayd, "Electricity in Gynecological Practice," (Buffalo: New York, n.d.).

[78] Wendy Mitchinson, "Causes of Disease in Women: The Case of Late Nineteenth Century English Canada," in *Health, Disease and Medicine: Essays in Canadian History*, ed. Charles G. Roland, 381 (Toronto: Hannah Institute for the History of Medicine, 1984).

[79] Henry Chavasse, *What Every Woman Should Know: Containing Facts of Vital Importance to Every Wife, Mother, and Maiden* (Chicago: Royal Publishing House, 1892), 33.

Despite that promise, the stress of modern life could lead to irregularities, which according to contemporary social commentators manifested itself as hysteria among women.

An article published in the *Canada Lancet* in April 1880 described hysteria as "a disease to which every woman [was] liable."[80] The symptoms of hysteria were difficult to pin down; it could manifest itself as sleeplessness, nervousness, irritability, pain in the lower abdomen, and irregular or absent menstrual cycles. American physician G. Betton Massey argued that the earliest symptom of hysteria was a young girl's "habit of selfishness."[81] Doctors took great effort to distinguish it from George Beard's concept of neurasthenia. Both were "constitutional diseases," and medical electricians, including Beard, promoted the "tonic and sedative influence" of galvanic and faradic currents to cure the body of these social maladies.[82] Canadian physician J. Matthews tried to explain the difference in a July 1889 article: "a hysterical woman often shows great power and capacity of both mind and body. A neurasthenic has lost elasticity and power […] the nerves are weak."[83] Two main differentiators between neurasthenia and hysteria were modernity and gender; while contemporary pressures caused a body to be run-down, hysteria was linked to the centuries-old belief of female diseases originating in the womb.

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[80] "The Treatment of Hysterics," *Canada Lancet* 12, no. 7 (April 1880): 244.

[81] Massey, *Conservative Gynecology*, 2.

[82] A.M. Rosebrugh, "Electricity in the Treatment of Specific Diseases," *Canada Lancet* 14, no. 5 (January 1882): 130.

[83] J. Matthews, "Clinical Lecture on Hysteria, Neurasthenia, and Anorexia Nervosa," *Canada Lancet* 21, no. 10 (July 1889): 335–37.

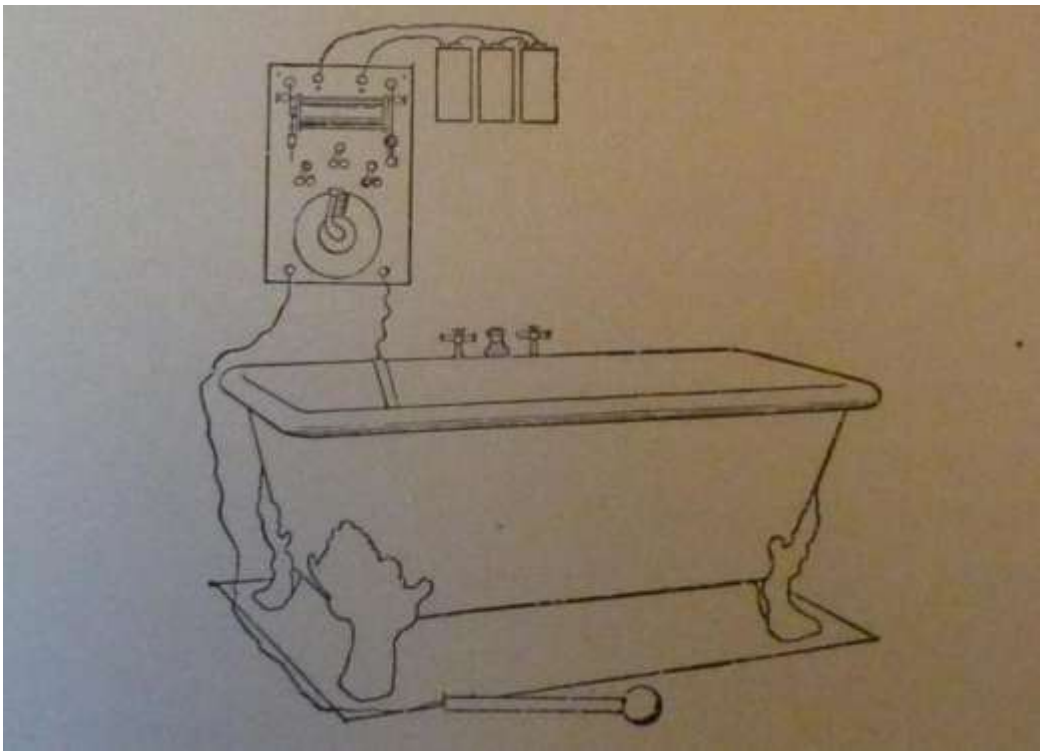

Figure 13: A sketch of an electric water bath, ca. 1900.[84]

[84] Bennett, *The Electro-Therapeutics Guide*, 95.

However, some gynaecologists did posit that hysteria could be triggered by external pressures. An 1868 article in the *Canada Lancet* observed that women who used sewing machines for a prolonged period could experience disorders of the reproductive system, such as dysmenorrhoea (intense pain during menstruation) and leucorrhoea (excess vaginal discharge), leading to hysteria. The article noted that "the motion of the limbs in working the machines occasions sexual excitement."[85] The labour of working the treadle was too much for the delicate frames of female youth. For Montreal-based Lapthorn Smith, school was to blame. Girls' brains were "using up all the blood that their enfeebled appetite and digestion can supply [which] means that the generative organs are being starved at the very time that they most require a plentiful supply of good blood for their development."[86] Smith was a product of his society and his observation was reflective of societal belief that women were the weaker sex. It would not have been unusual at the time for Smith to extend his "involvement to encompass not only the physical causes but the social and moral ones as well."[87] This allowed him to reassert his own importance and offer remedies, many electrical, to reverse the ill-effects of reproductive disorders, and thereby cure women of their hysteria.[88]

George Apostoli helped to popularize the use of electricity in gynaecology.[89] The Paris-based doctor encouraged the use of galvanic and faradic currents in the treatment of

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[85] "Effect of Sewing Machines on Menstruation," *Canada Lancet* 1, no. 3 (November 1868): 56.

[86] Lapthorn Smith, "Disorders of Menstruation," in *International System of Electro-Therapeutics*, ed., G-157.

[87] Mitchinson, "Causes of Disease," 392.

[88] Goelet, Electrotherapeutics of Gynecology, 1–16; Hayd, "Electricity in Gynecological Practice," 1–5; Currier, *Under What Circumstances*, 6–15.

[89] Chauncy D. Palmer, "The Gynecological Uses of Electricity," undated booklet, ca.1894, 4.

gynaecological disorders, and his methods were adopted throughout Europe and North America. He popularized the use of specially designed electrodes that would introduce current into the uterus to treat female reproductive disorders, such as amenorrhoea (the absence of regular periods) or dysmenorrhoea.[90] In a typical session, the patient would be placed in dorsal position, with her head and shoulders elevated and feet held in supports. The gynaecologist would insert an intra-uterine electrode, and establish the patient's tolerance to the current by gradually increasing it with the aid of a galvanometer.[91] The patient may have been told to keep perfectly still in order to avoid shock. If she complained of pain, the physician would reduce the current for a moment, before increasing it again in successive stages up to a maximum of 250 milliampères.[92] The gynaecologist would insert his bare hands into the vagina in order to adjust the electrode; some, like Smith, stressed cleanliness — "the hands have to be well washed and the fingers scrubbed with sublimate solution" — but it is doubtful that intra-uterine procedures were sanitary.[93]

Vibration and massage were also acceptable forms of treatment for hysteria at the turn of the century. Some gynaecologists noted that although it was a strenuous treatment, manual vaginal massage could at least "give the patient a measure of relief."[94]

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[90] J.H. Kellogg, "A Discussion of the Electrotherapeutic Methods of Apostoli and Others," in *International System of Electrotherapeutics* , ed. Bigelow, G53–G89.

[91] Hayd, "Electricity in Gynecological Practice," 3; Kellogg, "A Discussion of Electrotherapeutics," G65–G66; Engelmann, "The Faradic or Induced Current," A-175, A-180.

[92] Massey, *Electricity*, 58; See also Engelman, "Fundamental Principles," 6.

[93] A. Lapthorn Smith, "Electricity in Gynecology," *Canada Lancet* 20, no. 4 (December 1887): 99.

[94] Horatio Bigelow, *Gynaecological Electrotherapeutics* (Philadelphia: J.B. Lippincott Company, 1889), 170.

Either manually or with a specially designed tool, doctors would massage a woman's genitals until she reached climax. The process was often laborious and few physicians favoured it. As a result, historian Rachel Maines notes that the vibrator evolved into an "electromechanical medical instrument […] in response to physicians' demands for more efficient physical therapies, particularly for hysteria."[95] Electrotherapeutists argued that if the womb could be "brought into a healthy condition," hysteria could be cured, and electricity could provide the motive power to ensure instant relief.[96] The electric vibrator, introduced in the 1880s, required little skill to operate and was a quick alternative to manual stimulation. Facetiously referring to it as a "capital-labour substitution option," Rachel Maines indicates that the vibrator "reduced the time it took physicians to produce results from up to an hour to about ten minutes."[97] Personal vibrators were also on sale in the daily press, though none of them explicitly stated their use in vaginal stimulation.[98]

There seemed to be a consensus among medical electricians and gynaecologists adopting electrotherapeutics that intra-uterine electrodes and vibrators were only good for married women. Virgins required more non-invasive treatments. Smith argued that there was no form of reproductive disorder that warranted vaginal examinations in unmarried or virginal patients.[99] Instead, these women would receive treatment *over* their

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[95] Rachel P. Maines, *The Technology of Orgasm: 'Hysteria,' the Vibrator, and Women's Sexual Satisfaction* (Baltimore: Johns Hopkins University Press, 1999), 3.

[96] Chavasse, *What Every Woman Should Know*, 48.

[97] Maines, *Technology of Orgasm*, 4.

[98] Rachel P. Maines, "Situated Technology: Camouflage," in *Gender and Technology: A Reader*, eds. Nina E. Lerman, et al., 99 (Baltimore: Johns Hopkins University Press, 2003).

[99] Smith, "Disorders of Menstruation," G-151.

reproductive organs: "in virgins, the faradic current, one pole at the lumbar region and the other over the uterus, does remarkably well."[100] Another specially adapted treatment was the electric bidet (figure 14). Similar to the incandescent light bath, the bidet took the form of a box stool, with a back and arms. In the middle of the seat was a hole; below, six lamps would provide treatment. Mirrors positioned on the floor would reflect light and heat. This form of local bath was considered good for treatment in disorders of menstruation, but also rectal issues in both sexes. Medical electricians claimed that it would equalize the body's circulation, and relieve pain.[101]

These were modern solutions to modern problems. Men also experienced a gender-specific version of electrotherapy, except their illnesses were often linked to Beard's concept of neurasthenia. And much like hysteria, few medical electricians could precisely define what neurasthenia was.[102] Doctors would ascribe neurasthenia to a patient suffering a variety of symptoms, including insomnia, indigestion, constipation, irritability, depression and physical fatigue. They also defined it by class, age, and gender. At Beard's time of writing, neurasthenia was seen as an illness of the upper classes, but with the spread of electrical technologies, it was adopted as "an illness of the masses."[103] The average age of a sufferer tended to range from twenty-one to thirty-five, when, according to Canadian electrotherapist Jeanne Cady Solis, "the strain and stress of

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[100] Bigelow, *Gynaecological Electro-Therapeutics*, 158.

[101] Bennett, *The Electrotherapeutics Guide*, 194–95.

[102] Elmore S. Pettyjohn, "The Differential Diagnosis of Neurasthenia and its Treatment," *Dominion Medical Monthly* 5, no. 7 (November 1896): 492–94.

[103] Killen, *Berlin Electropolis*, 2.

life [were] the greatest."[104] These stresses were especially acute in males who suffered one particular symptom that helped to establish neurasthenia as a predominantly male illness: impotence.[105]

Impotence was a taboo subject in Victorian Canada, where social propriety was often delineated by strict gender codes. Erectile difficulty was equated with moral weakness — but a physical imbalance caused by psychological pressures associated with neurasthenia helped to legitimize a man's loss of sexual power.[106] Beard and Rockwell encouraged the use of electricity as a remedial agent in sexual problems.[107] By casting the blame for lack of sexual prowess on modern life, Beard and Rockwell helped to shift the attention away from men whose impotence was traditionally blamed on sexual excess and moral delinquency in the form of masturbation. Historian Angus McLaren notes that some doctors made attempts to attribute impotence to physical and organic causes, such as cancer, malformations, or venereal disease.[108] Canadian electrotherapeutists absorbed all of this reasoning into their own literature and advertisements for electrotherapeutic procedures and devices.

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[104] Jeanne Cady Solis, "The Psychotherapeutics of Neurasthenia," *Canada Lancet* 39, no. 1 (September 1905): 93.

[105] M. J. Grier, *The Treatment of Some Forms of Sexual Debility by Electricity* (Philadelphia: The Medical Press, 1891), 5–15; A. R. Rainear, *Electricity in the Treatment of Male Sexual Disorders* (Philadelphia: n.p., 1896).

[106] Angus McLaren, *Impotence: A Cultural History* (Chicago: University of Chicago Press, 2007), 116.

[107] A. D. Rockwell, *Electrotherapeutics of the Male Genital Organs* (New York: William Wood, 1874), 7–12.

[108] McLaren, *Impotence*, 131.

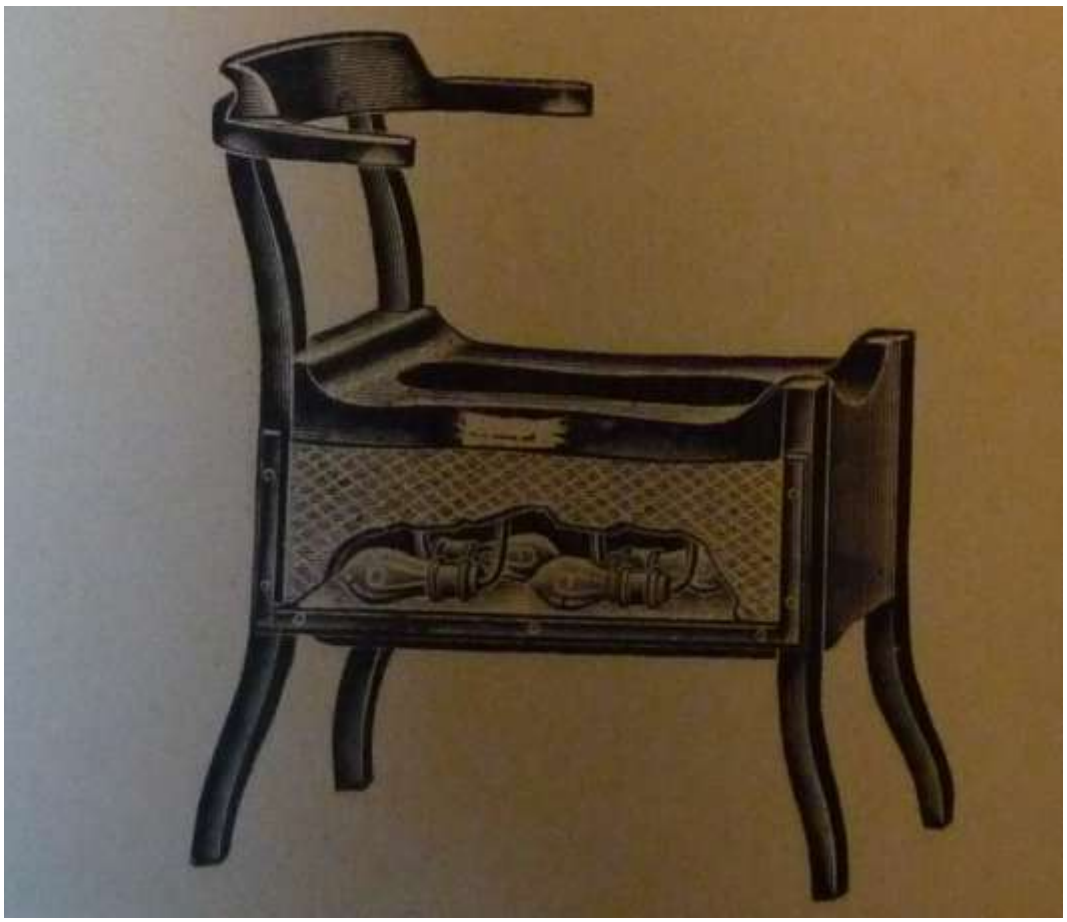

Figure 14: A sketch of an electric bidet, ca. 1900[109]

[109] Bennett, *The Electrotherapeutic Guide*, 194.

The enterprising medical electrician offered a variety of electric solutions to man's contemporary problems, and one of the earliest forms of treatment was the electric belt. De la Pena notes that in the United States, electric belts were the most popular form of treatment for impotence well into the 1920s.[110] Statistics on belts sold in Canada are not available; however, a proliferation of advertisements for this product occurred from the 1890s through the early decades of the twentieth century, suggesting a similar, though delayed, trend in Canada. Belts tended to vary from simple constructions made from cloth and galvanized discs to high-end versions made from silk, with brass capped batteries hidden inside leather liners.[111] Electric belts were relatively harmless, although some early versions had exposed zinc electrodes, which could cause burning or blistering of the skin.[112]

Instructions for electric belts varied, but generally, patients were to remove the batteries, immerse them in acid or vinegar, wipe off any excess moisture and replace them in the belt. This was meant to "charge" the batteries. According to the directions for one belt, the patient was to "buckle the belt snugly on the body around the naked hips, with the back plates resting on the base of the spine […] and pass the testicles through the loop in front which contains small silver plates."[113] These belts could be worn during the day, or at night to provide the "vitalizing power of electricity" while the patient slept.[114]

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[110] De la Pena, *The Body Electric*, 149.

[111] Andrew Chrystal, "Catalogue of Professor Chrystal's electric belts and appliances: consisting of electric belts and bands, electric belts with suspensory appliances," (Michigan: undated pamphlet, ca. 1899), 6–7.

[112] "A Victim of the Bare Metal Electrode Belt," *Globe*, 12 July 1900, 5.

[113] Museum of Healthcare of Kingston, File: Pamphlets, Museum Catalogue No. 003.050.036f, "Directions and General Remarks," n.d.

[114] "I Cure Varicocele!" *Globe*, 18 September 1900, 9.

Later versions of the belt would include a cord and plug, and the patient would literally plug himself into the wall to receive treatment.[115] Advertisements for electric belts were targeted at men and framed in neurasthenic terms. "Worn-out" and "weak men" were encouraged to seek treatment from specialists or to purchase electric belts for home use. Manufacturers promised that their belts could reverse youthful indiscretions by providing the "vitalizing power of electricity direct to all weak parts, developing the full, natural vigor of manhood."[116] The images associated with these advertisements were often suggestive of the relationship between penile health and masculinity — men "cured" by electric belts were featured with broad shoulders, Herculean strength, and defined muscular form. The "debilitated man," on the other hand, was frail, often depicted in a seated or slouched position, with slumped shoulders and a worried facial expression.[117] The electric belt, as a restorer of the body's natural life force, was frequently shown with tiny lightning bolts shooting out from the batteries, and occasionally, from the wearer himself. These images not only reflected Victorian notions of masculinity, they also helped to define the social meaning of electricity by promoting electrical medical technologies as the modern cure for the modern man.

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[115] Carolyn Thomas de la Pena, "Plugging in to Modernity: Wilshire's I-ON-A-CO and the Psychic Fix," in *The Technological Fix: How People Use Technology to Create and Solve Problems*, ed. Lisa Rosner, 44–53 (New York: Routledge, 2004).

[116] "No Cure, No Pay," *Globe*, 29 May 1900, 9.

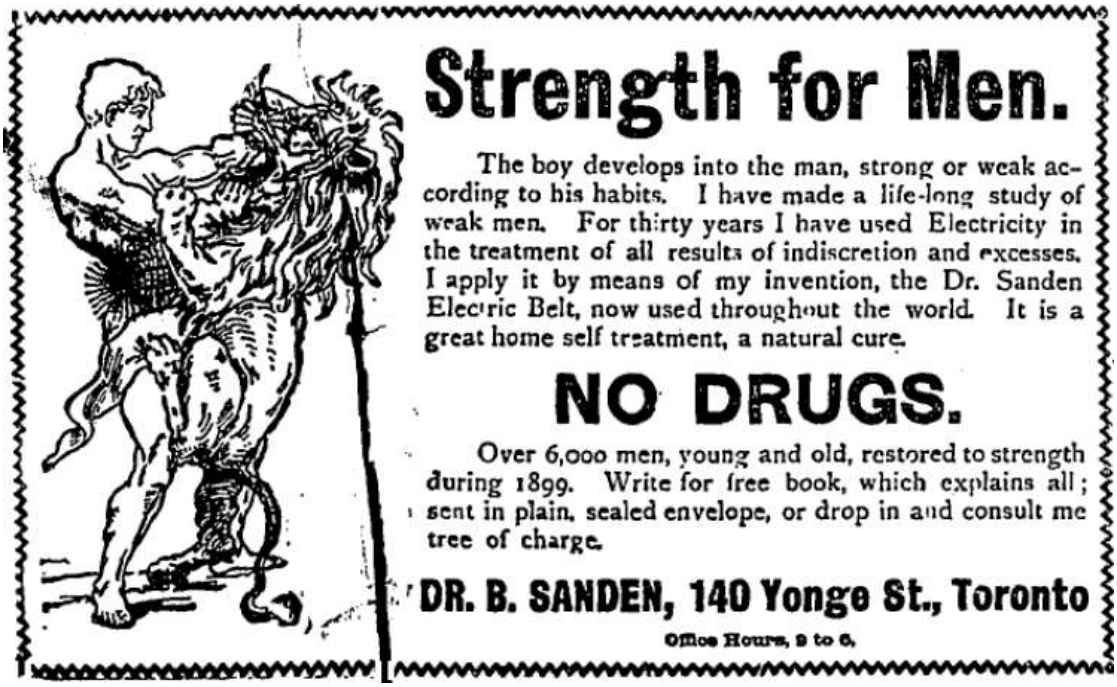
[117] "The Debilitated Man," *Globe* 2 January 1900, 7.

III

Electric belts and personal vibrators marked a transition in electrotherapy from a service sought out in a medical office to a treatment performed at home. Medical electricity as a speciality began to decline in the 1910s and 1920s, mostly thanks to the organizational efforts of orthodox practitioners who favoured developments in biochemistry over electric therapy to relieve pain or treat disease.[118] The leverage held by the regular medical community shunted electric medicine and other categories of fringe medicine, such as homeopathy or hydrotherapy, further to the sidelines. But facets of electrotherapy continued to linger. Although electricity shed some of its mystique as it became commonplace in urban areas during the interwar years, its purported healing properties continued to evolve. Widespread domestic electrification allowed Canadians to bring electric goods into their homes — as we learned in the last chapter, this usually came in the form of appliances such as irons, toasters, ranges, and refrigerators. But it also came in the form of portable electrotherapeutic devices, often with the light bulb as the medicinal agent.

The primary health effect of electric lighting was to conserve eyesight. Advertisements and articles published during the interwar years stressed the importance of adequate illumination in the home, the school, and the workplace. A December 1916 *Hydro Bulletin*, circulated to homeowners and businesses across Ontario, reflected contemporary knowledge in its declaration that there was a "direct relation between lighting and health." But, the pamphlet clarified, "this was not a question of lighting by

[118] Connor, "'I am in love with your battery'", n.p.



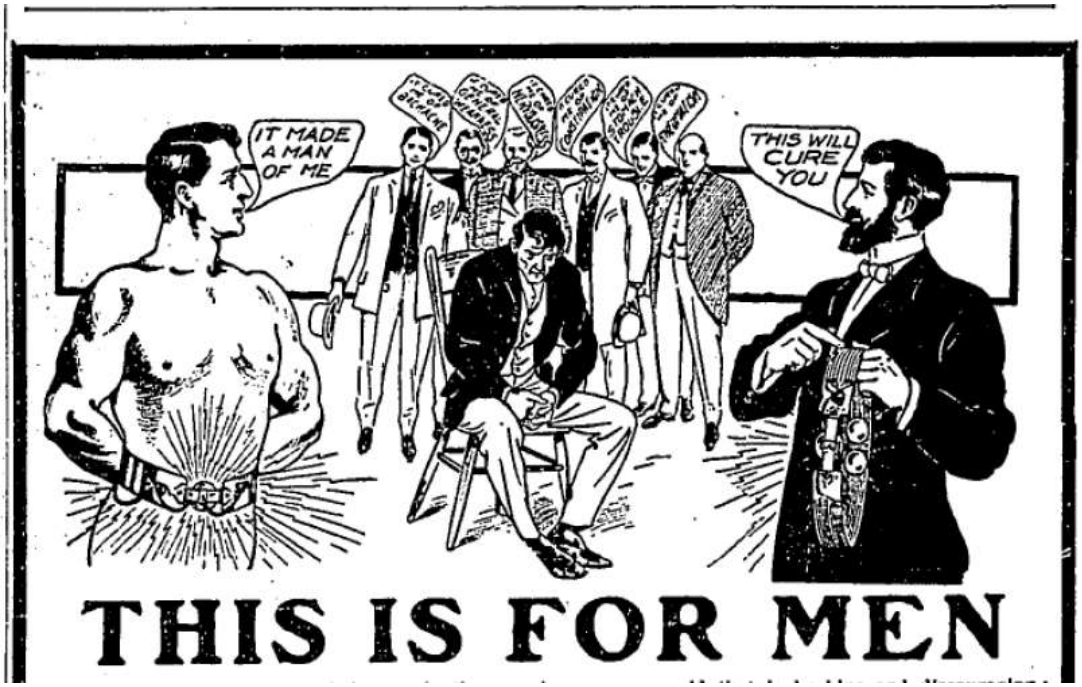


Figure 15: Advertisements for Dr. B. Sanden's electric belt, appearing in the *Globe*, 1900 and 1910, respectively.[119]

[119] "Strength for Men," *Globe*, 1 February 1900, 5; "This is for Men," *Globe*, 19 November 1910, 12.

electricity versus gas, but of different degrees of illumination by electricity."[120] The publisher of the bulletin, the HEPC, had a vested interest in promoting electricity; but an examination of literature published after the First World War reveals a general acceptance of the electric light bulb, although an artificial construct, as a natural replacement for sunlight. Electrical manufacturers and utility companies were on the frontlines promoting adequate illumination standards. The Calgary Electric Light, Heat and Power Company even offered a free "measured light" service, where a trained lighting advisor would test light levels in a customer's home to ensure eye safety. "Light is cheap," claimed the company. "But the eyesight of yourself and your family is priceless."[121] In 1924, BCER, along with other utilities, manufacturers, and electric service leagues, hosted a national "Better Home Lighting Campaign."[122] It undertook an advertising blitz in major magazines and newspapers in the summer months to inform families of the contest, and distributed registration cards to participating elementary and high schools in the fall. [123] Interested students were to return the cards in exchange for a Home Lighting Primer, which was filled with activities designed to teach youth about adequate domestic lighting.[124] Newspapers and magazines were littered with

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[120] "Relation of Health to Illumination," *Hydro Bulletin*, December 1916, 11.

[121] City of Calgary Electric System Fonds, Series: II, Box: 12, Public Relations: Newspaper Ads, "Who is this girl?", n.d.

[122] "Better Light — Better Sight," *Canadian Electrical News* 42, no. 20 (15 October 1933): 21.

[123] "The Better Home Lighting Campaign." *BC Electric Employees Magazine* 7, no. 5 (August 1924): 6.

[124] "Big Home-Lighting Contest Draws Near," *BC Electric Employees Magazine* 7, no. 5 (October 1924): 12.

advertisements and articles promoting the ability of electric light to banish poor lighting and, as one contemporary put it, to "ton[e] up the human system."[125]

Canadians believed that electric light emitted similar, if not identical, health-giving rays as the sun.[126] Even farm animals exposed to electric light were said to transfer its medicinal qualities to humans: "not only do cows and hens like it, but the treatment makes the quality of the milk and eggs much better; babies fed such milk are practically immune to rickets."[127] By the interwar years, it was well known that lack of vitamin D could cause bone softening, especially among children, and if electric light mimicked the sun, then it was not surprising that electric bulbs and lamps could be used to treat or cure the disease. And similar to Beard and J. Adams's nineteenth-century promises that electricity could cure a run-down body, utility companies and electrical manufacturers in the 1920s and 1930s promoted the idea that electric light could restore vitality to anyone lacking access to sunshine.[128] A promotional campaign for the Majestic Electric Heater, published in London Hydro's circular *The Live Wire*, called the unit a "portable sunbath."[129] One advertisement depicts a sketch of a sun's rays shining down onto a lamp, which in turn projects the same rays onto a family gathered together in the evening, demonstrating how the device could harness the power of the sun, even at night.[130]

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[125] "Modern Tendencies in Illumination," *Hydro Bulletin*, June 1930, 214.

[126] For examples, see: "Faulty Lighting and Poor Eyesight," *Hydro Bulletin*, October 1924, 409; "The Lamps of a Home," *Chatelaine*, April 1930, 23; "Guard your eyes with E.M.L.," *Chatelaine*, October 1931, 60; "Look to Your Lamps," *Chatelaine*, October 1931, 63; "Eyes are priceless. Light is cheap," *Chatelaine*, October 1940, 49.

[127] "Electric Sun Makes Contented Cows and Hens," *Hydro Bulletin*, June 1928, 215.

[128] "Capture the vitality of sunny summer," *Chatelaine*, November 1931, 55.

[129] "Electric Sun Baths," *The Live Wire*, December 1923, 2.

[130] "Healful Comfort with that Majestic 'Sun Heat'," *Live Wire*, April 1920, 5.

By the 1920s, a new device had entered the market that promised to "extol the remedial value of electricity": the violet ray apparatus (figure 16). This was a portable unit, which usually included a handle, several glass tubes in varying shapes and sizes, and was designed to apply high frequency electricity to the body. Depending on the affliction, the user would attach the appropriate glass tube (often called an electrode) into the handle, plug in the device, and rub the applicator over any sensitive area. For problems affecting the bladder or reproductive areas, the appliance would be inserted into the body. The glass tube would sometimes give off a purplish glow, emit heat, and, if using a metal-tipped electrode, dispense an electric shock. The Branston Violet Ray High Frequency Generator was the most publicized violet ray kit in Canada. Little is known of its proprietor, Charles A. Branston; a patent application for a high frequency vibrator dated 8 June 1920 lists his place of residence as Toronto, though some archival personnel speculate that he was originally from the United States.[131] Chas A. Branston, Ltd. sold these kits across Canada, and by the mid-1920s the information booklet for its signature apparatus had gone through eight editions.

By this time Canadians would have been aware of the purported benefits of violet rays in health care; like electricity, few probably could have described what it was or how it worked, but the idea of "light therapy" via violet rays would have resonated with the generation of Canadians already familiar with electrotherapy.[132] And like the electric medicine of the late nineteenth century, violet rays seemed to treat just about anything —

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[131] Canadian Intellectual Patent Office, Canadian Patents Database, "Vibrator for High Frequency Electro-Medical Apparatus," Patent No. CA200714, 8 June 1920.

[132] Fielding, *How the Sun's Rays Will Give You Health*, 10.

from general debility, "popularly known as 'that tired feeling'" to "retarded growth in children" and "muscular and nervous disease in adults."[133] Ultra-violet rays were shown to kill germs, and appeared to help sufferers of tuberculosis and, as mentioned previously, children with rickets.[134] The Chas A. Branston company pitched its violet ray kit as a "cure-all" that could be used in the home, either by a physician or by oneself (figure 17). The High Frequency Generator supposedly treated asthma, baldness, colds, sexual disorders, bladder infections, paralysis, influenza, sore throat, and toothaches among other ailments.[135]

Violet ray treatment could be applied in one of three ways: inhalation, surface massage, or insertion. It was to be used primarily as a sedative with several prescribed benefits, two of which were to generate oxygen and to increase blood circulation. The sparks created by the Branston Violet Ray kit were supposed to create ozone — "whenever a spark passes through the air, ozone is liberated"— which the patient would then breathe in as a form of treatment.[136] The company claimed that "daily treatments of ozone cleanses and revitalizes the blood, thus enabling it to guard against attacks of sickness and disease."[137] To increase blood circulation, the user would pass a task-

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[133] "Electricity in Medicine," *Hydro News* 24, no. 3 (March 1947): 4; "Branston Health Lamp," *Chatelaine*, May 1930, 62.

[134] "What do we Know About Ultra Violet?", *Canadian Electrical News*, 41 (1 April 1932) 7, 32; "Ultra Violet Rays Kills Germs," *Canadian Electrical News* 42, no. 11 (1 June 1933): 17; Fielding, *How the Sun's Rays Will Give You Health*, 23.

[135]Museum of Healthcare, Museum Catalogue No. 007.010, Catalogue No. 15, File: Pamphlets, "Health Rays from the Branston Violet Ray Generator, ca. March 1920.

[136] Charles A. Branston, *The Branston Violet Ray High Frequency Generator: Directions for Treatment and Instructions for Operating*, 8th ed. (Toronto: Chas. A. Branston Ltd., ca. 1926), 4; see also "Electrical Appliances for the Sick Room," *Live Wire*, December 1920, 22.

[137] Branston, *The Branston Violet Ray*, 22.

specific electrode over the affected area; for example, in the case of baldness or dandruff, an electrode in the form of a rake, designed "to make several points of contact at one time," was to be combed over the scalp, which would "destroy any germs [...] and increase circulation."[138] A final benefit of the violet ray kit was to heal the body from the inside out through the use of long, skinny tubes inserted into the body via the mouth, the rectum, the vagina, or (excruciatingly) the penis. The company advised only turning the current on once the electrode had been inserted, and to use plenty of lubrication to avoid shattering of the glass while inside the orifice.[139]

As an historical observer, it is clear that some of the prescribed uses of the violet ray kit were ludicrous at best and dangerous at worst. But hundreds, if not thousands, of these kits were produced and sold across Canada over a twenty-year time span.[140] Usage of these kits declined in the 1940s and 1950s in response to increased government regulation, but some forms of these devices have continued to surface, on television and in newspaper ads, but especially on the internet. Although in some cases the current uses of the unit have continued to retain a medicinal purpose (usually as a way to kill bacteria), many are promoted as toys for sexual pleasure. It is entirely possible that some of the early twentieth-century urban Canadians who purchased these kits incorporated the device into sexual play, but it is more likely that they were purchased and used for the purposes of healing specific afflictions. Whether or not they worked is subject to debate.

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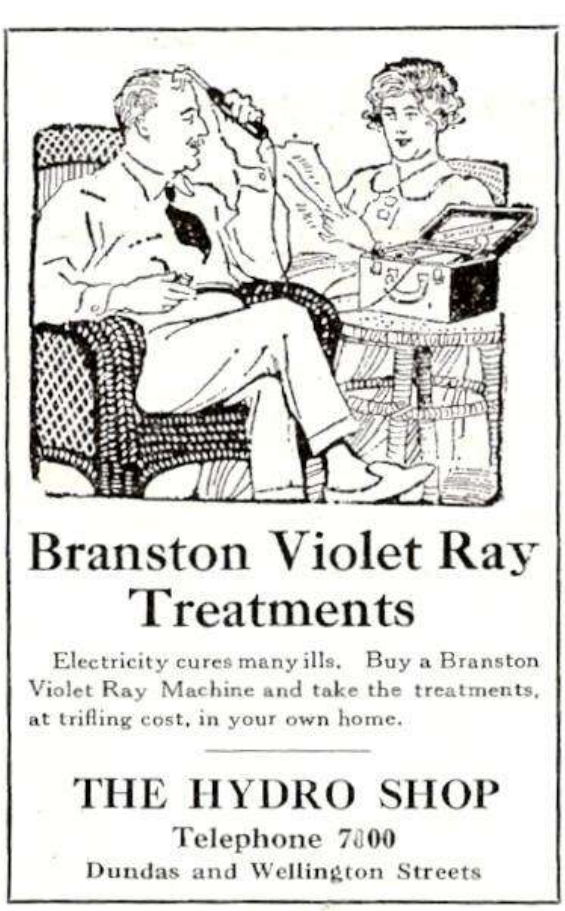
[138] Branston, *The Branston Violet Ray*, 6.

[139] Branston, *The Branston Violet Ray*, 7.

[140] Although official numbers are unavailable, evidence of their popularity exists in the countless numbers of kits that continue to be sold in consignment shops, antique stores, online, and that are donated to local and national museums.



Figures 16 and 17: Advertisements for the Branston Violet Ray Kit, 1920s.

IV

It would be easy to dismiss violet ray kits, electric belts, light baths and bidets as pseudo-medicine serving no real purpose except to line the pockets of doctors and manufacturers. This is especially true if we are too narrow in our definitions of "pain" and "cure". The *Oxford English Dictionary* defines pain as "a strongly unpleasant bodily sensation such as is caused by illness or injury; mental suffering or distress."[141] How we describe our own pain is entirely personal and impossible to quantify; author Marni Jackson refers to it as "the sasquatch of science, never witnessed, only endlessly speculated on."[142] As defined by the dictionary, if we are "cured" of our pain, it means:

> v. make healthy again after suffering from a disease or medical condition; end (a disease, condition, or problem) by treatment or remedial action. [...] n. a substance, treatment, or remedy that cures a disease, condition, or problem; restoration to health.[143]

If a person using an electrotherapeutic device *believed* she was cured of her pain, then could we not say that that application of electricity worked? In other words, even if medical science pointed to the impossibility of many electrotherapeutic claims in curing disease, we ought not to discount the possibility of the placebo effect in satisfying the user who *assumed* that it would work. The popularity of electrotherapy suggests that

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[141] Catherine Soans and Angus Stevenson, eds., *Oxford English Dictionary*, 11th ed. (Oxford: Oxford University Press, 2004), 1028.

[142] Marni Jackson, *Pain: The Science and Culture of Why We Hurt* (Toronto: Vintage Canada, 2003), 11.

[143] Soans, *Oxford English Dictionary*, 351.

users did extract some benefit from these devices, otherwise electric medicine and all of its incarnations would not have persisted for as long as it did.[144]

Canadians understood electricity in the context of the world around them. Electric medicine matured at a time when the telegraph was shrinking distance between provinces and countries; when Faraday's discoveries were proving their worth in industrial machinery; when streetcars were transforming the urban landscape; when Thomas Edison was turning night into day. Electricity powered these innovations, but how it worked remained a mystery. Medical electricians inserted themselves as voices of authority by providing definition to electricity for a society largely ignorant about its properties. Electric technologies were still in their infancy, and the social meanings of electricity remained ill-defined. Journalists touted it as a "mysterious agent" and a "powerful force." At least one reporter labelled it a "fluid," not unlike the blood that flows through human veins.[145] Some medical electricians capitalized on these descriptions, and maintained that electricity was "food" and just as it powered the modern world, it powered the human body.[146] The electric means to replenish the body in the 1870s through the 1940s was readily available, but the Canadians who received treatment were not simply pawns in the process — they had a choice. If it was cheaper to visit an electrotherapeutist than a regular physician, the decision was an easy one. And if they were dissatisfied with the service, it is unlikely that they would have returned.

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[144] De la Peña, *The Body Electric*, 110.

[145] "Electricity on tap," *Globe*, 21 June 1913, 6.

[146] C.H. Bolles and M.J. Galloway, *Electricity: Its Wonders as a Curative Agent* (Philadelphia: Philadelphia Electropathic Institution, n.d.), 2.

A July 1924 exposé by *Saturday Night* magazine reveals how a patient might have been duped by a quack medical electrician. A healthy reporter visited a medical electrician in Toronto, with claims of stomach trouble. He reported that the physician forced him to sit on a chair — facing west — before making a slight incision on the ring finger of his left hand: "This, the doctor explained, was part of the prescribed formula and a necessary course."[147] The author was told to come back the next day for diagnosis and treatment. The following day, the physician told the author that the blood showed a stomach ulcer and a diseased tonsil, to which the author noted, "my tonsils are in perfect condition but to encourage him I simulated surprise and told him that I had had trouble with my tonsils. He looked down my throat and pretended that what he saw confirmed the diagnosis." The author was then stripped to his waist and seated on a chair — again, that faced west. The chair was insulated by a rubber mat. He was attached to a machine "that looked like a radio set" with a number of aluminum plates. The physician turned on the device and "as he had been careful to explain, nothing would happen," wrote the author; "I could feel absolutely nothing. He told me not to cross my legs [because] it would interfere with the treatment. I sat there for an hour. I did not go back."[148] This particular doctor also claimed that with his electric machine, he could determine a patient's religion and political affiliation — and charged $124 for thirty treatments.

Because most people at the turn of the century did not fully understand electricity, medical electricians had an audience ready to be sold on the idea that it could cure them. One Ottawa woman reportedly believed that riding on a streetcar would cure her

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[147] "Curing the Sick by Machinery," *Saturday Night*, 26 July 1924, 9.

[148] "Curing the Sick," *Saturday Night*, 26 July 1924, 9.

rheumatism.[149] In the case of the Toronto physician, *Saturday Night* rightfully exposed this individual as a fraud, and medical electricians sought to distance themselves from charges of quackery by asserting the scientific merits of their practice; "the greater the scientific literacy of the doctor and patient, the more acceptable would therapeutic electricity become."[150] Many practitioners published material about electrotherapy in the late nineteenth century, intended for general physicians, medical students, and the public. Most stressed that electrotherapeutists become electricians first, and physicians second. "To undertake the practice of electro-therapeutics without a thorough knowledge of the fundamental principles and laws of the science of electricity," American physician Wellington Adams wrote in 1891, "is as ridiculous and impracticable as would be an effort to carry on chemical analysis without having first become conversant with the principles of chemistry."[151]

Despite their best efforts, medical electricians could not stop the decline of electrotherapy in the twentieth century. As regular practitioners became professionalized, the pluralistic medical society of the nineteenth century shifted to a more concentrated orthodox health care in the twentieth century.[152] The influx of useless devices into the market, coupled with an increasing risk of harm to patients by unlicensed, untrained, and self-styled physicians, led to harsh criticism against electrotherapy. Doctors became

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[149] As reported in *Canadian Electrical News* 1, no. 5 (May 1891): ix.

[150] Robert Newman, "The Want of College Instruction in Electrotherapeutics," *The Electrical Journal*, 1 October 1896, 1–8; William J. Herdman, "The Necessity for Special Education in Electrotherapeutics," undated pamphlet, xxv–xxxii; Senior, *Rationalizing Electrotherapy*, 56.

[151] Wellington Adams, *Electricity: Its Application in Medicine and Surgery* (Detroit: George S. Davis, 1891), 2; see also Julius Althaus, *Report on Modern Medical Electric and Galvanic Instruments*, (London: T. Richards, 1874) and Robert Amory, *A Treatise on Electrolysis and its Applications to the Therapeutic and Surgical Treatment in Disease* (New York: William Wood, 1886).

[152] Jacalyn Duffin documents this world-wide trend. See Chapter 6 of her *History of Medicine*.

increasingly intolerant of unsatisfactory treatment, and many shifted their attention to the promising developments in bacteriology and germ theory.[153] These discoveries meant that electrotherapy could no longer rely on its purported scientific merits; if electric machinery and modern life were not the cause of illness among Canadians, then the body did not need to be "recharged" in order to be healed. It was not just professional taste that was changing — personal tastes were changing as well. Although facets of electrotherapy continued to evolve (the well-publicized developments in shock therapy in the late 1930s for treating mental illness is a prime example), by the time electricity became a part of everyday life, it lost some of its mystery, making it difficult for the average Canadian to continue viewing it as a magical cure.

[153] Duffin, *History of Medicine*, 81–84.

Conclusion

The summer of 2003 marked the 125th anniversary of the Canadian National Exhibition. Fair organizers had planned a grand celebration, but the day before festivities were to begin, an unprecedented power outage plunged nearly 50 million people from New York to North Bay into darkness. Writing for the *Sunday Sun*, Mike Filey noted the irony "that one of the things the CNE had promoted so vigorously over the years, 'electricity, the wonder of the age,' would return one day to haunt the 'Grand Old Lady by the Lake'."[1] Four days after the 13 August blackout, the midway was allowed to resume schedule, but in a departure from its century-old practice of over-indulgent electrification, a spokesperson for the fair warned visitors that the exhibition would be operating at fifty-percent of its usual electricity consumption: "fountains won't be running; illuminated signs will be turned off; lighting on exhibits and stage shows will be lowered; and buildings won't be air-conditioned."[2] If electricity was a barometer for excitement, then it would also have been half the fun.

Outside the fairgrounds, much of Toronto's (and Ontario's) infrastructure was paralyzed. Subways were frozen. Elevators were stuck. Airplanes were grounded. Stores were closed. Commuters were stranded. Offices were emptied. Streets were clogged. Television stations were knocked off the air. Streetcars were immobilized. Computers shut down. Traffic lights were blacked-out. Ice cream melted. And cell phones could not

[1] Canadian National Exhibition Archives, File: Electricity at the CNE, *Sunday Sun* newspaper clipping, 24 August 2003.

[2] "Still a way to go before life back to normal," *Globe and Mail*, 18 August 2003, 4.

connect calls. Critics immediately pointed to the fragility of the cross-border electrical grid for "knocking […] Eastern North America back to the 19th century."[3]

Out of the chaos and uncertainty surrounding the power outage emerged stories of kindness and gratitude. *Globe and Mail* journalist Jordan Heath-Rawlings commented that "it was like someone had flipped one giant switch, turning off Toronto's power supply and turning on the city's sense of humanity."[4] On busy street corners, citizens directed traffic, while concerned residents supplied emergency personnel with cool refreshments and water.[5] These were scenes repeated in other parts of the province, where residents left the quiet darkness of their homes to congregate in the streets, and greet neighbours and passersby.

Although the 2003 blackout was not the first in history, it was the largest of its kind, and was quite likely one of the few times that any of the affected people considered their absolute reliance on electricity in their day-to-day lives. Although electric technologies had given them some measure of power to control how they lived, being connected to the electricity grid also meant that they were divorced from the power source. When an alarm system failed to alert workers in the control room of an Ohio generating station to a problem with its transmission lines, which caused the cascading blackout that hot summer afternoon, it was not just the technologies that were disconnected; people were disconnected, too. It forced Ontarians to snap out of their somnambulistic reliance on electric technologies that controlled their movements, that

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[3] "Massive failure highlights system's fragility, *Globe and Mail*, 18 August 2003, 01.

[4] "Amid a potentially disastrous situation men and women started directing traffic," *Globe and Mail*, 18 August, 2003, 2.

[5] "Torontonians play good Samaritan," *Globe and Mail*, 15 August 2003, 2.

supplied their information, and that cooked their food, and to rely on fellow citizens instead. While some may have enjoyed being forced to "power-down", others may have suffered from withdrawal, waiting anxiously before they could "re-connect."

Indeed, so many of us have come to take electricity for granted in our everyday lives that the only time we even think about it is when it is not working. Some of us are so dependent on electricity that we sometimes regard electric technologies as extensions of ourselves, and when they do not work, we somehow forget how to function as well. Any student whose computer has mysteriously lost an important document can attest to feelings of shock, denial, and immobility. But how did we get here? At what point did electricity become so ingrained in our culture that an entire society can practically shut-down because of a lost connection? The answers to those questions are long and intricate, and this dissertation has tried to answer them at least in part by examining how and to what extent we introduced electric technologies into our lives from the late nineteenth century until just after the Second World War. The reliance on electricity that has built up over the past sixty years (and the environmental consequences of that reliance) is an important area of study that is open to future historians. It is my hope that this project has at least laid the foundation for those future students who also pose queries about the role of electricity in our everyday lives.

What this earlier period of electrification can tell us is that there were at least two principal factors at play that contributed to the success of widespread electrification: government support and a quest for modernity. The support of local and provincial governments for electric power was instrumental in ensuring that electricity would become a formidable opponent to other forms of power supplies. In the late nineteenth

century, hydroelectricity in particular was seen as a way to wean Canada from its reliance on imported coal and to ensure that the country would evolve its industry to meet the demands of the twentieth century. While recognizing that private interests initially controlled the majority of electric generation in Canada, it is nonetheless true that, broadly speaking, governmental identification of electricity's potential provided a strong impetus for electrification. As we have seen, the early governmental push for electrification was stronger in some provinces, most notably Ontario. It was also an urban phenomenon for the first seventy years. Consider, for example, the desire among local municipalities to incorporate electric streetcars and electric lighting into their urban schemes. Political officials firmly believed that in addition to dazzling the eye of the spectator and generating civic pride, a "Great White Way" would also attract business interests to their cities, and help establish a thriving commercial centre. Canadians first experienced electricity in these public settings via street cars, shop windows, street lights, and at fairs, and learned about other electric novelties that appeared to be dissolving time and distances (such as the telegraph).

Urban electrification created the perception of a new standard of living in Canada, one powered by electricity. Even in the realm of personal health, electricity played a role. And why not? With electricity powering so many aspects of Canadian lives it would not have been inconceivable to think that electricity could power their own bodies as well. Canadians at the turn of the century were acutely aware of the speed of change that characterized the period they were living in. Electricity was being used to intervene in urban, rural, and domestic environments, and was demonstrating its ability to automate lives. Canadians, perhaps, felt that they, too, were part of that process of technological

evolution and began to view their own bodies in technical terms. Being told that electricity was the fuel of the future, and seeing it at work around them, led many to equate electricity with modernity. And what better way to heal the body than by the most modern means available.

Politicians, electrical manufacturers and utilities promoted an electrical lifestyle to Canadians, promising that a completely automated life meant a better life. As electricity became more firmly entrenched in urban centres by the 1920s, officials at the provincial level shifted their focus to rural dwellers, who, without access to central station electricity, appeared primitive. The disparity between urban and rural living conditions became a major political issue by the Second World War, and provincial governments developed comprehensive schemes to bring electricity to the farmer. Each province responded according to its own economic, geographic, and political circumstances, but a unifying link was the "connection between rural electrification and rural votes."[6] Once the census confirmed the fears of social commentators that the countryside was being depleted of its youth, who were drawn to the promises of a better life in the city, rural electrification became the ticket to keeping more people on the farm. Although there is no evidence to suggest that electrification stopped rural depopulation, by the Second World War farmers across the country were requesting electric service. Without government intervention it is unlikely that the majority of these Canadians would have been able to access central station electricity in the post-war years.

Once farming families were connected to central station electricity, they began to introduce electric technologies in their homes in an effort to raise their standard of living. Of course, some families had incorporated electric goods into their lives with the use of

[6] Fleming, *Power at Cost*, 18.

domestic-generated electricity in the form of wind, gas, or diesel power, but central station electricity promised uniformity in outlet design and erased any worries about inconsistent supply. The process of rural electrification remained slow and uneven across the country, though government intervention in the 1940s and 1950s made it unlikely that farming families would (or could) continue to operate outside the electrical grid in the post-war years.

Indeed, many Canadians wanted electricity. They equated electricity with modernity, and a personal desire for modern goods reflected a second factor that contributed to the success of widespread electrification. But even this quest for modernity was not uniform, and like rural electrification, it was reflective of the sometimes contradictory nature of the social history of electricity. Firstly, there was a generational gap between those who were encouraged by advertising to purchase electric technologies and those who actually purchased them. Statistical evidence suggests that, within the kitchen at least, urban Canadian families did not bring large appliances, such as refrigerators and ranges, into their homes until at least thirty years after they were introduced to market. But they did purchase smaller appliances, suggesting that cost was a factor, or that perhaps the technologies they did have remained in working condition. Anecdotal evidence suggests that when the children of these families purchased new, they purchased electric.

Institutional support for electric power was greeted with approval from Canadians on the ground so much so that by the Second World War, the idea of an electrical lifestyle had built up enough momentum — to borrow Thomas Hughes's phrase — that it would have been nearly impossible for Canadians to deviate from that path. Of course,

electricity was not, and is still not, the only option. But electricity has become so standard that it is now taken for granted, and with enough people adopting an electrical lifestyle, our technological alternatives have become increasingly more limited. As Blair Tothill points out: "it is inconvenient to use a coal burning stove when the infrastructure for supplying coal no longer exists."[7] But for the Canadians living in the early twentieth century it may have been convenient to use a coal burning stove [...] or a gas stove *or* an electric stove depending on their circumstances. They were living at a time when alternate technologies existed in multiple areas of their lives, with no clear winner between the two dominant utility providers: gas and electricity. Electrification did not occur overnight, but by gradually incorporating electricity into their homes, cities, and farms, these Canadians helped make electricity an integral part of everyday life.

[7] Tothill, "Living Electrically," 130.

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Curriculum Vitae

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Education

The University of Western Ontario 2005 to Present
Faculty of Social Sciences: London, ON
Candidate for PhD in History

Thesis: *"The Powered Generation: Canadians, Electricity, and Everyday Life"*

Comprehensive Exams
Technology and Society
Post-Confederation Canada
Great Power Diplomacy

The University of Ottawa 2000 to 2005
Faculty of Arts: Ottawa, ON
Bachelor and Masters of Arts

Teaching Experience

May 2009: The University of Western Ontario. "Canadian Business and Labour History."

September to December 2009: Brescia University College. "Canada: A Survey."

May 2009: The University of Western Ontario. "Toward Today's Canada: Selected Themes and Topics."

September to December 2008: Brescia University College. "Canada: A Survey."

Course Design Experience

Course Designer, Brescia University College, HIS2814 "Men, Women, and Technology: An Historical Perspective," Fall 2011.

Research

Publications:

Co-edited with Jonathan Vance, *Bulletin of Bulletin of Science, Technology and Society*, 30/3, special issue on military technology, (June 2010).

With Megan Howatt, "Sniper Girls and Fearless Heroines: The Representation of Foreign Women in English Canadian Media During the Second World War," in Hacker, Bart (editor), A Companion to Women's Military History (Forthcoming 2011).

"Toaster"; "Electric Fan" in Staley, David (editor), Encyclopedia of the History of Technology and Invention (Forthcoming 2011).

"Another of those mad, wild schemes: Canadian Inventions to Win the Second World War," in *ICON* (Summer 2009): pp. 167–176.

With John Crosmun, "Taking Stock of *la Longue Durée*," in *Technology and Culture*, January 2007, Volume 48, Number 1, pp. 153–57.

"Attila the Hun"; "Hostages," in *Encyclopedia of Prisoners of War and Internment*, *Jonathan F. Vance* (editor). Denver, CO: ABC-Clio, 2006.

Book Reviews:

Review of Michael Brian Schiffer, Power Struggles: Scientific Authority and the Creation of Practical Electricity Before Edison, (Cambridge: MIT Press, 2009). Forthcoming, *Scientia Canadensis*, Winter 2010.

Review of Graeme Wynn, Canada and Arctic North America: An Environmental History, (Santa Barbara: ABC-Clio, 2007). *Technology and Culture*, April 2008, Volume 49, Number 2, pp. 498–99.

Review of R.B. Fleming, ed., The Wartime Letters of Leslie and Cecil Frost, 1915–1919, (Waterloo: Wilfred Laurier Press, 2007). H-Net Book Review, February 2008.

Review of John McKendrick Hughes, The Unwanted: Great War Letters from the Field (Alberta: University of Alberta Press, 2005.) *Canadian Military History Book Review Supplement*, Spring 2006.

Conference Papers:

"Vibrators, Virility, and Voltage: Electric Medicine in Canada," Canadian Science and Technology Historical Association Conference, University of Quebec, 27 September 2009.

"Nature's Tonic: The Psychological Value of Electrotherapeutic Remedies, 1890-1930," presented at the International Committee for the History of Technology, 35th Symposium, University of Victoria, August 2008.

"Why drop bombs when you can drop rattlesnakes?: Popular Inventions and Suggestions from the Second World War," presented at The 19th Military History Colloquium, University of Waterloo, 3 May 2008.

"Modernizing the Domestic Workshop: The Invasion of Electrical Servants into Canadian Kitchens, 1920–40," Canadian Science and Technology Historical Association Conference, 13 October 2007.

"'Another of those mad, wild schemes': Popular Invention in Canada during the Second World War," International Committee for the History of Technology, 33rd Symposium, University of Leicester, 16 August 2006.

"Lock, Stock, but no Smoking Barrel: The Bren Gun 'Scandal' and Canada's Armament Industry," Bruce McCaffrey Seminar, University of Western Ontario, 16 March 2006.

Invited Talks:

"Reconciling History? Research, Policy, and the Legacy of Residential Schools," delivered to second-year Canadian history class, Brescia University College, 11 January 2011.

How to prepare a research proposal," delivered to graduate students for the Professional Development Workshop Series, The University of Western Ontario, London, ON, 24 September 2009.

"Canadian Science and Technology during the Second World War," delivered to a fourth-year seminar on Canada and the Two World Wars, King's College, London, ON, 7 February 2008.

"'The Elements of Style': How to Prepare a Research Essay," delivered to a graduate level seminar on American History, The University of Western Ontario, London, ON, 23 January 2008.

"The Experiences of Enemy Aliens in Canada during the First World War," delivered to a fourth-year seminar on Canada and the Two World Wars, King's College, London, ON, 5 October 2006.

Service

January 2011 to Present: Communications Coordinator, Canadian Science and Technology Historical Association

2007 to Present: Student Representative, Canadian Science and Technology Historical Association

2006 to 2008: Chair, History Graduate Student's Association, The University of Western Ontario

2006 to Present: Member, Society for the History of Technology

Awards

History of Electricity Grant, awarded by the EDF Foundation (France), December 2009.

Graduate Thesis Research Grant, awarded by the University of Western Ontario, February 2009.

Alice Patience Fellowship, awarded by the University of Western Ontario, May 2008.

Ontario Graduate Scholarship, 2007–08 and 2009 –10.

Bakken Travel Grant, awarded by the Bakken Library and Museum (Minneapolis), March 2008.

Best Student Presentation, awarded by the Canadian Science and Technology Historical Association, 13 October 2007.

Fellowship awarded by the Lois and Ley Smith Foundation, August 2006.

Western Graduate Research Scholarship, awarded by the University of Western Ontario, 2005–09.