

UNIVERSITY OF WISCONSIN-EAU CLAIRE

FROM FANTASY TO REALITY:
THE IMPACT OF RURAL ELECTRIFICATION ON THE DAIRY FARMS OF WEST-
CENTRAL WISCONSIN

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To most farmers, electric service means a transformation from groping darkness to a lightened pathway—a relief from drudgery, chores, and the entrance into a system of comfort, convenience and accomplishment.

—Taylor Fouts, c.1930 farmer, *Electricity on the Farm and in Rural Communities*

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ABSTRACT

Prior to the mid 1930s, nearly all of rural America was without electricity. In conjunction with that reality, daily activities and tasks were performed in much the same way as they had been for generations. From 1935-1936, the U.S. Government, as part of President Franklin D. Roosevelt's "New Deal" economic recovery plan, passed legislation that created the Rural Electrification Administration (REA) and tasked it with organizing and administering a nationwide rural electrification effort. Functioning primarily as a lending institution, the REA vigorously and successfully promoted the formation of companies intending to extend electric service to rural areas. Over the course of the following two decades, those REA-financed rural electric providers, most of them cooperatives comprised of local farmers, built an extensive infrastructure of power plants, lines, and substations that offered central-station electric service to nearly every farm in America. On the dairy farms of west-central Wisconsin, electrical innovation in the form of various conveniences, appliances, and equipment revolutionized farm work and daily life. Leaving practically no area of farm life untouched, electricity vastly improved the standard of living for farm families, decreased the amount of time and effort required for daily work in the home and on the farm, and greatly improved the efficiency, production, and milk quality of the dairy farms in that region of Wisconsin.

INTRODUCTION

March of 1939 found brothers Walter and Otto Schumacher eagerly awaiting a long-overdue arrival to their farm. They were not waiting for the birth of a calf, nor were they waiting for the right opportunity to plant their crops. The two brothers, joint owners of a farm in Washington Township, just southeast of the city of Eau Claire, Wisconsin, had signed up nine months earlier, in June of 1938, to become members of the Eau Claire Electric Cooperative (ECEC)¹, at that time a fledgling electric distribution cooperative in only its third month of existence: a product of the extensive rural electrification effort recently launched by the U.S. Government and spearheaded by the newly created Rural Electrification Administration. Since that day in June, the brothers had been waiting for their electricity.

Due to the fact that ECEC was less than a year old, its grid of power lines was not yet very extensive, and it was several months before the steadily growing network of lines reached the Schumacher's property. As soon as it was affordable, the Schumacher brothers had their farm buildings and house wired for electricity by a professional electrician. That task completed, the brothers were ready to connect to the ECEC power grid and begin utilizing the highly-anticipated new power source. There was just one problem; for a variety of reasons, the ECEC lines had not yet been energized. For ten more days the brothers waited in anticipation, in the meantime hooking up their brand new system to the only source of electricity available to rural residents at that time, an early gas-powered generator known as a "light plant." Although this allowed them to enjoy their new wiring while they waited for ECEC to turn the power on, the light plant had very limited capabilities, producing barely enough electricity to power several dim 32-volt light bulbs and nothing else.

¹ Later changed to Eau Claire *Energy* Cooperative with the addition of a Propane tank service in the 1980s.

Finally, on the evening of March 3, 1939, after correcting some initial problems with the brand new power lines, ECEC activated their main sub-station and the lines hummed to life. Within hours the Schumachers were connected to the energized ECEC grid, bidding farewell to their light plant and becoming the very first ECEC members to receive electric power. The 32-volt light bulbs were discarded for good, and their 110-volt replacements glowed more brilliantly than any artificial light the rural community had ever before seen. All along the ECEC lines, farmers like Walter and Otto wasted no time in taking advantage of the extensive opportunities offered by the new electric service, and were soon purchasing various appliances and equipment that had previously only been available to urban dwellers and farms within the service areas of urban electric providers. This revolution in west-central Wisconsin, along with a multitude of similar experiences throughout the country, marked the beginning a new era in farming and rural life.²

Only eighty years ago, the landscape of rural America was almost entirely devoid of reliable central station electrical service.³ Electricity is something that most Americans today, especially urban residents, take for granted; power for the computer, phone, TV, DVD player, lights, microwave, etc. is readily available on-demand at any time of the day or night. Even during severe weather, power outages are quite rare these days. But for the farm families that comprised the vast majority of the rural population in the early 1930s, the fact that all daily activities had to be done without this convenience was accepted as a normal part of life and they made do with what they had.

² This narrative adapted from: Harvey Schermerhorn, *A Quarter-Century in Review: Eau Claire Electric Cooperative* (Wisconsin Electric Cooperative Association, 1963), 12-13.

³ “Central Station Electrical Service” – Electricity provided to a large area by a single entity, whether that be a power producer or distributor. For more information on this concept, see Schermerhorn, *A Quarter-Century in Review*, 5.

Despite the success of rural electrification programs in other developed and developing countries in the decade or so prior to the presidency of Franklin D. Roosevelt, it was still considered a radical action when, between 1935 and 1936, FDR's administration passed several pieces of New Deal legislation which together created the Rural Electrification Administration (REA) and assigned it the task of planning, organizing, and orchestrating a nationwide rural electrification effort. Rural America would finally be able to experience the conveniences that they had never dreamed would be made available to them.

Providing all of rural America with electricity was neither an easy nor a quick process, but in the space of roughly two decades, nearly every rural residence in the country—save those in the most sparsely populated regions—was wired for electricity or at least offered that opportunity. Needless to say, the arrival of reliable electrical service had a profound impact on the rural farming community. Just one electric wire running to a farm fundamentally altered nearly every aspect of farm operation and farm life, significantly impacting even the processes and procedures that had been performed essentially the same way for multiple generations. The arrival of electricity to the farm—most often made possible only through the efforts of rural electric cooperatives comprised of local farmers—brought with it a vast improvement in the standard of farm life, a significant decrease in the time and labor involved in both household and farm chores and operations, and a revolution in efficiency, production, and milk quality within the operational realm of the dairy farm.

This paper will examine life on the farms of west-central Wisconsin as it related to the presence or absence of electric service before, during, and immediately following the creation and main thrust of the rural electrification movement in the United States. For the purpose of this examination, farm life will be divided into two general spheres: the “domestic sphere”

encompassing living conditions and work within the farmhouse, and the “farm operations sphere” encompassing all farm work outside of the home. The purpose of this process is to emphasize—through an examination of electrical innovation in both spheres and the personal accounts of those who experienced those extensive changes⁴—the fundamental impact that the arrival of electricity had on these two spheres.

That radical change in farm life is one that is not always fully appreciated by those who did not directly experience it or its effects. The arrival of electricity left no aspect of farm residents’ lives untouched. Hopefully, this project, in addition to its main goal as stated above, will also emphasize to today’s farmers the role which electricity played in the development of life as they know it today and increase awareness and appreciation within the non-farming community of the value and importance of the rural electrification effort to those it affected.

The Historiography

As late as 1912, the concept of rural electrification in America was completely absent in the literature of the day.⁵ Shortly thereafter, many American farmers began to seriously explore the potential benefits and logistical implications of the implementation of electricity on their farms. Since relevant published information was non-existent, those farmers that were so inclined were forced to probe for answers in figurative darkness. Consequently, multiple written works regarding the possibility of electrical usage on American farms were produced in short order to aid in that process. One such source was a book entitled, *Electricity for the Farm: Light, Heat and Power by Inexpensive Methods from the Water Wheel or Farm Engine*, by Frederick

⁴ For the purpose of this project, several oral history interviews were conducted by the author. For a basic list of interview questions, see the Appendix of this paper. For a list of interviews used in this paper, see the “Eau Claire Energy Cooperative’s 75th Anniversary Oral History Project” section of the Bibliography.

⁵ John M. Carmody, “Rural Electrification in the United States,” *Annals of the American Academy of Political and Social Science* 201 (January 1939): 1.

Irving Anderson. Published in 1915, the book was basically a Do-It-Yourself guide, explaining in detail how a farmer could obtain electric light, heat, and power on his farm through the relatively inexpensive means of a water wheel, windmill, or internal-combustion engine.⁶

Many early sources like Anderson's book were clearly educational in tone and purpose, intended to make farmers aware of the enormous benefits that could be attained through electrification. A similar source, originally produced in 1935, was *Electricity in the Home and on the Farm* by Forrest B. Wright, professor of Agricultural Engineering at the New York State College of Agriculture. It was explicitly intended for "those who wish to gain a practical knowledge of electricity and its applications in the home and on the farm...designed with the needs of the teacher in mind," although Wright also acknowledged that the information was also extremely applicable to "the average householder and farmer."⁷

Several decades later, following the massive national rural electrification effort, historians naturally became intrigued by the extensive impact of electricity on rural communities. A prime example of this is a 1996 book by Ronald C. Tobey, professor of History at the University of California, Riverside, entitled *Technology as Freedom: The New Deal and the Electrical Modernization of the American Home*. In this book, Tobey explores the vast physical and social changes within American households that resulted from electrification.⁸ Although few historical works deal exclusively with electrification of individual farms, many sources that deal with rural electrification in general contain sections dedicated primarily to electrical innovations that significantly impacted farm life. The natural literary shift from the presentation

⁶ Frederick Irving Anderson, *Electricity for the Farm: Light, Heat and Power by Inexpensive Methods from the Water Wheel or Farm Engine* (New York: Macmillan, 1915).

⁷ Forrest B. Wright, *Electricity in the Home and on the Farm* (New York: John Wiley & Sons, 1950), xi.

⁸ Ronald C. Tobey, *Technology as Freedom: The New Deal and the Electrical Modernization of the American Home* (Berkeley, California: University of California Press, 1996).

of electricity as an exciting potential development within rural communities to a retrospective analysis of electricity as a harbinger of change in those communities allows one to obtain a broad understanding of the impact of rural electrification through the juxtaposition of the anticipated outcomes against the actual outcomes.

This paper will deal extensively with various electrical appliances and equipment that significantly impacted farm life. In light of this, additional consideration must be given to the literature concerning technological innovation, organization and utilization. Within that literature are two distinct paradigms. The first is referred to as “technological determinism.” Adherents to this paradigm view technology itself as the driving force behind technological development, inducing adaptation of organizational methods. Paul E. Ceruzzi, of the Smithsonian’s National Air and Space Museum, describes technological determinism as “the notion that technology is an impersonal force with its own internal logic and a trajectory that human beings must follow.”⁹ The second paradigm is known as “management of technology,” and is basically the opposite of technological determinism. Management of technology points to human action, planning, and management as dictating the progress of technological development. In other words, technology is adapted to fit the organizational system already in place.¹⁰ According to Ceruzzi, this paradigm presents a more “contextual approach to technology.” The popularity of these individual paradigms has fluctuated over time; however overall, technological determinism has lost significant ground to management of technology in recent years. Regardless of the decrease in

⁹ Paul E. Ceruzzi, “Moore’s Law and Technological Determinism: Reflections on the History of Technology,” *Technology and Culture* 46, no. 3 (2005): 585.

¹⁰ Jeffrey K Liker, Carol J. Haddad, and Jennifer Karlin, “Perspectives on Technology and Work Organization,” *Annual Review of Sociology* 25 (1999): 575-596.

support, technological determinism continues to be an undeniable component of the study of the history of technology.¹¹

One further divergence in the paradigmatic view of electrification is brought to light by Ronald C. Tobey in his previously-mentioned book, *Technology as Freedom: The New Deal and the Electrical Modernization of the American Home*. He first describes the popular “consumerism thesis,” which claims that electrical modernization occurred primarily through consumer choice in the private marketplace. Tobey then voices his disagreement with that school of thought and explains his opposing position. He finds two major faults in the consumerists’ argument: first, it diminishes the role of public, political decision making in the process of electrical modernization of the home, and second, it claims that consumption is rational, which in America is not usually the case. Tobey adheres to the paradigm that electrical modernization in the home fits within the context of the political history of housing in America. He touts Roosevelt’s New Deal as the catalyst of the national, social revolution that resulted from that modernization.¹²

Although this paper was not written with the express intent of promoting or supporting any specific paradigms, it can be placed within that context. Portions of the following content if taken out of context can be taken to support a technological determinist viewpoint; however this paper also emphasizes the overall human advocacy involved in initiating the rural electrification program and in distributing electricity primarily through a cooperative model. By setting the individual electrical innovations on the farm within that broader context of human ambition, this work proves the veracity of the management of technology viewpoint. This paper also supports

¹¹ Ceruzzi, “Moore’s Law,” 584-593; Liker, Haddad, and Karlin, “Perspectives on Technology,” 575-596.

¹² Tobey, *Technology as Freedom*, 2-6.

Tobey's stance that political decision-making in the form of New Deal legislation was absolutely necessary in initiating the electrification of rural America.

Chapter 1

Unplugged—Farm Life Before Electricity

Behind the Urban Curve

Prior to the 1930s, the vast majority of U.S. farms did not have access to central station electric service, not because they could not afford it or did not desire to have it, but because the option did not even exist. Throughout rural America at that time, it was an accepted fact that rural life implied a dreary and difficult existence without the aid of electricity. Even those who lived just outside of urban centers, if they were not within the urban electric utility's service area, were destined for the same fate. Meanwhile a large portion of their urban counterparts only a few miles away possessed such simple, daily conveniences as electric lights, indoor plumbing, hot water, refrigerators, electric washing machines, and the like.¹³ In fact, as early as 1925 over half of urban American households, and an even larger portion of urban industrial and commercial structures, were enjoying the benefits of electricity a la private, urban electric utility companies.¹⁴

Marvin Barneson spent the first seventeen years of his life on a dairy farm in Eau Claire County prior to rural electrification.¹⁵ "I [thought] it was a great life...we didn't know any better," he stated, regarding to his earliest recollections of farm life without electricity. His naiveté was to be short-lived. One December night when Marvin was still a young child, he joined his family on a rare trip to the city to visit relatives. To his amazement the scene that greeted him was brightly illuminated. Streetlights and electric Christmas decorations lit up the

¹³ Lamoine Myers, Interview with Joe Tierney, Transcript, Eau Claire Energy Cooperative (November 9, 2010), 5.

¹⁴ Tobey, *Technology as Freedom*, 2, 12.

¹⁵ Marvin Barneson, Interview with Joe Tierney, Transcript, Eau Claire Energy Cooperative (November 2, 2010), 1, 8.

night and light streamed through the windows of many houses and businesses. The house he and his family stayed in also possessed many of the domestic electric conveniences of the day, directly reflecting the positive impact of electrification on the urban standard of living. Through that experience, Marvin discovered just what he, his family, and his neighbors were missing out on.¹⁶

Harriet Kovacezich experienced the same discrepancy in the standard of living between urban and rural communities. Born and raised on a farm, Harriet attended school in the town of Bruce, Wisconsin. The distance between her home and the school in conjunction with the poor rural road network necessitated that she live in town during the school week. As small of a town as Bruce was, it did enjoy the convenience of central station electric service. Harriet recalled getting so used to the presence of electricity during the week, that when she did return home on the weekends it was difficult to readjust to life in its absence, even though she had grown up in that environment. Living in a non-electrified environment was fine when that was all she knew, but once she got a taste of life with electricity, the alternative became unbearable.¹⁷ This urban-rural dichotomy was a primary factor in initiating serious exploration into the possibility of rural electrification.

This is not to imply that farm technology had remained completely static. In the absence of electricity, American farmers were forced to utilize alternative power sources for certain farm operations. Throughout history, the traditional power sources available to farmers were primarily human and animal muscle power. Advancements in internal combustion technology in the early

¹⁶ “Fields and Dreams Oral History Project: Marvin Barneson Interview (transcript),” interviewed by Steve Pederson on behalf of the Chippewa Valley Museum, 2004, CVM Library: Eau Claire, WI: 1, 17; Carl C. Taylor, *Changes I Have Seen in the Farming Community*, Unpublished Speech Manuscript, 1957, Carl C. Taylor Collection, Wisconsin Historical Society, Madison, WI; Tobey, *Technology as Freedom*, 2.

¹⁷ “‘Farm Life’ Oral History Interview: Rural Electrification (transcript),” Jean Siek, Harriet Kovacezich, Mary Smith, and Ruth Peterson, interviewed by Jim Zak on behalf of the Chippewa Valley Museum, 1 January 2004, CVM Library: Eau Claire, WI: 4.

twentieth century made the utilization of gasoline power on farms possible and affordable. In addition to the obvious application of internal-combustion in large farm implements such as tractors, it also became common to see early one-cylinder gas engines, nicknamed “one-one-ers,” performing various duties on the farm that had previously been done by hand. Powering machinery and appliances such as water pumps, saws, washing machines, and milking equipment, were just a few of the many common applications of the one-one-er in the years preceding rural electrification. Most farms did not have a separate engine for each piece of equipment; since they provided power via a simple belt system, it was common for the same engine to be hauled from machine to machine throughout the day, powering each in turn.¹⁸

In the absence of electricity, internal-combustion engines provided at least a little relief from some of the more labor-intensive farm activities. However, these early engines were known for being temperamental, especially during the long, cold Wisconsin winters.¹⁹ Marvin Barneson clearly recalled the early one-cylinder engines and their inconsistencies: “Those engines, they got called some awful names I tell you. When you needed them to work, no go.”²⁰ Early internal-combustion engines were a much-welcomed alternative to physical labor in the case of many farm chores, however, they did not cause a decrease in the desire for electricity on the farm. If anything the inherent inconsistencies of the one-one-ers caused an even greater demand for the consistent power that electricity could provide.²¹

¹⁸ Ronald L. Timm, *Unpublished conversation with the author*, March 2011, Digital recording, 10:43; “Farm Life,” Siek, Kovacezich, Smith, and Peterson, 1-2; Marvin Barneson, Interview with Joe Tierney, 11.

¹⁹ Marvin Barneson, Interview with Joe Tierney, 11.

²⁰ “Fields and Dreams: Marvin Barneson,” 2.

²¹ More information on farm life prior to the arrival of electricity will be included later in the analysis of the revolutionary changes brought about by electrical innovation in specific areas of farm life. For a more thorough look at rural life in west-central Wisconsin (specifically Trempealeau County) during this time period, see Jane Marie

Early Sources of Electricity on the Farm

Not long after the development of the American electric utility industry in the 1880s, it became clear to farmers that the benefits of that infrastructural element would not be made available to them anytime in the foreseeable future. Therefore, many farmers in west-central Wisconsin began exploring alternative means by which the benefits of electricity could be attained on the individual farm. An early popular alternative source of electricity was the water wheel. A dynamo,²² driven by a water wheel built on an already flowing water source, could easily produce enough electricity for two farms with some left over. Author Frederick Anderson wrote in his book, *Electricity for the Farm*, that “a small stream capable of developing from twenty-five to fifty horsepower will supply a farmer (at practically no expense beyond the original cost of installation) not only with light, but with power for even the heavier farm operations.” Many ambitious farmers were able to harness the potential energy of an available flowing water source in this manner.²³

Internal-combustion engines were not well suited to provide electricity directly to the house or barn as their speed fluctuated and they were incapable of producing an even, consistent flow of electricity. They were, however, far better suited for charging batteries which *did* provide a consistent flow of electricity and could be used as needed. In many cases, a gasoline engine could be rigged to charge a battery while at the same time powering other equipment that it

Pederson, *Between Memory and Reality: Family and Community in Rural Wisconsin, 1870-1970* (Madison: The University of Wisconsin Press, 1992).

²² A “dynamo” is an electricity-producing device basically consisting of a spool of copper wire that revolves at a high rate within a space surrounded by electric magnets. Anderson, *Electricity for the Farm*, 27.

²³ Anderson, *Electricity for the Farm*, vi-vii, 14-15.

would regularly operate. In this regard, electricity was a desirable byproduct of normal operation.²⁴

In the late 1910s, with the prospect of rural electrification still highly unlikely, many farmers invested in battery-storage systems known as a “light plants,” such as the one from the story of Walter and Otto Schumacher. One of the most popular brands of light plant was the Delco Plant. Available for purchase from mail-order catalogues such as Sears-Roebuck, they were basically early gasoline-powered electrical generators. The electricity produced by these units would charge a bank or a series of batteries which, when fully charged, produced between 32 and 34 volts of electrical current for use on the farm. Although a wonderful idea in principle, and a much-welcomed source of long-awaited electricity on the farm, it was a painfully imperfect system.²⁵

The maintenance involved in the operation of a light plant was significant. First, in order to maintain a charge on the batteries, the generator had to be run for a certain period of time at least twice a day. An inconvenience in itself, but when added to it the fact that the plants were gasoline-powered and thus suffered from the same reliability issues as other such engines, this task became a source of regular frustration. Additionally, while the generator itself had to be kept outdoors, the batteries had to be stored indoors in glass containers when not in use in order to protect them from the elements. Even despite this precaution, it was not uncommon for the batteries to become impossibly corroded.²⁶

²⁴ Anderson, *Electricity for the Farm*, 222, 252.

²⁵ Committee on the Relation of Electricity to Agriculture, *Electricity on the Farm and in Rural Communities (Revised Edition)*, C.R.E.A. Bulletin, Vol. 7, no. 1, ed. E.A. White (Chicago: Committee on the Relation of Electricity to Agriculture, 1931), 290-293.

²⁶ “Fields and Dreams: Marvin Barneson,” 2.

For all of the problems inherent in the Delco Plants, the service they provided was hardly worth the trouble. Because of the relatively low electrical output of the batteries, they could be used to power little more than low-voltage electric lights, and those were deemed to be hardly better in quality than the kerosene lamps that served as the most common source of rural lighting at that time. The limited amount of electricity available meant that children were taught at a young age to conserve and not waste electricity. Despite such efforts, lights powered by these plants still did not last very long would slowly dim as the batteries ran out of stored power, meaning that maximum lighting could only be achieved when the batteries were freshly charged. In the words of Marvin Barneson, “the bulb just got dimmer and dimmer, so if you’re too lazy to go out and crank up the generator, you could sit there and read in the shadows.” He continued, “They were not a dependable system. Sometimes they worked, [but] when you needed them the worst [sic], that is when they wouldn’t work.”²⁷ Regardless of these significant problems, an estimated 260,000 home lighting plants were operation across the nation in 1934.²⁸

Despite the existence and utilization of various alternative sources of electricity, the many advantages offered by central station electric service assured that its appeal in rural areas did not go away. As early as 1912, a significant number of farmers were becoming disgruntled not only with the fact that they had not yet been given option of receiving central station electric service, but also with the fact that the possibility of rural electrification was hardly even being considered at that time. In the three decades that the national electric utility industry had been in

²⁷ Marvin Barneson, Interview with Joe Tierney, 6-8; “Fields and Dreams: Marvin Barneson,” 1-2; Committee on the Relation of Electricity to Agriculture, *Electricity on the Farm*, 290-293.

²⁸ Warren H. Marple, “An Appraisal of Edison Electric Institute’s Statistics on Farm Electrification,” *The Journal of Land & Public Utility Economics* 14, no. 4 (November 1938): 471-476; “Fields and Dreams Oral History Project: Erma Quilling Interview,” interviewed by William Giese on behalf of the Chippewa Valley Museum, 2003, CVM Library: Eau Claire, WI, 7.

existence it had made little effort to extend service to rural areas.²⁹ There was also little hope at that time that action would be taken on this issue within the state or national legislatures where the prevalent mentality was that rural electrification was too costly and too big a logistical problem to ever be feasible.³⁰ Many rural residents simply resigned themselves to the belief that rural electrification would never become a reality.³¹

Despite that prevailing sentiment, several enterprising rural communities—initially in Washington and Minnesota—impatient with the lack of legislative action, began forming independent electric distribution cooperatives in order to provide affordable electricity to the local rural residents.³² These cooperatives were modeled after already existing rural agricultural and service cooperatives upon which the farming community relied for a large portion of its basic needs. The basic structure and principles of those existing cooperatives was applied to the distribution of electricity.³³ Following World War I the rate of creation of these privately formed and funded electric cooperatives increased drastically and by the mid 1920s those cooperatives were constructing lines at a remarkable rate considering they were not yet nationally organized and were receiving no federal funding.

According to a 1938 study by the Edison Electric Institute,³⁴ in 1924 only three percent of the 6,371,640 American farms were electrified, not including those with individual lighting

²⁹ Carmody, “Rural Electrification in the United States,” 82-83.

³⁰ Cong. Rec., 74th Cong., 1st sess., 1935, 79, pt. 7: 7574, 7576.

³¹ “Fields and Dreams: Marvin Barneson,” 1.

³² Carmody, “Rural Electrification in the United States,” 83.

³³ Pederson, *Between Memory and Reality*, 88.

³⁴ The Edison Electric Institute was at that time and continues to be today the national association of U.S. shareholder-owned electric companies, much like the National Rural Electric Cooperative Association is the national association for electric cooperatives. Marple, “An Appraisal of Edison Electric Institute’s Statistics,” 472-474.

plants. By 1930 that number had jumped to 10.4% where it would hover for the next several years.³⁵ That expansion rate was so significant that it caused the established private electric utility companies to begin actively opposing the actions of those cooperatives. Nevertheless, scattered rural communities had proven not only that they had the initiative to form local electric cooperatives and build extensive networks of power lines, but also that the system worked and could be made affordable to all rural residents.³⁶ Even in light of this success and clear enthusiasm within the rural economy, the electric utility industry still considered rural electrification to be a passing fad. It would soon learn otherwise.³⁷

³⁵ Marple, "An Appraisal of Edison Electric Institute's Statistics," 474.

³⁶ Carmody, "Rural Electrification in the United States," 83.

³⁷ Carmody, "Rural Electrification in the United States," 83.

Chapter 2

From the Drawing Board to the Front Door

Birth of the Rural Electrification Movement

By the time the issue of rural electrification finally made its way rather unexpectedly to the U.S. Senate in 1935, it was estimated that ninety percent of U.S. farms were still without any means of acquiring electric service. Of the ten percent that were already enjoying the luxury of electric service at that time, most were doing so primarily as a result of independently formed electric distribution cooperatives. However, ten percent was not good enough for President Franklin Delano Roosevelt, who exclaimed definitively, “Electricity is a modern necessity of life and ought to be in every village, every home, and every farm in the United States.”³⁸ In light of this sentiment, and after many farmers had given up all hope that rural electrification would ever become a reality, FDR finally brought the issue to the U.S. Congress.

In the ensuing debate within the two houses of Congress, Senator Homer Truett Bone (D-Washington), as one of his main arguments in support of the feasibility of rural electrification and the necessity of a government organization to allocate federal funding for such efforts, touted the initiative of the farmers in his state in the creation of private electric cooperatives.³⁹ Further support for a federally funded rural electrification program was provided in the form of a study conducted in 1933 by a team of electrical engineers headed by Morris L. Cooke, an advisor to the Power Authority of the State of New York. The results of that study revealed that electric lines in rural areas could be built for much less than what the electric utility companies had been predicting for years. However, Cooke also advised that federal monetary aid would most likely

³⁸ Carmody, “Rural Electrification in the United States,” 82, 88.

³⁹ Cong. Rec., 79, pt. 7: 7574.

still be required to get the ball rolling on a national rural electrification program and to be able to provide electrical service at a rate farmers could afford.⁴⁰

Three pieces of legislation, enacted in 1935 and 1936, set the groundwork for a nationwide, government-funded rural electrification effort. All three were part of FDR's "New Deal," intended to help pull the United States out of the Great Depression. The first was the Emergency Relief Appropriations Act of 1935. A broad piece of legislation intended to provide monetary relief to various sectors of the struggling national economy, this act designated \$100 million for the purpose of extending affordable central station electric service to rural America. Extensive debate ensued within Congress regarding how best to distribute that \$100 million. Much of that debate centered on the issues of defining who the beneficiaries of that money should be and whether or not a government agency should be created to oversee the allocation of those funds. The majority consensus was that the bureaucratic system in place at that time for distributing the \$100 million would greatly benefit the private power utilities but be of little value to rural residents themselves. As this was the opposite of the intended purpose of those funds, it was therefore determined that a government agency *should*, in fact, be created to distribute the money in a way that would most benefit the rural residents.⁴¹

Later that same year, President Roosevelt issued Executive Order 7037 which authorized the creation of a Rural Electrification Administration (REA) as a temporary, emergency agency under the terms stipulated by the Emergency Relief Appropriations Act.⁴² Tasked with distributing the government-allocated funds, the REA was to function as a lending institution, a

⁴⁰ The Rural Electrification Administration, *Rural Lines—USA: The Story of Cooperative Rural Electrification*, U.S. Department of Agriculture, Washington, DC, 1981: 2.

⁴¹ Cong. Rec., 79, pt. 7: 7574.

⁴² Carmody, "Rural Electrification in the United States," 82-84.

bank of sorts, from which any aspiring electric provider, especially newly formed electric cooperatives, could receive a loan to begin building the rural electric infrastructure. In addition to distributing funding for rural electrification, the REA was also granted the broad power to “initiate, formulate, administer, and supervise a program of approved projects with respect to the generation, transmission, and distribution of electric energy in rural areas.”⁴³

Morris L. Cooke was appointed as the first REA Administrator and he immediately began tackling the most imposing obstacles in the path of the rural electrification effort, namely: competition with existing electricity providers, the design of affordable but durable electric lines and poles that would allow for low rates in an area with low customer density, the acquisition of electricity from existing generating plants, and the provisions for the construction of REA-operated power generating plants in the interest of lowering bids from existing plants or producing electricity in areas where no previous plants existed.⁴⁴

Shortly thereafter, the final major piece of rural electrification legislation was enacted. The Rural Electrification Act of 1936 made the Rural Electrification Administration a permanent agency and gave it full control of the logistics and administration of the rural electrification effort which was intended to be only a ten year program.⁴⁵ In the months preceding the bill, the Senate Committee on Agriculture and Forestry declared firmly that, “the rural population of the country is unanimously in favor of the principle of rural electrification set up in [this] bill.”⁴⁶ No

⁴³ Rural Electrification Administration, *Rural Lines—USA*, 3.

⁴⁴ Carmody, “Rural Electrification in the United States,” 85. The construction of REA power generating plants was not very extensive as most electricity was purchased from existing plants.

⁴⁵ Carmody, “Rural Electrification in the United States,” 82; John M. Carmody, “Rural Electrification: Progress and Future Prospects,” *Journal of Farm Economics* 20 no. 1 (1938): 361.

⁴⁶ Congress, Senate, Committee on Agriculture and Forestry, *To Provide for Rural Electrification*, 74th Cong., 2nd sess., 1936, S. Rept. 1581, 4.

longer just a lending institution—although it did continue in that role as well—the REA became from that point on the organization responsible for proliferating central station electric service to all corners of rural America.

Throughout the debate and discussion within the federal legislature regarding the Rural Electrification Act, as well as within the stipulations of the bill itself, the farming community had clearly been the main focus and primary intended beneficiary of the rural electrification project. The intended outcome of this project, as summed up in a bulletin [No. 171] produced by the National Popular Government League in 1935 and presented to the U.S. Senate read, in part

...low-tension rural distribution lines will be built, buildings will be wired to carry current to light the house, the barn, and the yards; to do the washing and ironing; to pump water for the house—including, perhaps, the newly installed bathroom—to water the stock, run motors to chop feed, grind grain, and to operate many other appliances which ease the work burden and bring a far greater degree of comfort, enjoyment, and profit to farm life... The average farm home, the one with which the administration is concerned, must have, not light and radio alone but power for washing, ironing, pumping, and machines run by motor, if the program is to succeed.⁴⁷

And so, with that somewhat prophetic statement to live up to, the REA set about its task of making electricity available to all rural residents in America; in a Depression-plagued society and economy, that was not an easy task by any stretch of the imagination. The national rural electrification process was officially begun; the moment that farm families had waited for so long for was finally on the horizon. However, for some it was still a lot farther off than they would have liked.

Initial Progress—The First Five Years

Throughout the rural electrification effort, Wisconsin was regularly at the forefront of the movement, setting precedents and pushing the envelope. Shortly after the enactment of the Rural Electrification Act, the Wisconsin legislature, along with Pennsylvania and Mississippi passed

⁴⁷ Cong. Rec., 79, pt. 7: 7574-7576.

legislation that not only offered additional state-funded aid to new rural electric providers, but also provided legal power to those providers to deter infringement on their territory by private electric utilities. Wisconsin was also one of the first six states to create a state rural electrification agency. Additionally the state mandated restrictions on private electric utilities to deter them from building rural lines purely for their own gain rather than in the interest of the consumers.⁴⁸

In part due to the intentional efforts of the state government, rural electrification progressed rapidly in Wisconsin. From 1934 to 1940, the percentage of electrified farms in the state grew from 19.6% to 41.3% according to census data processed by the Edison Electric Institute. Although many other states had higher percentages of farms receiving electricity in 1940, in total number of electrified farms Wisconsin ranked eighth in the nation.⁴⁹ The efforts of this state were significant enough to draw individual praise from Morris Cooke's successor as REA Administrator, John M. Carmody, for contributing to "the rapid and orderly development of the rural electrification program in that state."⁵⁰

As far as the REA itself is concerned, the first five years of its existence saw significant progress and some major changes. In 1938, the U.S. Congress appropriated another \$100 million for the continuation of rural electrification, and on July 1, 1939, the REA became part of the U.S. Department of Agriculture.⁵¹ In addition to these significant events, the REA implemented many programs to provide aide to newly-formed rural electric distributors. In addition to basic training and advising services, the REA also offered the services of its attorneys to rural providers for

⁴⁸ Carmody, "Rural Electrification in the United States," 85-86.

⁴⁹ Rural Electrification Administration, *Electricity for the Farm Through REA*, U.S. Department of Agriculture. Washington, DC: U.S. Government Printing Office, 1940: 23.

⁵⁰ Carmody, "Rural Electrification in the United States," 85-86.

⁵¹ Carmody, "Rural Electrification in the United States," 86; Rural Electrification Administration, *Electricity for the Farm Through REA*, 7.

legal issues dealing with rural electrification that other attorneys may not have yet been familiar with.

Throughout the nation, rural electrification spread rapidly in the first five years of the REA's existence. In 1935, 20,396 farms were added to REA and non-REA lines; in 1937, that number rose to 150,000 in that year alone. A 1938 Edison Electrical Institute study estimated that, including non-REA accounts, 20.7% or 1,330,997 American farms were electrified, double the amount from only three years earlier.⁵² However, just to put that number in the context of the urban-rural dichotomy, it was estimated at that time that 21,700,000 non-farm, residential customers were enjoying the benefits of electricity.⁵³ The rapid growth of electric service nationwide can also be partially attributed to increased private utility interests in the rural market as a result of the competition and administrative force provided by the REA. Simultaneously, while the REA expanded opportunities for rural farm residents, the extension of electricity into rural areas also opened up brand new markets for manufacturers of electric tools, machinery, and appliances.⁵⁴

The Electric Cooperative System—Getting Electricity to the Farm

In the years immediately preceding the creation of the REA and the beginning of the rural electrification program, it became clear that not-for-profit rural electric distribution cooperatives were by far the most practical vehicle for propagating electricity throughout the rural areas of the country. In fact, while the Rural Electrification Act bestowed the REA Administrator with relatively unhindered power to provide rural electrification loans, it did stipulate that preference

⁵² Marple, "An Appraisal of Edison Electric Institute's Statistics," 471, 474.

⁵³ Carmody, "Rural Electrification in the United States," 88.

⁵⁴ Tobey, *Technology as Freedom*, 112-113, 124.

should be given to public organizations and cooperatives. The first two REA Administrators, Cooke and Carmody, were very careful to adhere to this stipulation.⁵⁵ In 1939, a full eighty-six percent of rural electric providers with REA loans were cooperatives. By 1941 that number rose to ninety percent. The popularity of the cooperative system was due in part to the success of the pioneering electric cooperative experiments of the 1910s and '20s, and also to the fact that the cooperative system was becoming increasingly popular in rural areas in the mid to late 1930s. In 1935, According to the Co-operative Division of the Farm Credit Administration in Washington D.C., there were approximately 10,700 agricultural cooperative buying and selling organizations with a membership of around 3,280,000.⁵⁶

In general, most electric cooperatives are similarly structured. A cooperative is a member-owned business and so in order for an individual to receive service, he or she has to become a member, many times for a small fee. As part owner, members support their co-op through their monthly electricity bills and attend annual meetings at which they vote on major issues and elect members to serve on the Board of Directors. This Board works with the cooperative manager (head administrator) to make all of the executive administrative decisions regarding the operation of the cooperative with the best interests of the general membership in mind. At the end of each fiscal year, any surplus money (following payment of employees and other financial obligations) is distributed back to the members.⁵⁷

This structure was adapted directly from the many different types of cooperatives that American farms were already relying heavily on for a variety of necessary services. Common

⁵⁵ Carmody, "Rural Electrification: Progress and Future Prospects," 362; Rural Electrification Administration, *Electricity for the Farm Through REA*, 7.

⁵⁶ Carmody, "Rural Electrification in the United States," 82, 84; Rural Electrification Administration, *Electricity for the Farm Through REA*, 20.

⁵⁷ Eau Claire Energy Cooperative, 2010, "Bylaws, Eau Claire Energy Cooperative," <http://documents.ecec.com/Public/governance/September2010Bylaws.pdf> (accessed May 1, 2011).

rural cooperatives at the time included agricultural, insurance, telephone, oil, and livestock purchasers and distributors, just to name a few. These cooperatives allowed farmers to have more control over their business instead of having to deal directly with national corporate industries. The cooperative mentality also fit well into the collectivistic rural society. A study conducted in the 1930s by sociologists revealed that fifty-five percent of business in rural areas at that time was done by and through cooperatives. Since many farmers were already relying on the services of cooperatives for many of the vital aspects of farm operation, it made sense that electric service should be handled in the same manner.⁵⁸

Using this basic cooperative system, much of rural America finally began to “see the light,” so to speak. But progress in the late 1930s and early 1940s was initially slow. The legislation set the groundwork for the rural electrification system, but the actual implementation of it took some time to get rolling. Despite the familiarity of the cooperative system within the rural community, very few of the farmers involved in the formation of rural electric cooperatives had any previous experience with electricity, much less organizing and managing an electrical infrastructure.⁵⁹ That inexperience combined with several additional factors to assure that the progression from the “rural electrification plan” on the REA’s drawing board to the physical arrival of electricity at individual farms would be far from quick and easy.

Clearly the first step in providing electricity to any rural community was the creation of a new provider or the expansion of the service area of an existing provider. Hundreds of new organizations were needed to provide service to the entirety of rural America and since this relied upon the initiative of individual communities or regions to organize themselves, the process did not happen overnight. Many rural electric providers were not created until several

⁵⁸ Pederson, *Between Memory and Reality*, 88, 91.

⁵⁹ Carmody, “Rural Electrification: Progress and Future Prospects,” 362.

years after the creation of the REA. For example, in Eau Claire County in west-central Wisconsin, it was already 1938 by the time enough farmers could be organized to establish the Eau Claire Electric Cooperative and apply for a loan from the REA. Until a local provider was created, farmers had no choice but to wait or take the initiative to start a cooperative within their local community.⁶⁰

Once a local provider was created, that wait was still not over. Depending on the distance between a farm and the nearest electrical substation, it was not uncommon for a farmer to have to wait an additional several months for electricity to reach his farm. Poles had to be erected and wires strung. Priority for electrification of individual properties was based exclusively on location. Farm, church, school, it did not matter; properties closest to the substation(s) were the first to be provided with electric service while those farther away had to wait for the ever-expanding network of power lines to reach them. This process was steady, but in many cases it could also be very slow.⁶¹

Even after the lines finally arrived, many farmers did not immediately connect to the system for a variety of reasons. Initially, many farmers who had just recently invested in a light plant or some other alternative source of electricity either chose to stay with that system over the local electricity provider, or required much convincing to persuade them to abandon their previous system in favor of the central station service. Alternative sources of electricity were significant investments for farmers who were already strapped for cash, so this was no small matter for them.⁶²

⁶⁰ Schermerhorn, *A Quarter-Century in Review*.

⁶¹ Marvin Barneson, Interview with Joe Tierney, 7; "Farm Life," Siek, Kovacezich, Smith, and Peterson, 5.

⁶² Marvin Barneson, Interview with Joe Tierney, 6.

In the case of Eau Claire Electric Cooperative, even the initial five dollar membership fee was enough to make some farmers think twice about signing up. Despite the establishment of the REA as a government agency and the progress of rural electrification by 1938 and 1939, there was still significant controversy and debate even within the farming community over whether or not rural electrification in its fullest sense, in the sense that REA was pursuing, could ever be accomplished. Could electricity really be spread to all parts of rural America? Many farmers chose to believe the message being promoted by the big electric utility companies who, as competitors, were claiming that complete rural electrification was impossible. The stability of the young REA was not certain and very few people were eager to take any sort of financial risk during the Depression. “Boy, now I am telling you, in the ‘30s, five dollars, that was something. That was something you needed. You didn’t just hand that to anybody,” said Marvin Barneson of the choice his father and the other farmers in the community had to make regarding whether or not to join the Eau Claire Electric Cooperative.⁶³

Even if one could afford the cost and the risk of signing up for electric service, the expense of having a professional REA electrician do the wiring in the house and barn was well beyond the financial reach of many late Depression-era farmers.⁶⁴ Marvin further recalled, “they [the REA electricians] wanted \$125 to wire the house and barn on my folks’ place. My dad didn’t have \$125. He was a proud man to come up with a five dollar bill [for membership in Eau Claire Electric]...when you talk over one hundred dollars, that left him way off!”⁶⁵ \$125 far exceeded the initial estimated base-line cost of forty dollars made by the US Senate in 1935.⁶⁶

⁶³ “Fields and Dreams: Marvin Barneson,” 4-5.

⁶⁴ “Farm Life,” Siek, Kovacezich, Smith, and Peterson, 2.

⁶⁵ Marvin Barneson, Interview with Joe Tierney, 7.

⁶⁶ Cong. Rec., 79, pt. 7: 7575.

This problem continued to be a common hindrance to rural electrification throughout the 1940s. Money was still tight and the Depression mindset did not immediately disappear with the advent of World War II.

With the end of the War in 1945, American farmers found themselves once again with money in their pockets, and the rate of rural electrification increased dramatically. During the final years of the War and immediately following, milk prices were up and times were good, at least in the financial sense, for Wisconsin farmers.⁶⁷ However the cost of wiring the farm buildings for electricity continued to be a deterrent for many farmers even into the early 1950s. In many of these cases, those who could not afford this process resorted to enlisting amateur electricians to do the job for a fraction of the cost of hiring a professional. In fact, Marvin Barneson wired several houses in his community, mostly those of widows, or elderly neighbors for little to no pay⁶⁸. This was clearly less desirable, but inspections (when they were actually conducted) were not very stringent and for many rural residents this was their only hope of receiving electricity. In many of those buildings, that amateur wiring is still in use today.⁶⁹

Despite the delays and difficulties, slowly but surely, one by one, over the course of the two decades following the creation of the REA, the vast majority of American farms—more than 90 percent by 1953—were finally allowed to experience the miracle of electricity. With it came changes that would forever alter farm life on a fundamental level.⁷⁰

⁶⁷ Timm, *Conversation with the author*, 7:06.

⁶⁸ Marvin Barneson, Interview with Joe Tierney, 17-18.

⁶⁹ “Fields and Dreams: Marvin Barneson,” 9; Marvin Barneson, Interview with Joe Tierney, 17-18.

⁷⁰ National Rural Electric Cooperative Association, “History of Electric Co-Ops,” <http://www.nreca.coop/members/History/Pages/default.aspx> (accessed February 28, 2011); Committee on the Relation of Electricity to Agriculture, *Electricity on the Farm*, 6.

A New Arrival on the Farm—Early Experiences with Electricity

For all farm residents, the much-anticipated arrival of electricity was a momentous occasion. Only a handful of years earlier—more or less depending on the individual farm and the extent of the previously mentioned obstacles—rural electrification had been a nearly impossible dream. Now was literally at their doorstep. Some greeted the new arrival with excitement and wonder; others simply saw it as a deserved relief, and a long-overdue necessity.

“Unbelievable, at first!” Marvin Barneson enthusiastically said of his initial experience with electricity on the farm as a seventeen year-old kid, “We had lights twenty-four hours a day! It took a long time to get used to that. It was just like a gift, more like a dream than reality.” On a different occasion Marvin recalled, “I remember my brother and I would...go out at night and we’d come home, run to the house and turn the light on to see if it was still there. We were so used to coming home in the dark. Finding our way upstairs with no lights, yes sir we turned that switch and there it was. It was just unbelievable.”⁷¹ Jean Sieck, who also experienced the arrival of electricity on her farm as a child remembered, “...we got electric colored lights for our Christmas tree...We were so proud of that Christmas tree all lit up so beautiful! We didn’t pull our shades or anything, so people could see our...tree.”⁷² To these rural residents, electricity presented a whole new world full of exciting possibilities.

However, despite the initial elation at this long-anticipated arrival, electricity did present several challenges and cause its fair share of frustration as the rural communities became acquainted with this revolutionary new service. Initially, depending on the provider, individual farms were charged a minimum rate between three and four-and-a-half dollars a month for forty

⁷¹ Marvin Barneson, Interview with Joe Tierney, 9.

⁷² “Farm Life,” Siek, Kovacezich, Smith, and Peterson, 6.

kilowatts.⁷³ Today, these same farms use a significantly larger amount of electricity with the average monthly bill potentially exceeding several hundred dollars. However, at the time that electricity was first introduced, most farmers had no idea how much electricity they would use or the extent to which their initial demands would increase. Many farmers doubted that they could even use forty kilowatts in a month as most farms initially only utilized electricity for lighting and possibly a few small household appliances; these individuals voiced concerns that they were being charged for much more than they wanted or needed.⁷⁴

In addition to the uncertainty regarding usage and rates, many flaws within the electrical system quickly became evident, as is to be expected with any such new and extensive technological endeavor. Initially, the quality and reliability of the electricity provided by the electric system was, in the words of Marvin Barneson, “just about as bad as the Delco Plant. When you needed it, it wasn’t there. It was weak, fragile, lot of things [the REA] hadn’t learned about. It was not dependable.”⁷⁵ Eau Claire County native Noble Larson recalled, “...when I was growing up as a kid on the farm, and this was so true, when a storm started coming over the hill my dad would say, ‘Get the cows in, we’ve gotta get them milked before the power goes out!’”⁷⁶

Not only was the initial system unreliable, but it did not have enough capacity to simultaneously provide one hundred percent power to multiple recipients on the same line. The result was that individual recipients along the same line frequently found themselves essentially competing for electricity. Marvin Barneson recounted a specific example of this involving a Methodist Church just down the road from his house that was connected to the same Eau Claire

⁷³ Cong. Rec., 79, pt. 7: 7575; Schermerhorn, *A Quarter-Century in Review*, 2.

⁷⁴ “Fields and Dreams: Marvin Barneson,” 5; “Farm Life,” Siek, Kovacezich, Smith, and Peterson, 9.

⁷⁵ “Fields and Dreams: Marvin Barneson,” 6.

⁷⁶ Noble Larson, Interview with Joe Tierney, Transcript, Eau Claire Energy Cooperative (November 16, 2010), 23.

Electric Cooperative power line: “they [the Methodist Church] would get all the ovens and everything to have their dinner, and all the farmers got on to that. Boy you milk cows before they have their dinner that evening, because [otherwise] you’re not going to have enough electricity to run your milk machine.”⁷⁷ In addition to this, some newly established rural electric providers were only able to produce power for part of the day. Jean Sieck remembered that on her farm in Weyerhaeuser, located on the northern edge of the west-central Wisconsin region and within the service area of Barron Electric Cooperative, electricity was initially only provided between the hours of 6:00am and 10:00pm each day.⁷⁸ This was not the norm, but it was another of many limitations and problems with early rural electric systems.

Despite these early hiccups, electricity was still considered a godsend by the vast majority of American farm families and a significant improvement in the rural standard of living. And it did not take very long for the major initial problems to be resolved. Farmers also quickly realized that not only did they easily use the forty kilowatts they initially paid for, but their demand soon exceeded that limit. Also, as the rural electrification movement gained momentum, the experience, technical knowhow, and service standards of the rural electric providers significantly improved, and subsequently so did the quality, consistency, and reliability of the electricity they provided. These improvements, in turn, contributed to the ever-increasing demand within the farming community in general as well as on each individual farm.

From the arrival of electricity and onward, the timeline and extent of electrical advancements on individual farms varied drastically. Those that could afford it began utilizing the full potential of electric power on the farm and in the home as soon as the electricity was hooked up. However many farmers were much slower to take advantage of new electric

⁷⁷ Marvin Barneson, Interview with Joe Tierney, 6.

⁷⁸ “Farm Life,” Siek, Kovacezich, Smith, and Peterson, 6.

innovations, whether due to financial constraints or resistance to change, and many pre-electrification farming practices persisted on individual farms even into the 1960s.⁷⁹

Nonetheless, regardless of when it happened on each individual farm, the general impact of electricity and the manner of its usage when it did arrive on the farms of west-central Wisconsin was relatively consistent.

⁷⁹ Lamoine Myers, Interview with Joe Tierney, 10.

Chapter 3

Impact on Farm Life and Operations

A Whole New World

With one flip of a switch, the residents of a newly electrified farm entered a whole new world of possibilities. Farmers quickly came to the realization that the practical applications of electricity extended beyond simply lighting the barn and house and they found themselves being solicited by numerous electrical appliance manufacturers and retailers eager to capitalize on the vast new electrified rural market. Farmers were presented with a seemingly endless list of possibilities for putting their newly acquired electricity to work for them.⁸⁰ Cream separators, milk machines, bulk tanks, water pumps, indoor plumbing, feed mixers, refrigerators, water heaters, and washing machines were just some of the many ways in which farmers and their families could begin to find respite from the backbreaking, time-consuming physical labor that had characterized farm life for so long.⁸¹ As the farmers began taking advantage of the available equipment and appliances, the farming community and the federal government alike eagerly anticipated the extensive changes in farm life that were sure to come. The National Resources Committee of the U.S. House of Representatives, in a report entitled *Technological Trends and National Policy*, typified this hopeful sentiment by predicting that “the wise use of electricity in agriculture should lower the cost of production, improve the quality of produce, lighten the labor of farm people, and make possible more comfortable living on the farm.”⁸²

⁸⁰ “Fields and Dreams: Marvin Barneson,” 16.

⁸¹ Cong. Rec., 79, pt. 7: 7575.

⁸² Carmody, “Rural Electrification: Progress and Future Prospects,” 363.

To assist farmers with the daunting task of choosing which electrical applications to purchase first, the REA created programs designed to advise rural residents of the many ways electricity could potentially be utilized in farm operations and in the farmhouse. REA engineers were also tasked with aiding and educating the managerial staff of rural electric providers on how to best communicate and promote the potential applications of electricity to their customers.⁸³ Additionally, the Electric Farm and Home Authority, an agency of the federal government, provided financing for a variety of key electric appliances to help farmers acquire such conveniences, while also providing additional funds for rural electrification through the interest on those loans.⁸⁴

The possibilities were many and the means for acquiring them were readily available. For the residents of electrified farms the question became “where do we even begin?” Out of the myriad of possibilities, a few specific aspects of farm life and operations emerged as clear priorities for electrification within the two distinct spheres of farm life—farm operations and the farmhouse.

Initial Applications

Two specific initial applications of electricity quickly emerged as clear priorities for the dairy farmers of west-central Wisconsin. The first was lighting for the house, the various farm buildings, and the yard. Second was an electric water pump for the purpose of providing water for the livestock, cleaning milking equipment and other farm implements, and providing running

⁸³ Carmody, “Rural Electrification in the United States,” 87.

⁸⁴ Carmody, “Rural Electrification: Progress and Future Prospects,” 363.

water to the house.⁸⁵ Of all of the ways in which electricity was utilized early on, these two innovations had the broadest implications within both spheres of farm life.

Most often installed as part of the initial wiring in the house, electric lights were almost always the first thing to be tested out immediately following the connection of the house to the main power grid.⁸⁶ As a result, the warm glow of an electric light bulb became the symbolic first-experience with electricity in the farmhouse. In that moment of illumination the dream of electricity on the farm became for the first time a tangible reality, a revelation so profound that it was known to regularly invoke tears of joy from farm residents. To this day, rural residents commonly refer to that event as “when the lights came on.”⁸⁷

Prior to electrification, kerosene-burning lamps were the most common source of light in the farmhouse. The regular maintenance involved in the use of these lamps was extensive. Once a week, every lamp in the house would have to be gathered up and washed as dead bugs and deposits of soot would quickly build up on the glass over the course of a week and impede the flow of light. All of the children in the family helped with this process as it was a large task and since small hands were especially suited for the job.⁸⁸ After the lamps were washed and dried, the wicks needed to be very carefully trimmed. This was a skill that farm children learned at a young age. Marvin Barneson recalled, “If you didn’t get [the wick] straight and get the corners cut, you made a smokestack, but if you had it trimmed right, you got good light out of that. Boy, I tell you, you weren’t very old before you learned how to trim a lamp and make it burn.” This

⁸⁵ For a further look at the most popular initial applications of electricity on the farm, see: Schermerhorn, *A Quarter-Century in Review*, 14; Timm, *Conversation with the author*, 4:30; “Fields and Dreams: Marvin Barneson,” 8; “Farm Life,” Siek, Kovacezich, Smith, and Peterson, 1.

⁸⁶ Committee on the Relation of Electricity to Agriculture, *Electricity on the Farm*, 65.

⁸⁷ Marvin Barneson, Interview with Joe Tierney, 6.

⁸⁸ “Farm Life,” Siek, Kovacezich, Smith, and Peterson, 8; Meta Malueg Fox, *Reminiscence*, Unpublished Memoir Manuscript, Wisconsin Historical Society, Madison, WI, 14.

time-consuming process was a weekly necessity if a family wanted to have any sort of decent light in the house. It was such a disagreeable, inconvenient, and monotonous chore that its memory stuck with many of those who experienced it for the rest of their lives; today it is one of the more frequently recounted and vividly recalled stories of pre-electric farm life.

On top of the maintenance involved in simply keeping the lamps clean, actually using them took additional time and effort. Every time a lamp was used, a built-in reflector would have to be adjusted to just the right position in order to direct the optimal amount of light to the desired location.⁸⁹ In addition to this inconvenience, the regular use of kerosene light came with a significant health risk. Despite the fact that a clean, well-trimmed lamp produced what Marvin considered at the time to be “good light,” eye strain was a common hazard to households that used them. This was a significant concern as eye strain induced by poor lighting was the most common cause of near-sightedness in farm children. In fact, prior to electrification, one in five rural children had noticeably impaired vision, while in the electric-lit urban areas, one in twenty children suffered from the same condition. The many drawbacks of kerosene lamps prompted a widespread demand for better lighting in the farmhouse. That demand served as one of the primary causal factors in the growing desire for electric power on the farm in the years leading up to the rural electrification movement.⁹⁰

Electric light offered many advantages over kerosene. Brighter, higher-quality light significantly decreased eye strain. Instantaneous response, reliability, and lack of necessary maintenance other than periodic bulb replacement also contributed to the appeal of electric light.⁹¹ However, despite these clear improvements and the general demand for better lighting,

⁸⁹ Marvin Barneson, Interview with Joe Tierney, 13.

⁹⁰ Committee on the Relation of Electricity to Agriculture, *Electricity on the Farm*, 6, 62, 65.

farmers tended to be rather conservative in the initial application of electricity for that purpose. It was common for a newly electrified farmhouse to have only one light bulb per room. Pull-chords on individual bulbs were also common and served as a waste-prevention technique, allowing only the necessary lights to be turned on in any given situation. Eventually, as the usage of other electric appliances in the home increased, rural residents became more acclimated to the electrified environment and the appeal of additional electric lights could not be denied.⁹²

The extensive benefits of electric lighting were not exclusive to the farmhouse; the availability of better light had a significant impact on the sphere of farm operations as well. In smaller barns a couple of kerosene lamps hanging from strategically positioned nails could provide sufficient light. However, in larger barns and other farm building such as machine shops, those same lamps struggled to adequately illuminate the space.⁹³ Electric lights easily filled all sizes and types of barns and outbuildings with quality light, improving working conditions immensely and even decreasing the amount of time required for farm chores.⁹⁴

Additionally, large lights were often installed in the yard. In the limited daylight hours during Wisconsin winters, many farm chores had to be completed in the dark. Before electricity, this meant that a farm worker would either have to carry a lantern around while doing chores or simply move about in the dark, both of which were inconvenient and impractical. A yard light allowed farm workers to clearly see their way between the barn and the house and any other outbuildings and it also provided a deterrent to nighttime prowlers. In many cases, the pole upon

⁹¹ Committee on the Relation of Electricity to Agriculture, *Electricity on the Farm*, 61-72.

⁹² "Farm Life," Siek, Kovacezich, Smith, and Peterson, 8.

⁹³ "Fields and Dreams: Marvin Barneson," 3; "Fields and Dreams: Erma Quilling."

⁹⁴ Committee on the Relation of Electricity to Agriculture, *Electricity on the Farm*, 68.

which the overhead electric lines of the main grid connected to the farm system served as the perfect perch for this light.⁹⁵

The benefits of a light-source on the farm that provided better, brighter light without the maintenance or upkeep of the kerosene lamps are obvious. In fact, electric light was nothing short of a miracle to farm families.⁹⁶ Electricity did not introduce light to the farm, but as Marvin put it, “electricity made it so much *easier* to have light.”⁹⁷

The utilization of electricity in the task of pumping water, an application promoted heavily by the REA early in the rural electrification effort, often followed closely after the electrification of a farm.⁹⁸ In the decades prior to electrification, water was most commonly retrieved outdoors via a hand-operated pump. Any activity or chore on the farm that required water—cooking, washing, cleaning, and watering the livestock to name a few—necessitated a trip to the water pump. In conjunction with the previously noted rise of the small internal-combustion engine on farms in the early twentieth century, it was common for one such engine to be hooked up to the existing pump via a drive belt. This alleviated the physical strain of having to work the hand-pump, but these gas engines, as emphasized earlier, provided challenges of their own as far as reliability and consistency, and they still necessitated a trip to the pump every time water was needed.⁹⁹ Some farms utilized windmills instead of gas engines to operate the water pump, but this was also an unreliable method as wind was not constant.¹⁰⁰ As soon as

⁹⁵ Timm, *Conversation with the author*, 8:40, 17:07; Committee on the Relation of Electricity to Agriculture, *Electricity on the Farm*, 72.

⁹⁶ Fox, *Reminiscence*, 19. Anderson, *Electricity for the Farm*, 217-218.

⁹⁷ Marvin Barneson, Interview with Joe Tierney, 13.

⁹⁸ Carmody, “Rural Electrification in the United States,” 87.

⁹⁹ Marvin Barneson, Interview with Joe Tierney, 11.

the house and barn were wired for electricity, most farmers promptly replaced the gas engine on the water pump with an electric motor.¹⁰¹ Where one might have once spent a significant amount of time struggling to start the gas engine, a simple flip of a switch now did the same job. Eventually, electric motors would be utilized on all equipment and appliances that had previously been operated by small gas engines due to their increased dependability. This shift significantly decreased the amount of time and effort involved in all areas of daily farm life.¹⁰² Eventually, fully electric, pressurized water pumps took the place of the old pump and electric motor.¹⁰³

In conjunction with these initial applications, electrical usage on the dairy farms of west-central Wisconsin expanded rapidly. While electric lighting and electric water pumps had wide-ranging uses in both the farmhouse and farm operations, the effects of the majority of subsequent electrical innovations on the dairy farm were felt most acutely in one sphere or the other.

The Farmhouse

Originally, most farmhouses were wired for a very limited amount of electrical current, in many cases less than a third of the today's standard load capacity. The usage of electricity in the home was not initially expected to be very significant and many rural residents could only afford or only wanted one electrical outlet installed per room, if that. However, as the availability and number of electric appliances in the farmhouse began to inevitably increase, farm residents realized very quickly the value of having extra outlets and a larger load capacity.¹⁰⁴ In many

¹⁰⁰ Fox, *Reminiscence*, 19.

¹⁰¹ Timm, *Conversation with the author*, 5:51.

¹⁰² Marvin Barneson, Interview with Joe Tierney, 11.

¹⁰³ Timm, *Conversation with the author*, 5:51.

cases, electricians found themselves increasing the load capacity and installing additional outlets in houses that they had just wired for electricity little over a year earlier. This is illustrative of how quickly the farming community came to embrace the role and the potential of electricity in daily life.¹⁰⁵

Electrical Appliances

As previously mentioned, prior to electrification, rural residents lived and operated daily in very much the same manner as the generations that preceded them. The majority of household chores and other activities were accomplished through manual labor and physical exertion. However, the slew of electrical appliances that accompanied the rural electrification movement revolutionized housework and vastly enhanced the standard of living of the farm family by drastically decreasing the labor involved in tasks such as washing, churning, ironing, and cooking while at the same time providing the creature comforts of electric light, running water, and other innovations.¹⁰⁶ Ron Timm, retired Director of Training for A&L Laboratories in Minneapolis, Minnesota and a leading expert on dairy equipment and quality milk production, can still remember experiencing the early stages of electrification on a Wisconsin dairy farm as a child. In his words, “everything that was previously done by hand was eventually electrified.”¹⁰⁷

For the most part, electrical appliances were not conceptually new to farm families; most had some type of non-electric predecessor that had filled the same general role or performed the same function on the farm up to that point. Instead, the benefits of electrical appliances were manifest in their revolutionary improvements over their older counterparts. To use an example

¹⁰⁴ “Fields and Dreams: Marvin Barneson,” 10-11; Tobey, *Technology as Freedom*, 29-30.

¹⁰⁵ Marvin Barneson, Interview with Joe Tierney, 18.

¹⁰⁶ Taylor, *Changes I Have Seen in the Farming Community*.

¹⁰⁷ Timm, *Conversation with the author*.

already discussed, an electric motor on a water pump performed the same task as its gas-powered predecessor; however the electric motor was cleaner, quieter, more efficient, and far more dependable. Marvin Barneson summed it up nicely, stating, “[Electricity] was so much better, so much handier, so much more convenient.”¹⁰⁸

Another perfect example of this, and one of the most popular electric appliances to first make an appearance in the farmhouse, was the refrigerator. At the time of rural electrification, iceboxes and ice houses had long been performing the task of keeping food and other perishable items cool on many of west-central Wisconsin’s dairy farms.¹⁰⁹ However, the labor involved in these early methods of food preservation was extensive. During the winter months, ice would be cut from the surface of lakes and ponds by crews of men, mostly farmers.¹¹⁰ This ice would then be placed in ice houses, between layers of insulating sawdust, where it would keep milk, butter, cream and other perishables cool throughout the following summer and provide ice for iceboxes inside the farmhouse.¹¹¹

Electric refrigeration made the process of cutting, hauling, and storing ice completely obsolete, saving a significant amount of time and labor for farmers that participated in that process.¹¹² Even more significantly, refrigerators allowed food to be kept in a dry, clean environment at a constant temperature below fifty degrees, ensuring a relative lack of spoilage from mold, yeast, and bacterial growth. This was a vast improvement over the fluctuating temperatures and damp, mold-breeding conditions found inside ice boxes. The implications of

¹⁰⁸ “Fields and Dreams: Marvin Barneson,” 16.

¹⁰⁹ Timm, *Conversation with the author*, 49:53; Fox, *Reminiscence*, 14.

¹¹⁰ Pederson, *Between Memory and Reality*, 152.

¹¹¹ Fox, *Reminiscence*, 14, 31.

¹¹² Pederson, *Between Memory and Reality*, 154-5.

these improvements in food storage were enormous for farm families. The quality and life-span of perishable food items, as well as the overall health of the family were significantly enhanced through the safe care of food. Electric refrigeration, as much as any other household electrical innovation, contributed significantly to the modernization of the home.¹¹³

Cooking was another significant household task that was profoundly impacted by electrification. Prior to electrification, the vast majority of farm families in west-central Wisconsin utilized wood-burning stoves for all their cooking needs. Food preparation was one of the most time consuming tasks on the farm. Not only did farm families tend to be large in number, but extended family, crews of farm workers, and groups of visiting neighbors were common fixtures around the dinner table. This was especially true during the harvest season when large groups of farmers and their families travelled from farm to farm harvesting and threshing each other's crops.¹¹⁴ The preparation of three meals a day for such large numbers of people was a full-time job in itself.¹¹⁵

In addition to ice-harvesting, crews of farmers regularly spent a significant portion of the winter months in the forest, working to cut enough wood to satisfy the ravenous appetites of their stoves and wood-burning furnaces. Except in the rare cases where a member of the community owned a gas-powered saw, this task was accomplished entirely with traditional woodcutting tools such as axes and hand-saws.¹¹⁶ In addition to the extensive time and labor involved in this

¹¹³ Committee on the Relation of Electricity to Agriculture, *Electricity on the Farm*, 33-35.

¹¹⁴ "Threshing" is the process of separating corn kernels or grains from the husk and straw. Stuart Macdonald, "The Progress of the Early Threshing Machine," *The Agricultural History Review* 23, no. 1 (1975): 64.

¹¹⁵ "Fields and Dreams: Erma Quilling"; Jane Mueller, Interview with Joe Tierney, Transcript, Eau Claire Energy Cooperative (November 18, 2010), 24.; "Fields and Dreams Oral History Project: Dorothy Bullis Carpenter Interview," interviewed by Mary E. Stolder on behalf of the Chippewa Valley Museum, 2000, CVM Library: Eau Claire, WI; Committee on the Relation of Electricity to Agriculture, *Electricity on the Farm*, 6, 9.

¹¹⁶ Pederson, *Between Memory and Reality*, 152.

process, the actual operation of the wood stove took a significant amount of effort. Regular trips outside to the woodpile were necessary and the use of wood as a fuel source was messy and inefficient.

With rural electrification came the revolutionary electric stove. This new appliance was easier, cleaner, and less expensive to operate and maintain. Precise temperature management and automatic time controls took much of the guess work and constant monitoring out of cooking. The absence of soot and ash byproducts meant that weekly cleaning and care of an electric stove took up to eighty-five percent less time than did its wood-burning counterparts. These features, as well as several others, combined to significantly decrease the amount of time and labor involved in cooking.¹¹⁷ Also, the elimination of a large portion of the required yearly woodcutting meant that the men on the farm also benefitted directly from this electrical innovation. For these reasons, electric stoves rapidly gained popularity in the dairy farming community of west-central Wisconsin. By 1960, only twelve percent of households in west-central Wisconsin's Trempealeau County still relied on wood for cooking.¹¹⁸

After cooking, one of the most prominent domestic chores on the farm was the laundry. A weekly occurrence at the very least, the frequency of this task varied from farm to farm depending primarily on the size of the family and the age of the children. In a time before disposable diapers, the presence of one or more babies in a household could necessitate washing as often as once a day.¹¹⁹ Before electrification, clothes were either boiled in large copper "wash boilers," or scrubbed by hand using the familiar wooden tubs and washboards.¹²⁰ In addition to

¹¹⁷ Committee on the Relation of Electricity to Agriculture, *Electricity on the Farm*, 9-12.

¹¹⁸ Pederson, *Between Memory and Reality*, 154.

¹¹⁹ "Farm Life," Siek, Kovacezich, Smith, and Peterson, 2; Committee on the Relation of Electricity to Agriculture, *Electricity on the Farm*, 26.

the large amount of time and effort required by either method, preparation for this task was a rather significant chore in itself. Water would first have to be pumped from the well outside, hauled into the house, and heated up on the stove before it could be used for washing. Many farm families fortunate enough to be able to purchase a gas-powered washing machine prior to the arrival of electricity found relief from the majority of that labor. However these machines were operated by the same pre-electric, small gas engines previously discussed and subsequently suffered from the same issues of inconsistency and unreliability.

Upon electrification of the farmhouse, it did not take long for those farm families without a washing machine to purchase a new electric one and for those with a gas-powered washing machine to refit it with an electric motor.¹²¹ As a result, the amount of time required for washing decreased by as much as sixty percent and the replacement of physical exertion with automated electric power allowed for the completion of other tasks while the clothes were being washed. Electric washing machines transformed the washing component of laundry work from a disagreeable, labor-intensive chore into a relatively painless task that required little more energy than that expelled in the act of hanging the clothes on the line.¹²²

Not all electrical appliances were developed for the sole purpose of facilitating housework. In addition to such physical contributions many innovations were intended primarily to be a source of pleasure and entertainment for the family. One such device was the radio. Providing entertainment as well as practical information pertaining to farming and farm life, radios provided a link between the relatively isolated farm and the rest of the world and made

¹²⁰ "Fields and Dreams: Marvin Barneson," 4; Fox, *Reminiscence*, 19.

¹²¹ "Fields and Dreams: Marvin Barneson," 8; "Farm Life," Siek, Kovacezich, Smith, and Peterson, 1; Timm, *Conversation with the author*, 51:00.

¹²² Committee on the Relation of Electricity to Agriculture, *Electricity on the Farm*, 24-26.

life in the home more enjoyable. Some farm families did possess battery-powered radios prior to electrification, but such batteries required regular charging and other maintenance and it was not uncommon for them to die right in the middle of an important or enthralling radio broadcast.¹²³

The potential of the radio as window to the outside world was anticipated in a 1938 article by John M. Carmody, the sitting REA Administrator at that time. In it he stated, “A wide field for future inquiry is being opened up by the acquisition of one or more radios by nearly every farm family securing electric service. Rural purchasing habits, cultural interests, political opinions, and modes of life are being changed by the radio.”¹²⁴ It is clear from this statement that the presence of a radio in the farmhouse had a deep and fundamental impact on the lives of farm residents.

These were only a few of the most common early electrical innovations in the farmhouse. Other popular electrical applications such as water heaters, irons, vacuum cleaners, sewing machines, clothes dryers, clocks, and various furnace components all contributed to decreasing the amount of time and labor consumed by daily domestic duties. This subsequently led to a significant improvement in both the standard of living of the electrified farm family and the overall aesthetics and comfort of the farmhouse. Slowly, the level of electrical modernization within the farmhouse began to catch up to that of the average contemporary urban household.¹²⁵

Impact on Farm Women

While the impact of electric appliances and conveniences within the home was felt by the entire family, the women in the farm family felt it even more acutely because it was they who

¹²³ “Farm Life,” Siek, Kovacezich, Smith, and Peterson, 10; Committee on the Relation of Electricity to Agriculture, *Electricity on the Farm*, 52.

¹²⁴ Carmody, “Rural Electrification in the United States,” 87.

¹²⁵ Committee on the Relation of Electricity to Agriculture, *Electricity on the Farm*, 6, 8, 23, 41, 49, 55, 57.

traditionally performed most of the domestic chores for which those appliances were used.¹²⁶ In the late nineteenth century, the doctrine of “separate spheres” was embraced by a significant portion of the urban American public, primarily the middle class. This ideology delegated men to the role of providing for the family and tending to business in the outside world, while women were confined to the domestic tasks of taking care of the family and the home and providing a comfortable environment to which the man of the house could return at the end of each day of work. This ideology persisted in urban areas well into the early twentieth century.

However, the situation for farm women was unique. On a farm, the line between the work-place and the home, between the center of production and the center of reproduction, was not so clearly defined, and farm women rarely subscribed to the notion of separate spheres, if they were even aware that such an idea existed. They frequently participated in farm work alongside their husbands, especially (but not exclusively) in the milking process, which commonly involved the whole family. The extent of a particular farm woman’s participation in activities outside of the farmhouse depended on several factors, mainly the availability of aid from hired help, extended family, neighbors, and the older children in the family.¹²⁷

Although farm women essentially had one foot in each sphere, their primary concern was still the more traditional female role of homemaker, which occupied the vast majority of their time. The combined workload of both spheres was enormous. A 1931 national survey by the U.S. Department of Agriculture’s Bureau of Home Economics revealed that the farm women surveyed worked an average of 63.5 hours per week, 53 of which were spent in activities

¹²⁶ Jaskiran Kaur Mathur and Dhiraj Mathur, “Dark Homes and Smoky Hearths: Rural Electrification and Women,” *Economic and Political Weekly* 40, no. 7 (2005): 640.

¹²⁷ Pederson, *Between Memory and Reality*, 158-9; “Fields and Dreams Oral History Project: Earl and Alyce Myers Interview,” interviewed by LaVerne Ausman on behalf of the Chippewa Valley Museum, 1998. CVM Library: Eau Claire, WI, 4; Jane Mueller, Interview with Joe Tierney, 5-6.

pertaining to homemaking such as preparing meals, cleaning, doing laundry, and caring for children.¹²⁸ It was in these regular, daily, domestic chores that farm women experienced the most tangible effects of electricity. Electric stoves, washing machines, sewing machines, irons, clothes dryers, vacuum cleaners, and various cooking wares completely revolutionized the work of women in the farmhouse.¹²⁹ As was the case with most electrical innovations, these appliances made housework much easier and far less time-consuming, which consequently caused a drastic reduction in the overall workload of the average farm woman. This allowed women to spend more time with the family, pursue other means of income for themselves and for the farm such as raising poultry or growing produce for the market, and it even presented the possibility of leisure time, a rarity on farms of that time.¹³⁰

Farm Operations

Although the improvement of the standard of living of the farm family and the facilitation of farm women's duties were important outcomes of rural electrification, electrical innovation within the operational sphere of the farm was paramount, as the farm was the business, the primary source of income for farm families. Because farm production represented the livelihood of those families, electrical innovation in this sphere was often even given priority over household applications. In fact, it was not at all uncommon in west-central Wisconsin for the

¹²⁸ Committee on the Relation of Electricity to Agriculture, *Electricity on the Farm*, 7.

¹²⁹ "Farm Life," Siek, Kovacezich, Smith, and Peterson, 2, 7; Jane Mueller, Interview with Joe Tierney, 16; Fox, *Reminiscence*, 19; Timm, *Conversation with the author*.

¹³⁰ Committee on the Relation of Electricity to Agriculture, *Electricity on the Farm*, 8-9; Mathur and Mathur, "Dark Homes and Smoky Hearths," 638. For a more thorough treatment of the role of women on the farms of Trempealeau County in west-central Wisconsin, see Pederson, *Between Memory and Reality*, 157-185.

barn to be wired for electricity and provided with running water—courtesy of an electric pump—well before the house.¹³¹

Lamoine Myers, a long-time west-central Wisconsin farm resident recalled that, as a young child in 1945, the barn on his parents' farm was quite modern for the time, boasting electric lighting, running water, and electric milking equipment, while the house had not yet been wired for electricity.¹³² Another dairy farm resident in the region, Jane Mueller, recalled how her mother-in-law would tell stories of washing clothes in the milk-house because it had hot, running water before the house did.¹³³ This staggered electrification of the farm could be a result of many different factors, but whatever the individual reasoning behind it, the fact that the barn was most commonly given priority over the farmhouse clearly illustrates the importance of the business aspect of the farm and the potential for electrical improvement within this sphere.

Even as electricity first began to arrive at scattered farms across the country in the 1930s, the potential for electrical innovation in farm operations was already on the minds of farmers and rural electrification proponents alike. By 1939, REA Administrator Carmody reported, “the adaptation of electricity to farm work is in its infancy...but as new equipment and methods are developed to utilize electricity in farming they may be expected to lessen its burdens and to bring about important changes in its techniques and rewards.”¹³⁴ It would not be long before electricity did, indeed, live up to those expectations.

¹³¹ Committee on the Relation of Electricity to Agriculture, *Electricity on the Farm*, 9; Timm, *Conversation with the author*, 19:41.

¹³² Lamoine Myers, Interviewed with Joe Tierney, 2-4.

¹³³ Jane Mueller, Interview with Joe Tierney, 5.

¹³⁴ Carmody, “Rural Electrification in the United States,” 88.

Stages of Electrical Development in Dairy Farm Operations

Throughout the research for this project, it became clear that, while the exact rate and timeline of electrical development varied from farm to farm, general trends in this process certainly did exist. These coincided with factors such as the progression of electrical farm machine technology, the importance of certain electrical innovations to the operation of the farm, overall financial condition of the farming community, and the impact of world events. From these trends, and with the aid of the expertise of Ron Timm in the area of dairy farm equipment, production, and operations, a few general stages in the electrical development of the dairy farm in west-central Wisconsin can be extrapolated.

The first stage consisted of the few years immediately following the arrival of electricity on a particular farm. In this stage the most popular, highest priority initial electrical applications, milking machines, running water, and lights for the barn and yard, were customarily acquired.

The second stage of development spanned from the end of the first stage to roughly 1950. In this period vital areas of dairy farm operations that had not quite been enough of a priority to be included in the first stage were electrified. In this period, electric welders, electric fencing, milk-can coolers, and upgrades or replacements of stage-one milking machines were among the common applications of electricity. In this period, the juxtaposition and cohabitation of pre and post electricity technology and procedures on the farm was especially evident. Electric-powered machines were quickly revolutionizing certain aspects of dairy production and farm operations, but technology was still lacking in several key areas and many farm tasks were still being accomplished in the same manner as they had been for many years before electricity.¹³⁵

It was also within this stage that World War II came to an end, the impact of which has already been briefly mentioned. Higher milk prices and an improved market for the sale of

¹³⁵ Fox, *Reminiscence*, 31; Timm, *Conversation with the author*, 23:37.

livestock meant that dairy farmers had money with which to further electrify the farm.¹³⁶ In the same way that the conclusion of World War I had boosted the rate of independent electric distribution cooperative formation prior to the creation of the REA, the end of World War II increased the rate and extent of electrical innovation on the farm.¹³⁷

The third and final stage began in the early 1950s and, for the purposes of this paper, lasted until the late 1950s. It was in this period that some of the most revolutionary improvements in dairy production and farm efficiency were made: bulk tanks for cooling milk, barn cleaners, silo un-loaders, feed elevators, and barn ventilation systems. By the late '50s, technology had progressed to the point that electric equipment and machinery had been developed to aid every major aspect of dairy production and farm operations. This does not by any means imply that all dairy farms in west-central Wisconsin were actually utilizing such technology by this time. In fact, in the early 1950s a significant number of farms were still not electrified or had only very recently been electrified.¹³⁸ Regardless, by this period, the technology did exist and was present and functioning on a significant number of dairy farms in west-central Wisconsin. The others would soon follow suit. Obviously, the farms that were electrified much later did not fit the trends outlined in this section, but these stages were fairly uniform on dairy farms that were electrified in the mid 40s or earlier.

In most areas of farm work on electrified dairy farms, several different types, styles, and brands of electrical equipment were utilized. Names such as International Harvester, DeLaval, and McCormick-Deering dominated manufacturing in this area, but other brands did exist and

¹³⁶ Timm, *Conversation with the author*, 7:06; Marvin Barneson, Interview with Joe Tierney, 12; "Fields and Dreams: Marvin Barneson," 8.

¹³⁷ Carmody, "Rural Electrification in the United States," 83.

¹³⁸ Lamoine Myers, Interview with Joe Tierney, 10.

were used on the farms of west-central Wisconsin. Throughout the following information regarding farm operations, only certain popular brands and styles of each type of electric-powered equipment or machine will be mentioned, with the main focus being on the general impact of electricity on each area of dairy farm operations, not on all of the variations of electric farm equipment that were available.

Milking

As might be expected, some of the most significant electrical innovations on the dairy farms of west-central Wisconsin were in the area of milking. Electric milking machines, as part of the first stage of electrical innovation, were immediately one of the most popular applications of electricity on the dairy farm as a whole and especially within the sphere of farm operations.¹³⁹ Prior to electricity, most milking was done by hand under the glow of a kerosene lamp and often with the help of the immediate and even extended family. This was a labor and time-intensive task that had to be repeated twice a day, every single day of the week.¹⁴⁰ As early as the late 1800s, mechanical milking machines were in development, but none of the early models did a very thorough job of milking the cow and all were physically strenuous and even dangerous to the cow. By the time the earliest electric milking machines made their way to American dairy farms, some dairy farms were already utilizing some sort of mechanical milking machine, although this technology still suffered from many of the same problems as the earliest models.¹⁴¹

¹³⁹ Timm, *Conversation with the author*, 4:30.

¹⁴⁰ “Fields and Dreams: Marvin Barneson,” 3, 9; Pederson, *Between Memory and Reality*, 171; Jane Mueller, Interview with Joe Tierney, 6; “Fields and Dreams: Erma Quilling,” 1.

¹⁴¹ Timm, *Conversation with the author*.

Rural electrification quickly made the electric milking machine a standard fixture on nearly every electrified farm.¹⁴² The earliest models, such as the Clean-Easy machine owned by Ron Timm’s father, were compact systems that were wheeled up and down the barn aisles, milking two cows at once and filling a ten-gallon milk can which sat right on the cart that housed the machine. With the early milking machines and even with some of the subsequent models, the farmer would actually have to finish extracting the last little bit of milk from each cow after the milking units were removed. This was known as “stripping” the cow.¹⁴³

Another extremely popular variety of early electric milking machine was the Surge Bucket Milker. With this model, each milking unit¹⁴⁴ pumped milk into a metal bucket that hung under the cow on a strap that went over the cow’s back. The “pulsator” or pump on each individual unit was operated via an electric-powered vacuum line that ran around the barn. As with many of the electrical innovations covered above, the earliest variations of the bucket milker were developed prior to electrification and operated by a gas-powered motor. However, once dairy farms received electricity, new electric vacuum pumps replaced the gas-powered ones and as with any other case where electric motors replaced gas engines (water pump, washing machine, etc), the emergence of electric vacuum pumps made the operation of the bucket milking system cleaner, quieter, less expensive, and more reliable.¹⁴⁵

These early systems still necessitated the hauling of milk cans to the cooler or, later, the bulk tank. Later milking machines were not only more sophisticated as far as effectively removing the milk from the cow, but they also provided the option of a “pipeline” system that

¹⁴² Pederson, *Between Memory and Reality*, 171.

¹⁴³ Timm, *Conversation with the author*, 4:42, 38:15.

¹⁴⁴ “Milking Unit”—The part of the milking machine that attaches directly to the udder of the cow.

¹⁴⁵ Timm, *Conversation with the author*, 36:45; Fox, *Reminiscence*, 31.

would send the milk directly from the milking unit to the bulk tank, where it would be cooled.¹⁴⁶ Regardless of what type of milking machine a particular dairy farmer chose to purchase, the implications were generally the same as with all of the electrical innovations already discussed. Electric milking machines cut down the amount of time it took to milk each cow and significantly reduced the amount of physical labor involved in the process.

A later development in the dairy production process had less of an impact on time and labor, but had enormous repercussions within the area of producing high quality milk. This development was the invention in the early 1950s of the electric bulk tank which acted as a refrigerator of sorts for warm milk just extracted from the cow.¹⁴⁷ Prompt cooling of milk after it comes out of the cow is a crucial step in the milking process. Milk initially comes out of the cow at 101.5 degrees which is the average body temperature of a cow. Without cooling, undesirable bacteria quickly multiply and the milk becomes unfit for sale for human consumption. Cooling is therefore necessary for deterring such bacterial growth and ensuring the production of quality milk.¹⁴⁸

Before bulk tanks, milk cans were taken directly to a tank where they were immersed in water to cool the milk and keep it cool.¹⁴⁹ Milk could only be cooled down to whatever temperature the water happened to be, usually around fifty-five degrees. This method of cooling could keep milk from spoiling for eighteen hours or more. In the mid to late '40s, before the invention of bulk tanks, electric refrigeration units designed to hold full milk-cans were developed to get the milk cooler than was possible with water-cooling. These milk-can coolers

¹⁴⁶ "Fields and Dreams: Marvin Barneson," 3.

¹⁴⁷ "Farm Life," Siek, Kovacezich, Smith, and Peterson, 10.

¹⁴⁸ Timm, *Conversation with the author*, 24:20

¹⁴⁹ "Fields and Dreams: Marvin Barneson," 3; Fox, *Reminiscence*, 14, 31.

allowed for much lower temperatures than were possible with straight water cooling. These were quite popular, but they would soon be eclipsed by the arrival of the bulk tank in the early 50s.¹⁵⁰

The invention of the bulk tank made it possible to quickly cool large quantities of milk down to forty degrees, the ideal temperature for quality milk, and maintain it at that temperature for an extended period of time. As milk was added, the blend temperature was never supposed to exceed forty-five degrees, and this was not a problem for even the earliest bulk tanks. Not only did the milk last longer, but there was an incredible improvement in the quality and flavor of the milk.¹⁵¹ The implications of this innovation in the production of high quality milk will be covered in detail shortly.

In the Barn and Other Outbuildings

In addition to milking equipment, electricity also allowed for other significant improvements within the barn. One of these electrical applications was the installation of large fans to take moisture out of the air and better regulate the environment within the barn. This played a crucial role in achieving higher milk production per cow as a more comfortable cow naturally produces more milk.¹⁵² A huge labor-saving device to come out of the early 1950s was the automated electric barn cleaner. In the basic dairy barn, a long gutter in the floor behind the cows collects the manure they produce while they are in the barn. This gutter must be cleaned regularly to avoid it filling up and flowing over. Before the development of the electric barn cleaner, the contents of those gutters had to be shoveled out by hand and hauled outside to the manure pile. Not only was this a labor-intensive job, it was also just not very pleasant.¹⁵³

¹⁵⁰ Timm, *Conversation with the author*, 24:20, 24:30.

¹⁵¹ Timm, *Conversation with the author*, 27:17.

¹⁵² Timm, *Conversation with the author*, 31:50.

The basic electric barn cleaner functioned as follows: an endless “flight conveyor”¹⁵⁴ installed in the manure gutters in the floor of the barn pushed and slid the manure along the gutter, out of the barn, and up an elevator where it was dropped into a manure spreader. Then as the flights returned to the barn to repeat the circuit, they were wiped off by a device to avoid it freezing when it went outside. This continuous circuit continued until the system was shut off. The installation of this system in the barn made the undesirable task of cleaning out the manure gutters by hand unnecessary.¹⁵⁵

In every area of farm operations, electrical innovation allowed for, as it did within the domestic sphere, a significant decrease in the time and labor necessary for accomplishing daily tasks. As a result, continuous up-scaling, upgrading, and improving of the existing electrical technology was a common feature. The level of available electrical innovations escalated so rapidly that there was no way any farmer could keep up with it. This expansion of the application of electricity on the dairy farms of west-central Wisconsin caused a continuous increase in the load on the electrical grid and served to further entrench the necessity of electricity in nearly every aspect of farm life.¹⁵⁶

The Business—Efficiency, Production, and Quality

Of all the improvements that resulted from the electrification of various processes within the sphere of farm operations, the most significant benefit of electricity on the dairy farms of west-central Wisconsin was manifested in the collective impact of those individual benefits on the business aspect of dairy farming. In his interview with the author, Marvin Barneson

¹⁵³ Fox, *Reminiscence*, 31.

¹⁵⁴“Flight Conveyor,”—A moving chain with scrapers every couple inches.

¹⁵⁵ Timm, *Conversation with the author*, 54:04.

¹⁵⁶ “Fields and Dreams: Marvin Barneson,” 19.

enthusiastically made the claim that "...the biggest thing that ever happened to the rural economy was electrification." Whether this assessment is accurate or simply one individual's opinion, the positive impact of electrification on the dairy business is undeniable.

First of all, the incredible amount of time and labor saved by the new electric systems greatly improved the efficiency of work on the farm. These innovations allowed for far fewer people to be able to accomplish a far greater amount of work with less physical labor involved. The number of cows that one person could handle in a single milking as well as the automation of many labor-intensive tasks such as cleaning the barn, feeding the cows, erecting fences, and many others meant that a farmer had the option of either hiring fewer extra hands or greatly expanding the dairy operation without increasing the existing number of hired workers. In either case, the financial implications are obvious.¹⁵⁷ Jane Mueller's husband, Doug, was known to say frequently that "electricity is the cheapest hired man you can get."¹⁵⁸

The cost-effectiveness of electricity was also an improvement in efficiency over the more expensive gasoline power that preceded it in many farm operations. In the words of Lamoine Myers, who served for twenty-seven years as a Director on the Board of the Eau Claire Electric/Energy Cooperative, "To me, electricity has always been penny-cheap. I won't say you shouldn't use it wisely, but compared to other energies electricity is such a bargain."¹⁵⁹

The second major contribution of electricity to the business of dairy farming was in the area of milk production. According to Ron Timm, today's average American milk production per cow is around 21,000 pounds per year. Compare this to the early 1940s when 12,000 pounds of

¹⁵⁷ Lamoine Myers, Interview with Joe Tierney, 8-10; Timm, *Conversation with the author*, 34:52; Pederson, *Between Memory and Reality*, 171; Marvin Barneson, Interview with Joe Tierney, 8.

¹⁵⁸ Jane Mueller, Interview with Joe Tierney, 13

¹⁵⁹ Lamoine Myers, Interview with Joe Tierney, 10.

yearly milk output per cow was setting the bar high.¹⁶⁰ In this area innovations in electric milking equipment played a significant, albeit partial, supporting role.¹⁶¹ Other major contributors to the increase of average milk production include improvements in the understanding of the biology of the cow and research and innovation in pre-milking cleaning and stimulating chemicals for the udder.¹⁶²

The third and most significant impact of electricity on dairy farming was its contribution to higher milk quality. As with milk production, electricity was not the only contributing factor to this trend, however electric-powered milking equipment and subsequent innovations in that area played a significant part. Of those innovations in milking equipment, the bulk tank had the greatest impact. Before this innovation, there was no way to cool milk properly and within a quick enough time frame. Electric bulk tanks were and continue to be an absolutely essential component in the production of high quality milk.¹⁶³ Subsequently, as higher quality milk is priced higher, an improvement in quality also signified an increase in the profit of a dairy farm.

Milk is a dairy farmer's main product, and the basis of the farm family's livelihood. Electrical innovation within the operation of the dairy farm drastically improved that livelihood by increasing the efficiency and cost-effectiveness of farm operations as well as the quantity and quality of the product. This did wonders for the smooth operation and overall profitability of the business. Any one of these improvements would have had an enormous impact on dairy farming, but when coupled together, these results of rural electrification completely revolutionized the entire dairy industry.

¹⁶⁰ Timm, *Conversation with the author*, 29:11.

¹⁶¹ Lamoine Myers, Interview with Joe Tierney, 9-10.

¹⁶² Timm, *Conversation with the author*, 38:32.

¹⁶³ Timm, *Conversation with the author*, 31:50; Committee on the Relation of Electricity to Agriculture, *Electricity on the Farm*, 33.

Chapter 4

Drawbacks to Using Electricity on the Farm

As with any technological revolution, especially one as extensive as rural electrification, the shift from pre-electric farm life to electrified farm life was not without certain undesirable consequences. Although the response of the American farming community to the arrival of electricity on their farms was resoundingly positive, electrification did have some very significant negative outcomes. Two of the primary drawbacks, stray voltage and the complete reliance of modern farms on electricity, were and continue to be serious concerns for farmers.

On all electrified farms even today, small levels of electrical current can be found running through most conductive objects and surfaces. The presence of electricity where it is not intended to be is known as stray voltage.¹⁶⁴ When a dairy cow touches two slightly electrified surfaces at once, current passes through her body between the two surfaces. At normal levels, stray voltage is virtually undetectable without special detection equipment and has no observable ill effects on the cows. However, if voltage levels become elevated on a dairy farm, severe consequences can result. Even 1-2.5 volts of electrical current causes a significant amount of stress on a cow, resulting in poor milk production, incomplete milking, longer milking time, a greater chance of disease, and a decrease in overall milk quality.¹⁶⁵

Although not a common problem anymore, stray voltage posed a significant problem to dairy farmers in the 1960s and '70s as a result of a general increase in voltage demand by new equipment at that time. Elevated stray voltage was especially prevalent on larger farms that used

¹⁶⁴ Also known as “tingle voltage,” “step potential,” and “touch potential.”

¹⁶⁵ Wisconsin’s Department of Agriculture, Trade and Consumer Protection and Public Service Commission, *A Guide to Identifying Stray Voltage on Your Farm*, Madison, WI: 1994; Timm, *Conversation with the author*, 47:54.

substantial amounts of electricity at high voltages. Stray voltage was especially troublesome because its source or sources on a particular farm were often very difficult to locate. Not only was it challenging to narrow down which of the many pieces of electrical equipment on the farm was the root cause of the problem, many times the true culprit was not even located on the farm experiencing the problem. Depending on soil content and moisture levels, electricity can travel quite well through the ground. As a result, many cases of stray voltage were caused by excess electricity running through the ground from a neighboring farm.

Ron Timm has had considerable experience with stray voltage in his lifetime, both as a farmer and as part of his career in the dairy industry with A&L Laboratories. As an example of the elusive nature of stray voltage, he recounted a story about a farm that he visited many years ago near Athens, Wisconsin in Marathon County. That particular farmer had been struggling with incredible levels of stray voltage for quite some time and had been unsuccessful at either finding its source or decreasing its effects. The farmer showed Ron a voltage meter that he had connected to a metal surface in the barn. He watched as the meter jumped instantly from zero volts to over seven volts—an exceptionally high level for stray voltage—without a single piece of electrical equipment running on the farm. After much investigation and a certain amount of luck, it was discovered that the cause of that farm’s woes was actually the neighbor’s silo un-loader running nearly a quarter of a mile down the road.¹⁶⁶

The prolonged effects of uncorrected stray voltage on cow health and milk production were enough to cause many farms to go out of business. Ron used another example of a farm he once visited in Madison to illustrate the impact of stray voltage on milk production. That farm was producing roughly fourteen thousand pounds of milk per cow per year, much less than a farm with that size herd and that type of milking equipment should have been producing. Ron

¹⁶⁶ Timm, *Conversation with the author*, 45:08.

determined the problem to be stray voltage, found and corrected its source, and within a matter of months, milk production on that farm shot up to the equivalent of roughly twenty thousand pounds per cow per year. On the other hand, it is worth noting that production on that scale would not have even been possible without electricity in the first place.¹⁶⁷

The second most significant drawback of the presence of electricity on the dairy farm is less direct: the total reliance of modern farms on electricity. Nearly every aspect of modern dairy farming relies on electricity in some form or another. This does not immediately stand out as being an overtly negative consequence until one considers that in the event of prolonged electrical outages, mostly resulting from natural disasters, the continued operation of even a small dairy farm becomes nearly impossible. In rural areas, even the running water stops working in the event of a power outage and on top of that, in the words of Marvin Barneson, “you don’t want to milk fifty cows by hand!”¹⁶⁸

Jane Mueller recalled how a huge 1980 storm left her and her husband Doug without electricity for an entire week. Keeping their farm running during that time was incredibly difficult. They had to continuously haul a backup gas-powered generator back and forth between their farm and a neighbor’s farm in order to do the milking twice a day and to power the bulk tanks to keep the milk cold. In addition to being exhausting and time consuming, it was also very expensive to use that much gasoline both in powering the generator and in transporting it. And the Muellers were the lucky ones. Many of their neighbors had much smaller generators and were forced to shut every electrical device and appliance off on the whole farm in order to provide enough power to the milking equipment.¹⁶⁹

¹⁶⁷ Timm, *Conversation with the author*, 47:25.

¹⁶⁸ Jane Mueller, Interview with Joe Tierney, 8; “Fields and Dreams: Marvin Barneson,” 20.

All of the large dairies today have a giant backup diesel generator to provide for such occasions. They are an absolute necessity because there is no way that a farmer and his hired help can possibly milk one to three thousand cows by hand. It is a big expense—thousands of dollars for a one hundred to two hundred horsepower diesel engine that barely ever gets used, if at all—but it is necessary insurance as there is no way the farm could operate without electricity for any length of time. A farmer once told Ron, “If I didn’t have that [generator] and the lights went out, I might as well go to the house and go to bed, because there’s nothing I could do.” This complete reliance on electricity means that, while electric service is by and large a wonderful thing in dairy farming, it can also serve as a handicap in some situations.¹⁷⁰

These negative consequences, although substantial, come with the territory so to speak. When the vast, fundamental improvements in farm life and operations are weighed against these drawbacks, the imbalance in favor of electricity is explicitly clear. There is no evidence that any notable number of farmers found rural electrification to be a fundamentally negative event. To the contrary, the evidence that is available shows overwhelming farmer support of and appreciation for the efforts of those who brought electricity to rural America.

¹⁶⁹ Jane Mueller, Interview with Joe Tierney, 7-8.

¹⁷⁰ Timm, *Conversation with the author*, 22:21.

CONCLUSION

In a 1939 article written for the *Annals of the American Academy of Political and Social Science*, REA Administrator John M. Carmody made the following astute, pseudo-prophetic statement: “In future years, students of the social sciences will analyze this national program of rural electrification and will appraise its social, economic, and political aspects. Evidence already at hand suggests that they will find that it will have profoundly changed the way of living in thousands of farm communities throughout the United States.”¹⁷¹ Over seventy years later, it is possible to look back on the effects of rural electrification and conclude that the path of history did, in fact, fulfill and exceed this prediction. It is questionable whether Administrator Carmody could have even dreamt of the extent to which electricity would affect life in the farmhouse and the operation of the farm. Virtually no area of farm life remains untouched by electricity.

Today, it is estimated that ninety-nine percent of the nation’s farms enjoy the benefits of electric service.¹⁷² For the most part, rural electrification has faded into the memories of the dwindling population that experienced it first-hand. But for those who can still clearly recount that experience, rural electrification, even with its few negative consequences and drawbacks, stands out as one of the most significant events in the development of farm life during their lifetime. In the words of Marvin Barneson, “[There was] no way up until rural electrification.”¹⁷³ Looking back on his childhood, Lamoine Myers also remarked, “I wouldn’t want to go back [to life] without electricity.”¹⁷⁴

¹⁷¹ Carmody, “Rural Electrification in the United States,” 87.

¹⁷² National Rural Electric Cooperative Association, “History of Electric Co-Ops,” <http://www.nreca.coop/members/History/Pages/default.aspx>.

¹⁷³ Marvin Barneson, Interview with Joe Tierney, 39.

¹⁷⁴ Lamoine Myers, Interview with Joe Tierney, 10.

To the farm residents who worked extremely hard to organize cooperatives or other rural electric distributors so they could have the opportunity to have electricity delivered to their doorstep, rural electrification meant much more than just a relief from much of the intense labor and drudgery of farm work. Bonnie Cornell, who grew up on a west-central Wisconsin dairy farm recalls, “That’s how the farmers felt about electricity...it really meant something to them. You know, now-a-days, it’s there. I mean, I’m not saying that they’re not proud of [electrification on the farm], but it’s there, where these people [farmers in the period before rural electrification] had to get it.”¹⁷⁵

In the lives of the residents of newly electrified dairy farms, electrical innovation represented a vast improvement in the standard of farm life, a significant decrease in the time and effort involved in both household and farm chores and operations, and a revolution in efficiency, production, and profitability within the business realm of the dairy farm. Additionally, it clearly aided rural culture in catching up to and integrating with the contemporary urban culture, blurring the long-standing division between the “city” and the “country.” These revolutionary changes assured that farm life after the arrival of electricity would never be the same.

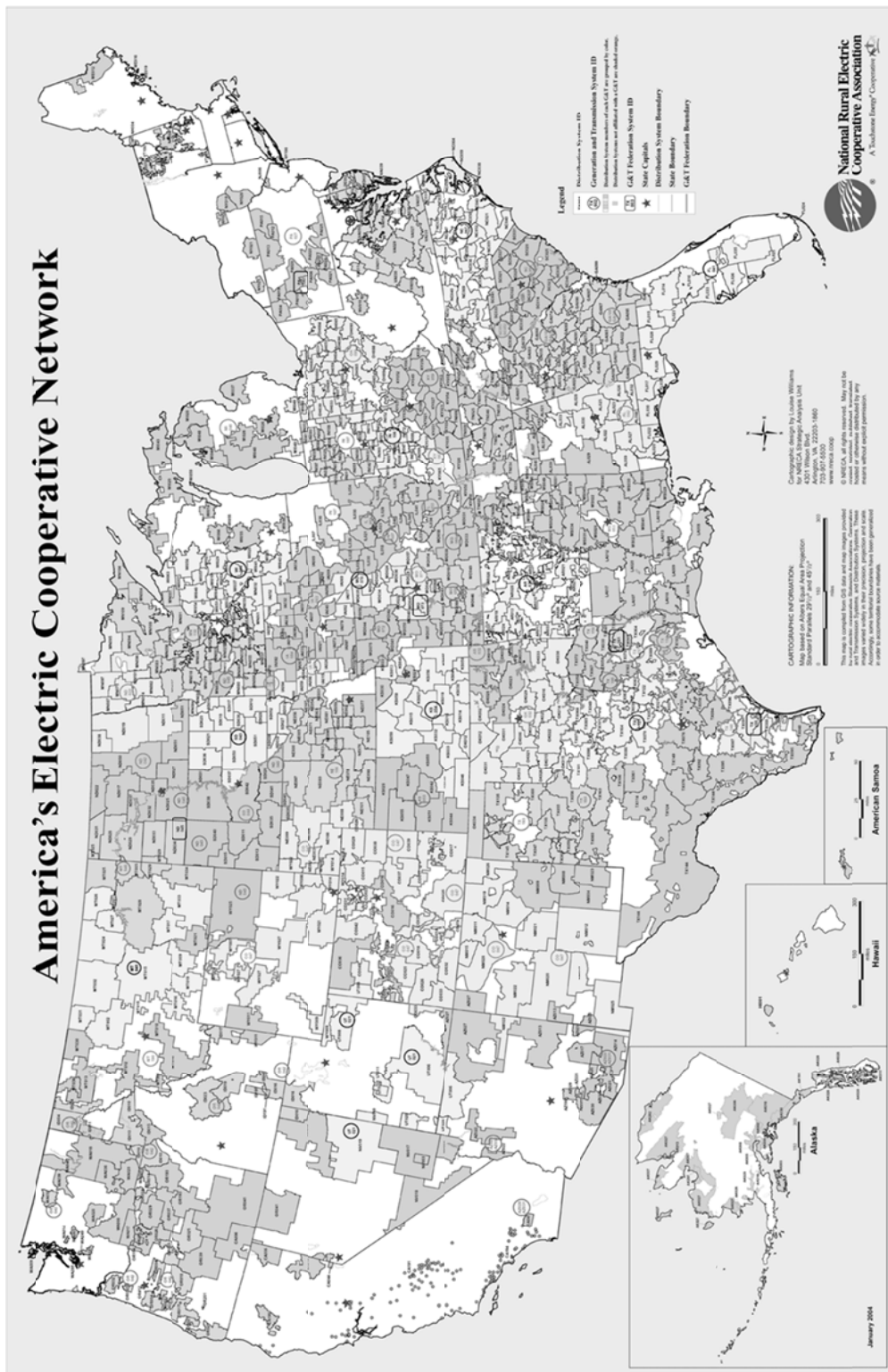
As far as the future implications of rural electrification are concerned, Marvin Barneson had this to say: “when you think [back to] where we were a hundred years ago, it almost scares you to think where we going to be in the next hundred years. I have seen an awful lot of change in my seventy some years here.”¹⁷⁶ Although it is unlikely that electricity itself will be the main cause of any fundamental changes in the lives of future generations of dairy farmers as extensive

¹⁷⁵ Laverna (Bonnie) Cornell, Interview with Joe Tierney, Transcript, Eau Claire Energy Cooperative (December 7, 2010), 13.

¹⁷⁶ Marvin Barneson, Interview with Joe Tierney, 13.

as those that occurred in the years immediately following rural electrification, if precedent means anything at all, any major changes that do occur will almost certainly be aided by electricity and electrical innovation.

APPENDIX A



Distribution of electric cooperatives in the United States as of 2004.

Source: National Rural Electric Cooperative Association, "History of Electric Co-Ops," <http://www.nreca.coop/members/History/Pages/default.aspx>.

APPENDIX B

Basic Interview Questions

The following is a list of selected questions that were used in the oral history interviews conducted by the author for this project. The exact selection and wording of questions varied slightly from one interview to the next, but the majority of the basic topic areas addressed in the interviews are represented by these questions:

- Where were you born and raised? Where do you live now? Have you ever lived anywhere else for over a year?
- What were some of the duties/chores you were responsible for on your farm? How did the arrival of electricity affect those activities?
- What power sources were used before electricity?
- When did you first receive electricity in your childhood home? What were your feelings when the lights first came on?
- Was the entire farm wired for electricity right away or were the house and farm buildings wired on separate occasions?
- What were the very first applications of electricity on your farm?
 - What were some of the first electrical appliances in your home?
 - What were some of the first electrical machines or other equipment used outside the home?
- How did electricity affect the standard of living in your home?
- Can you give some examples of farm activities that were made easier by electricity?
- Do you recall experiencing any problems or difficulties with the electric service?
- Did electrification affect production and/or profit of the farm?
- How would you summarize the impact that electricity had on your farm and on your childhood?

BIBLIOGRAPHY

PRIMARY

Carmody, John M. "Rural Electrification in the United States." *Annals of the American Academy of Political and Social Science* 201 (January 1939): 82-88.

<http://www.jstor.org/stable/1022068>.

----- "Rural Electrification: Progress and Future Prospects." *Journal of Farm Economics* 20 no. 1 (1938): 361-369. <http://www.jstor.org/stable/1231551>.

Committee on the Relation of Electricity to Agriculture. *Electricity on the Farm and in Rural Communities (Revised Edition)*. C.R.E.A. Bulletin, Vol. 7, no. 1. Edited by E.A. White. Chicago: Committee on the Relation of Electricity to Agriculture, 1931.

Eau Claire Energy Cooperative. 2010. Bylaws. Eau Claire Energy Cooperative,

<http://documents.ecec.com/Public/governance/September2010Bylaws.pdf> (accessed May 1, 2011).

Eau Claire Energy Cooperative's 75th Anniversary Oral History Project:

Barneson, Marvin. Interview with Joe Tierney. Transcript. Eau Claire Energy Cooperative, November 2, 2010.

Cornell, Laverna (Bonnie). Interview with Joe Tierney. Transcript. Eau Claire Energy Cooperative, December 7, 2010.

Larson, Noble. Interview with Joe Tierney. Transcript. Eau Claire Energy Cooperative, November 16, 2010.

Mueller, Jane. Interview with Joe Tierney. Transcript. Eau Claire Energy Cooperative, November 18, 2010.

- Myers, Lamoine. Interview with Joe Tierney. Transcript. Eau Claire Energy Cooperative, November 9, 2010.
- “‘Farm Life’ Oral History Interview: Rural Electrification,” Jean Siek, Harriet Kovacezich, Mary Smith, and Ruth Peterson, interviewed by Jim Zak on behalf of the Chippewa Valley Museum, 1 January 2004. Transcript located at CVM Library: Eau Claire, WI.
- “Fields and Dreams Oral History Project: Dorothy Bullis Carpenter Interview,” interviewed by Mary E. Stolder on behalf of the Chippewa Valley Museum, 2000. Transcript located at CVM Library: Eau Claire, WI.
- “-----: Earl and Alyce Myers Interview,” interviewed by LaVerne Ausman on behalf of the Chippewa Valley Museum, 1998. Transcript located at CVM Library: Eau Claire, WI.
- “-----: Erma Quilling Interview,” interviewed by William Giese on behalf of the Chippewa Valley Museum, 2003. Transcript located at CVM Library: Eau Claire, WI.
- “-----: Marvin Barneson Interview,” interviewed by Steve Pederson on behalf of the Chippewa Valley Museum, 2004. Transcript located at CVM Library: Eau Claire, WI.
- Fox, Meta Malueg. *Reminiscence*, Unpublished Memoir Manuscript. Wisconsin Historical Society, Madison, WI.
- Owen, William E., Papers. Wisconsin Historical Society, Madison, WI.
- Rural Electrification Act of 1936, U.S. Statutes at Large* 1363 (1936). S 7.9: 49/pt.1.
- Rural Electrification Administration. *Electricity for the Farm Through REA*. U.S. Department of Agriculture. Washington, DC: U.S. Government Printing Office, 1940.
- Rural Electrification Administration. *Rural Lines—USA: The Story of Cooperative Rural Electrification*. U.S. Department of Agriculture. Washington, DC: U.S. Government Printing Office, 1981.

Taylor, Carl C. *Changes I Have Seen in the Farming Community*, Unpublished Speech
Manuscript. 1957. Carl C. Taylor Collection. Wisconsin Historical Society, Madison, WI.

Timm, Ronald L. *Conversation with the author*. March 2011. Digital recording.

U.S. Congress. *Congressional Record*. 74th Cong., 1st sess., 1935. Vol. 79, pt. 7.

U.S. Congress. *Congressional Record*. 74th Cong., 2d sess., 1936. Vol. 80, pt. 5.

U.S. Congress. Senate. Committee on Agriculture and Forestry. 1936. *To Provide for Rural
Electrification*. 74th Cong., 2nd sess. S. Report 1581.

U.S. House. National Resources Committee. *Technological Trends and National Policy*. Report
prepared by E. A. Halsey. 75th Cong., 1st sess. 1937. H.doc.360.

Wisconsin's Department of Agriculture, Trade and Consumer Protection and Public Service
Commission. *A Guide to Identifying Stray Voltage on Your Farm*. Madison, WI: 1994.

SECONDARY

Anderson, Frederick Irving. *Electricity for the Farm: Light, Heat and Power by Inexpensive
Methods from the Water Wheel or Farm Engine*. New York: Macmillan, 1915.

Ceruzzi, Paul E. "Moore's Law and Technological Determinism: Reflections on the History of
Technology." *Technology and Culture* 46, no. 3 (2005): 584-593.

Courter, J. W. *Aladdin: The Magic Name in Lamps- Aladdin Kerosene Mantle Lamps / Aladdin
Electric Lamps / Alacite By Aladdin*. Des Moines: Wallace-Homestead, 1989.

Hamilton, Roland J. *Using Electricity*. 2nd ed. Englewood Cliffs, New Jersey: Prentice-Hall,
1971.

"History of Electric Co-Ops." National Rural Electric Cooperative Association.
<http://www.nreca.coop/members/History/Pages/default.aspx> (accessed February 28,
2011).

- Liker, Jeffrey K., Carol J. Haddad, and Jennifer Karlin. "Perspectives on Technology and Work Organization." *Annual Review of Sociology* 25 (1999): 575-596.
- Macdonald, Stuart. "The Progress of the Early Threshing Machine." *The Agricultural History Review* 23, no. 1 (1975): 63-77.
- Marple, Warren H. "An Appraisal of Edison Electric Institute's Statistics on Farm Electrification." *The Journal of Land & Public Utility Economics* 14, no. 4 (November 1938): 471-476.
- Mathur, Jaskiran Kaur and Dhiraj Mathur. "Dark Homes and Smoky Hearths: Rural Electrification and Women." *Economic and Political Weekly* 40, no. 7 (2005): 638-643.
- Pederson, Jane Marie. *Between Memory and Reality: Family and Community in Rural Wisconsin, 1870-1970*. Madison: The University of Wisconsin Press, 1992.
- Schermerhorn, Harvey. *A Quarter-Century in Review: Eau Claire Electric Cooperative*. Wisconsin Electric Cooperative Association, 1963.
- Tobey, Ronald C. *Technology as Freedom: The New Deal and the Electrical Modernization of the American Home*. Berkeley, California: University of California Press, 1996.
- Wright, Forrest B. *Electricity in the Home and on the Farm*. 3rd ed. New York: John Wiley & Sons, 1950.