

37. Dairy Farming

Well, Little Dear One, I think we should talk for a while about the most important thing Johnnie and I did in Bloomington, dairy farming. As we have seen, the primary commercial agricultural commodity in early Bloomington was wheat. By the late 1800s the soil had been depleted by years and years of growing wheat, and some of the farmers were turning to dairy farming, particularly as they noted the growing success of their Swiss neighbors to the east in the town of New Glarus. Let's look at some information about the history of cheese-making in Wisconsin and in New Glarus, which ultimately helped to provide so much success for me and Johnnie in our dairy business. Here is an informative article about the cheese-making industry in Wisconsin, from *The History of Cheese*, National Historic Cheese-making Center, followed by an article about the cheese-making history in New Glarus, where by 1914 farmers were earning \$1000 a year more than farmers farther north in Wisconsin.

The southeastern portion of Wisconsin was settled in the 1830's and 1840's by eastern pioneers who came by the way of the Erie Canal and the Great Lakes waterway. By 1850 foreign immigrants from Germany, Norway, and Switzerland had arrived and started several communities in the interior of Wisconsin. The immigrants coupled with American pioneers from the east engaged in farmstead cheese manufacture almost as soon as they settled in their perspective towns. The 1850 census records reveal 400,283 pounds of cheese made on Wisconsin farms in 1849. Cheese development in Wisconsin moved from southeast to west and later to the north and northwest.

In August of 1845 the first settlers arrived in Green County, Wisconsin from the canton of Glarus, Switzerland. These pioneers established the community of New Glarus in southwestern Wisconsin. These people had experience making cheese in the Alps but quickly realized that almost everything necessary for cheese-making was lacking in the New World: no milk or cows, no implements to make cheese, and little or no money. It took some time for these dairymen and their families to accumulate cows (usually one to five) so that cheese could be made. Procuring the cows was only the first hurdle. Equipment could be procured from Europe, Switzerland or possibly Ohio but this would take some time. In the meantime a common wash boiler had to serve as a kettle. Hoops were made of hickory or white oak splint. A gunny sack or piece of linen had to serve as cheese cloth. A heavy beam filled with stones was used as a press, and bare hands were used to mix the cheese and act as a thermometer in the warming process to make cheese. Although the pioneers are of different descent, the story of cheese-making in all of Wisconsin mimics this Green County primitive scenario.

Making cheese was a very effective way to preserve milk which was very perishable. A typical farmstead cheese producer would skim off the cream to make butter and then use the rest of the milk for making cheese. From the collection of supplies by oxcart, to the milking of the cows, to the hauling of the milk, to the churning of the butter and the pressing of the cheese, cheese-making in the early days at home on the farm all across America was and still remains today difficult, hard work. Until the birth of the "cheese factory" across America, the role of women was to carry on the difficult cheese-making tradition of making cheese at home on the farm.

As the American population grew west, so did the cheese industry in southern Wisconsin. The amount of dairy herds grew primarily from internal growth and imports from Ohio and New York. Equipment arrived from Europe, out east or was manufactured locally. The household science of making cheese was now just a few generations away from becoming a big business in America which meant economic success was coming to Wisconsin.

In 1831 Wisconsin's first farmstead cheese factory was opened in Koshkonong. In 1841 Mrs. Anne Pickett established Wisconsin's first "cottage industry cheese factory" using milk from neighbors' cows. Seventeen years later John J. Smith obtained Wisconsin's first cheese vat and made cheese at home in Sheboygan County. Swiss immigrants opened a farmstead cheese factory in New Glarus (a small community in southwest Wisconsin) in 1846 with cows imported from Ohio. Cheese was manufactured at this point by women on the farm.

Prior to and during the expansion of cheese-making in the 19th century, Wisconsin agriculture was primarily focused on crops such as wheat, barley, and hops. During the Civil War, Wisconsin was considered "the granary of the north". By 1862 over 1 million acres and 30 million bushels of wheat were harvested in Wisconsin, and Milwaukee led all wheat markets in the world. Cheese and cheese-making were important in Wisconsin but in many areas the development of the cheese industry was subordinate to the wheat culture. Several factors influenced this emphasis on wheat in Wisconsin agriculture. Wheat acreage increased to over 2 million acres by 1878 but yields were rapidly declining. Soils were significantly depleted by the long-lasting effects of erosion and one crop agriculture. Chinch bugs infested the crops for several years and various diseases and winter kill dramatically influenced wheat yields. By the end of the 19th century Wisconsin wheat farmers could not compete with the wheat grown in the plains of the west. Because of the rolling hills originally caused by the Ice Age, farmers realized that the land across southern Wisconsin was much better suited to cultivate crops and maintain pastures for the ever-increasing population of cows and other livestock. Along with the increase in cow population, more people were settling in Wisconsin from Europe, New York, Ohio, and other New England states who continued to bring their knowledge and experience of cheese-making to the Wisconsin frontier.

Agricultural emphasis again shifted to dairy farming and cheese-making. Farmers began to see the value of working together and pooling their resources into a centralized cheese processing facility to convert their milk to cheese and other dairy products. In many instances the farmstead cheese factory was built on one of their farms. In 1868 Nicholas Gerber opened the first Green County, Wisconsin cheese factory in a small log house southwest of New Glarus. Five local farmers supplied the milk for the factory, which was a resounding success and a boost to the local economy. This factory was the first Limburger cheese factory in Wisconsin and one of 53 cooperative cheese factories built in Wisconsin from 1864-1874. Nicholas Gerber was a Swiss immigrant who had spent time in the commercial Mohawk Valley of New York making Limburger cheese. In 1869 he started the first Swiss cheese factory in Wisconsin located between Monticello and New Glarus. After 1874 things in Green County and the rest of the state would never be quite the same again. Turning milk into cheese was equivalent to turning lead into gold. The only difference is that the cheese process worked. By 1899 Wisconsin contained 1500 factories located at rural crossroads where farmers would deliver their daily morning milk. Cheese production was 77,848,600 pounds. The top producing cheese state at the turn of the twentieth century was New York. Wisconsin had already passed Ohio (1880), and eventually surpassed New York by 1910, to become number one in cheese production in the USA.

Wisconsin's cheese had to get to market. Its proximity to the Great Lakes shipping and the development of railroad transportation in the Midwest provided excellent routes for expanding the market.

In 1900 the foreign type cheese region (Swiss, Brick, and Limburger) was established in southwest Wisconsin and had over 300 factories dotting the countryside. In Green County (epicenter of the Foreign Type Cheese Region) this correlated to one cheese factory for every 2.8 square miles. Monroe, county seat of Green County, was the marketing center for the three Foreign-type cheeses and Plymouth in Sheboygan County was the marketing center for American cheese and Cheddar cheese varieties.

In most southern Wisconsin communities, Yankees from New England or other Americans were the first settlers, followed by other European ethnic groups. In New Glarus, the first settlers were Swiss, and New Glarus would remain almost exclusively Swiss for decades. While keeping their Swiss culture and traditions, the people of New Glarus quickly adopted the customs of their host country and became loyal Americans, even to sending many young men to serve in the Civil War. In 1867 the school program offered some instruction in German but held classes predominantly in English. In 1897 despite there being a Swiss-German language newspaper in nearby Monroe, John Theiler began a weekly newspaper in New Glarus, *The New Glarus Bote* (Messenger). He soon changed the name to *Deutsch-Schweizerischer* (German-Swiss Courier) and printed news of Switzerland and the New Glarus community. This newspaper also carried news of dairy industry developments and prices that were of interest to creameries and dairy farmers. The publication was very popular until the anti-German sentiment of WWI shut it down in German.

In all, the New Glarus settlers purchased 1,200 acres (4.9 km²) for their new home. Many of the pioneers were carpenters, mechanics, and farmers; trades that proved useful as the settlers prepared for their first winter in the Wisconsin Territory. A sum of \$1,000 was used by the settlers that winter to purchase tools, cattle, seed, and other provisions, all of which had to be repaid with the price of the land within ten years of the formation of the colony. Twelve families stayed in the community's only wooden hut that first winter, which was built on the same property where the Swiss United Church of Christ is presently located. Their diet consisted mainly of potatoes and grated cheese, a dish also known as Röschi. They also ate fish caught from the Little Sugar River. Bread, it was said, was a rarity, and meat even more so. To earn money to survive their first winter, the settlers worked in the nearby lead mines in Exeter and Mineral Point. In 1851 the first store in New Glarus opened, followed in 1853 by the first hotel, and in 1870 by the first cheese factory.

After their first winter in the New World, the residents of New Glarus purchased cattle from Ohio at \$12 a head. This stock was the birth of dairy farming and cheese making in New Glarus, a trade many had learned from their fathers and forefathers in Switzerland. Soon the herds of dairy cows in and around New Glarus swelled and dairy products proved lucrative.

Between 1870 and 1900, New Glarus made the transition from pioneer settlement to thriving village, primarily because of the success of the dairy industry that brought prosperity to area farmers. During the mid-19th century, farmers in Wisconsin were growing wheat as a cash crop, but when the soils were depleted by this type of intensive farming and wheat prices dropped after the Civil War and new areas northwest of Wisconsin opened up to intensive wheat-growing, Wisconsin farmers needed to find a new source of income.

The Swiss, who were familiar with cheese-making, began to make the transition to dairying in the 1870s. At first, like many farming activities, cheese-making was done on the farm and the products were sold to distributors and retailers. But soon entrepreneurs began building cheese factories where farmers could sell milk, making the production of milk a cash crop. As early as 1873, the New Glarus Cheese Company built a cheese factory in the village and cheese factories were being established elsewhere in the county. During the 1880s, dairying expanded as cheese factories were built in large numbers in Green County. Ironically, the New Glarus area did not specialize in Swiss cheese, but Limburger cheese that was shipped to large cities and overseas.

Following the end of the Civil War, and with the evolution of the cheese production, the prosperity of New Glarus and neighboring communities grew. At its peak in 1905, New Glarus boasted 22

cheese factories; so many it was said that the crossroads of the town were congested with daily deliveries of milk to the Limburger and Swiss cheese factories. New Glarus quickly became known as the "Cheese Capital of the World."

In July of 1887 the Chicago Milwaukee & St. Paul Railroad completed the Brodhead-New Glarus extension. Talks to extend the branch from Albany began in late February 1887 with actual construction beginning in March. It took just five months to grade, excavate, and build bridges and two depots on the 16-mile extension. This accomplishment was without doubt one of the most important events in New Glarus history. The rail line connected the community to commercial centers and markets and boosted local growth. In that same year, a lumber yard was established, and a residential housing boom began as the village grew to 600 people by 1890. The relationship with the Swiss Reformed Church in the community remained strong and residents still celebrated Kilbi and other Swiss cultural events. Every 10 years, on the anniversary of the founding of New Glarus, the residents held a large celebration that culminated in impressive gatherings in 1895, 1905, and 1915. These celebrations grew off of the very successful celebration in 1891 that New Glarus residents held for the 600th anniversary of the founding of the Swiss federation. The growth of the community in the late 19th century made for civic growth, as well. In 1901 New Glarus incorporated as a village and built a waterworks system. With the waterworks system in place, a formal volunteer fire department was established in 1902.

During the 1910s and 1920s, perhaps the historic peak of the growth and development of New Glarus occurred. Events in these two decades would give the community stability for decades. In 1910, cheese-making was flourishing in the New Glarus area with dozens of small factories, along with creameries making butter. But in that year, most of the small factories in the New Glarus area would close due to the opening of the Helvetia Condensed Milk factory. The new condensed milk plant would buy as much milk as they could from area farmers, who quickly abandoned the local cheese and butter factories in favor of a regular check from the Helvetia milk plant. And, although the small dairy-related factories would close around New Glarus, the opening of the milk condensing plant would lead to good jobs in the village and a stable industry, even during the Great Depression of the 1930s.

On November 1, 1910, the Helvetia Milk Company of New Glarus 75 miles slightly southeast of Bloomington and for many years a strong leader in cheese production, began operations condensing milk, with the milk from 15 area farms. There was a reliable water source in the Sugar River, they had their own power plant and electricity, and there was telephone service through the Brodhead Exchange, which could connect them to all the farmers in their catchment area. In 1904 they had installed concrete sidewalks to accommodate the crowds of tourists. Through a well-established railroad system, New Glarus had access to all the Midwest and Eastern markets, shipping their milk to Milwaukee and Chicago to be sent to New York and points east, and shipping to Madison, La Crosse and St. Paul for shipping to the Midwestern markets. "By 1911 condenseries in Wisconsin were supplying the Midwest and the East with 'milk from contented cows.'" (Slogan from 1907) The railroad system was also accommodating to install extra sleeper cars to bring guests and visitors to the Swiss celebrations. One year there were 6000 visitors.

The opening of the milk plant, which expanded almost continuously over the next three decades brought physical changes to the New Glarus community beyond the construction of the large factory. Several large brick buildings were constructed in downtown New Glarus in 1914, including a double-storefront hardware store and a large car dealership. The local school was overcrowded

again, and a new addition doubled its size in 1914. The new space in the school would also mean that New Glarus would have a four-year high school program.

The World War I years and the years immediately afterward were difficult ones for German-related communities like the German-Swiss of New Glarus. Anti-German feeling was high and one of the results was that the celebration in 1925 of the founding of the New Glarus settlement was a more subdued affair. This was a change from the 1915 celebration, which was the largest yet held and featured the installation of the Pioneer Monument in front of the Swiss Reformed Church. But one bright spot in the 1920s was the construction of the new Zwingli House in 1923-24. With new classrooms for the Sunday school, and meeting spaces for church groups and others, this building was a welcome addition to the community.

As we see, the railroads were very important for the New Glarus market. Let's look at this information from *The Story of Milk Transportation by Rail* in Riverraisinmodels.com:

In the 1840s the railroads dramatically reduced the time it took to move dairy products to market, making milk transport to the city viable. In a very real sense, the milk business helped establish some railroad lines. By 1890 an extensive railroad network had come into being. Beginning that year, the use of mechanical refrigeration by the railroads spread rapidly driven by a distrust of the water that went into the ice harvested in winter. This provided an unprecedented opportunity for the milk industry. It was now possible to send large quantities of raw milk directly to the cities from areas that had before been too far away. In 1843 the milk was kept cold by "a tin tube filled with ice inserted in the top and stirred. By the time of the Civil War, milk revenue was an important part of a railroad's income in many areas. The 40-quart can was standardized as the container of choice, and it was weighed, cooled and loaded on the trains. Up to now, the milk cans were shipped in available boxcars or in head-end baggage cars. Blocks of ice were placed on top of the cans for refrigeration. This was a mess. The introduction of refrigerated cars in the 1880s signaled another major step in milk transport. These basic cars were either insulated or iced and hauled individual cans. Not only did this reduce the mess in handling, but it greatly extended the range of milk service into cities. By 1881 milk could be successfully hauled nearly 200 miles. New York City's milk came from 50-195 miles away depending on the railroad. A "milkshed" was the catchment area of farms serving one market. 1904 experiments to put tanks in freight cars took another 20 years to catch on, and meanwhile tank-truck development began, which eventually took over the milk delivery business. Railroads had, however, safely delivered milk for over 130 years.

Despite many attempts over 37 years, Bloomington was not successful getting rail service to the village. Their best opportunity came in 1886-87 when the C&N (Chicago and Northwestern Railroad) came through Lancaster and Fennimore. Bloomington was complacent thinking they would get it, and they did not pursue it hard enough. The Chicago, Milwaukee and St. Paul coming through Bridgeport was a strong chance until it too fell through because the raising of money and sale of bonds did not quite succeed. Meanwhile, the Burlington through nearby tiny Glen Haven was the most heavily used freight location for several decades, a point made repeatedly by advocates of rail service in Bloomington. However, as the histories of many communities have shown, early adoption of new methods and technology in commerce and industry does not always ensure lasting prosperity. Shortly after Glen Haven was platted in 1857, a steam sawmill was built, and the town grew to an impressive 30 buildings. But economic conditions changed and by 1859, many of the town's buildings sat empty. Slowly the town

bounced back as it grew into an important shipping point for stock and produce. The railroad arrived in 1884 and granted the town some economic security through the rest of the 19th century; it was one of the largest shipping points for livestock between St. Paul and Chicago. Glen Haven's role as a transportation hub ended in the early 20th century when trucks took much of the freight business from railroads. The construction of the lock and dam system ended Glen Haven's close ties with Guttenberg as ferries stopped running and the ice was no longer safe for winter crossings. Glen Haven lost much of its population in the ensuing years and relied mostly on a farm-based economy. In 2004, the village had fewer than 100 residents.

THE RAILROADS THAT NEVER CAME

The Village of Bloomington has the distinction of becoming an active trading center with many businesses without ever having a direct connection with a railroad when being bypassed by a railroad was almost a certain death sentence in the past. Although Bloomington tried for at least 37 years to get a thread from the vast spider web network of branch lines, it and surrounding townships and smaller villages could never obtain or guarantee enough capital (money) to build a railroad.

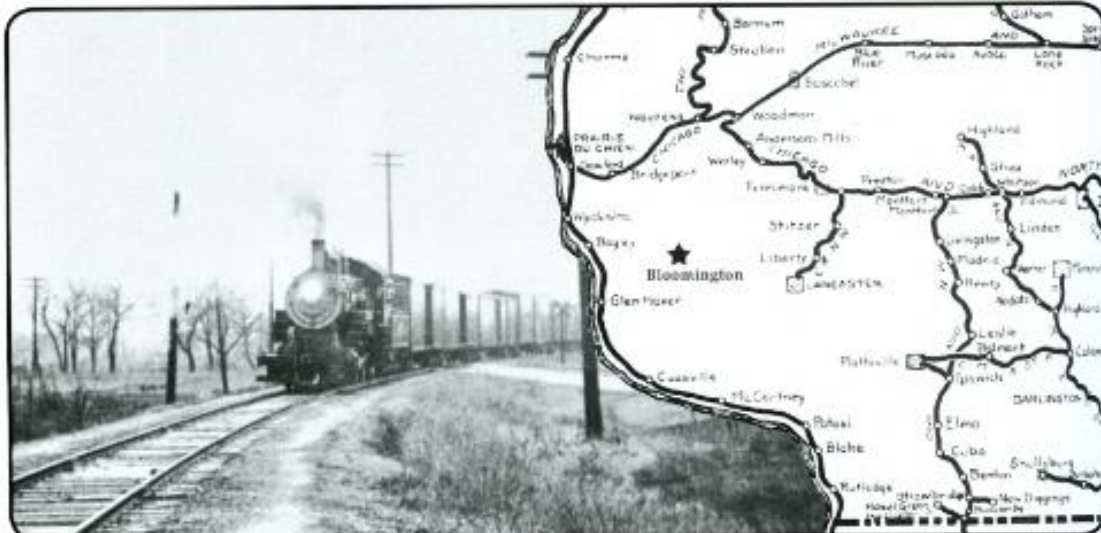
Probably the best opportunity happened during the years 1881-1883 when the Chicago & Northwestern Railroad actually surveyed routes from Lancaster and from Fennimore and selected a location for a depot. This was before the river railroad (the Burlington) was built in 1884, and Glen Haven became the most heavily used railroad freight location for several decades. Ranking second was the Milwaukee Road depot at Bridgeport. Because the Bloomington Record was very optimistic and definite at first about the C&NW coming to Bloomington, the residents may have been lulled into thinking they didn't have to do anything to convince or help the railroad to come. The Record later realized this mistake and tried to encourage more local support. When it came to spending money, the railroads had to answer to their shareholders and directors about the probability of making money from the investment.

The next best chance came when the Burlington RR surveyed a route from Cassville to Bloomington and selected a depot site in 1897. Pat Flynn, a likeable Irishman and experienced railroad builder, had crews all set to begin construction, but the funding fell through at the last minute. Flynn made the Bloomington area his home for several years because he helped with other surveys and thought a railroad would eventually get built. He was responsible for much of the construction of the race track at the Blake's Prairie (Bloomington) fairgrounds in 1904.

Hope remained eternal when the Kickapoo and Northern RR (Wauzeka to LaFarge) in 1901 surveyed a route that would go from Wauzeka through Bloomington and other towns on the way to Galena or East Dubuque. That idea died in 1903 when the Milwaukee Road took over the line. Some Milwaukee Road officials did pay a visit to Bloomington in November of 1905 which caused some rumors to circulate for awhile. Bloomington and West Grant RR corporations were formed in the late 1890's and the early 1900's and more routes were surveyed. But the raising of money and the sale of bonds never quite succeeded.

The last great hope was the proposed electric railway which existed under various names as the years went by, and, yes, surveys were completed. Flynn even got to help with some of these projects. The United States' entry into World War I (shortages of materials and rising construction costs) finally brought the railroad attempts to an end.

Researched by Jim Warczak



Rail lines in Southwest Wisconsin

Bloomington continued to pursue the dream of a railroad, however, and on a 1916 promotional mailing envelope wrote: "Bloomington is not on a railroad – it is 14 miles from Lancaster on the C. & N. W. Ry.; 12 miles from Bridgeport on the C. M. & St. Pa. Ry.; and 10 miles from Glen Haven on the C.B. & Q Ry. – but is willing to give substantial aid to any legitimate proposition that will bring in a railroad and know that such an enterprise would pay. Bloomington is the best inland town in the United States, and is also 'The Biggest Little Town in Wisconsin.'" The Chicago, Milwaukee and St. Paul Railway went through La Crosse in 1914.

Let's review a timeline of dairy farming in Bloomington.

1883 A creamery is established on the east edge of the village by Mr. Schulte. A creamery is the location of cream processing, where cream is separated from whole milk. Then pasteurization (once it became promoted in 1910) is done to the skimmed milk and cream separately. Whole milk for sale has some of the cream returned to the skimmed milk.

1890 The Federal Meat Inspection Act is passed, authorizing USDA inspectors to enforce standards of sanitation and hygiene in the meat and dairy industries using a score card. When the inspector visited dairy facilities, he filled out a form called a dairy score card to record the health of the herd, the cleanliness of the cows and of the utensils used for milking, the cleanliness of the employees, and the handling of the milk.

1894 Another creamery is started southwest of the village.

1895 The USDA established the Division of Agrostology and the Dairy Division.

1897 The early work of the Dairy Division consisted primarily of collecting and disseminating information. In response to surveys, the division issued bulletins on subjects of particular interest to the dairy industry. There is a series of articles for the dairy farmer about the work of the USDA in the Yearbook of Agriculture, 1897.

By 1900 the foreign type cheese region (Swiss, Brick, and Limburger) was established in southwest Wisconsin and had over 300 factories dotting the countryside. In Green County (epicenter of the Foreign Type Cheese Region) this correlated to one cheese factory for every 2.8 square miles.

1906 Gas engines were developed for cold storage for milk.

1910 Messmore and Hazard advertise their windmills in the newspaper. The windmills were manufactured in Bloomington. Windmills helped provide an ongoing source of water for the herds of dairy cows and for cooling the milk.

1910 There was a big educational effort for pasteurization in Wisconsin.

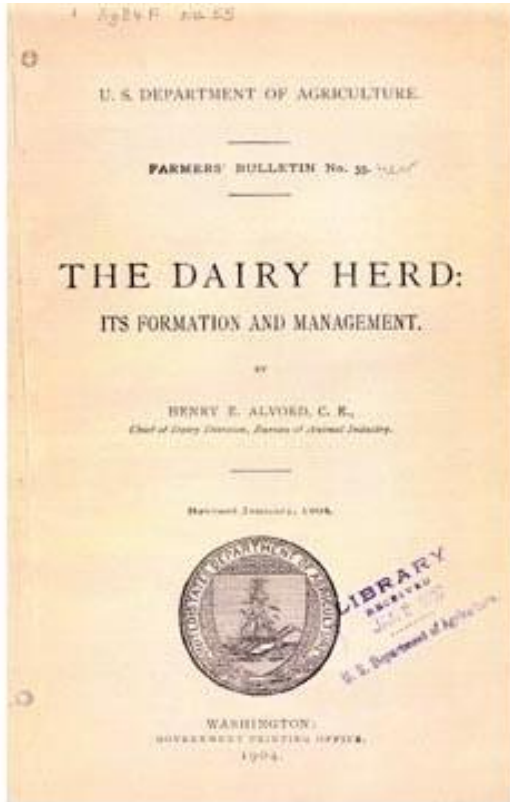
1912 Jake Frick, Ernest Hoesly and John Kundert in New Glarus began a business that purchased yearling cattle which were shipped to other states and foreign countries. Hoesly's son Harold continued the business for many years.

1913 New Glarus forms the Farmers' Cooperative Stock Company.

1910-1913 President William Howard Taft kept a Holstein cow on the White House Lawn as his pet and to provide milk for his family. The cow's name was Pauline Wayne. This visibility, plus the fact that the Holstein gives more milk than any other breed of cow may have helped Wisconsin dairy farmers eventually select the Holstein as their preferred breed.

April 30, 1913 In Bloomington C. A. Guernsey has fixed up a room in the basement of the old mill for the manufacture of ice cream. In April of 1914 Guernsey moves the ice cream manufacturing plant to the basement of L. Abraham's building (the old Baptist Church).

Pasteurization started in the early 1900s in the U.S. but the first dairy pasteurization laws came in 1947. These were early promotional materials.



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"The Dairy Herd: Its Formation and Management.
Farmers' Bulletin, no. 55.
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 Government Printing Office, 1904.



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This photo shows a farmer operating the Mehring milking machine in York Roads, Maryland, in 1908. With improvements in storing, handling, and marketing milk, the question of milk production capacity arose, and farmers started to build their herds with cows that produced the most milk. According to the United States Department of Agriculture, immigrants in the early 1600s brought cattle with them from Europe to supply their families with dairy products and meat. Although

many different breeds of cattle including Durhams, Ayrshires, Guernseys, Jerseys, and Brown Swiss were imported through the next few centuries, it was not until the late 1800s that cattle breeds were developed specifically for dairy purposes. In rural America, milk and milk products were made primarily for home or local use. However, with the movement of population from the farms to the cities at the turn of the century, it became necessary to mass produce and improve the quality of milk. Significant inventions such as commercial milk bottles, milking machines, tuberculin tests for cattle, pasteurization equipment, refrigerated milk tank cars, and automatic bottling machines contributed towards making milk a healthful and commercially viable product. Widespread use of the Mehring milking machine in the 1890s provided a more efficient milking method for the farmer and made it possible to produce a cleaner milk product.

The National Museum of American History provides this information about the Mehring milking machine in *Foot-Powered Milking Machine*:

The Mehring Company began developing mechanized milkers in 1892 as a way to improve the speed and sanitation of cow milking. The machines continued to be manufactured through the early 1920s, and more than 3000 were sold. Although William Mehring was from Maryland, most of the milkers he manufactured were sold in New Zealand and South America. The foot-powered milker was designed as an improvement to the earlier hand-powered model and could milk two cows at once with less exertion from the operator.

The machine consists of a foot treadle connected to several hoses that could be attached to a cow's udders. When the foot treadle was rocked forward and backward, it produced a suction in the hoses, which would squeeze milk out of the udders and deposit it into a bucket that hung on the milker. The hoses were valve-controlled, so that the operator could stop suction on an individual teat without disconnecting the machine. An 1896 pamphlet advertises that the milker allows one man to milk up to twenty cows per hour, and since physical exertion was minimal, women and children could also help with the milking, making the chore even less time-consuming.

In addition to improved efficiency, Mehring advertised the sanitation of his machines. The milk can no longer sit on a dirty stable floor, and air exposure was minimal since the milk went from cow to bucket through a sanitary hose. Thus, the milk was not contaminated with the dirt, hair, and germs that plagued milk from traditionally-milked cows.

Americanartifacts.com tells us in *Early Cow Milking Machines* why it took so long to develop a good mechanical milking machine.

Development of a usable milking machine took several decades of trial and error, unlike the rapid development and acceptance of other dairy innovations, such as hygienic milking and processing, the Babcock test, and the centrifugal cream separator. Some editors of 19th century dairy and ag publications acknowledged a need for a good milking machine but were dissatisfied with all that were being offered. Others discouraged all attempts at machine milking, stating that it was unnatural or intrinsically injurious to the cow. As late as 1892, S.M. Babcock, (of Babcock test fame), wrote in *the National Dairyman* that "milking machines would result in poorer quality of milk and lowering the standards of dairy animals." In *The Farmers Advocate*, L.B. Arnold, secretary of the American Dairyman's Assoc., wrote about the great value of hand milking in the development of the bovine udder, and warned against resorting to machine milking.

Nevertheless, many inventors kept applying themselves to the task. In the end, the development of a satisfactory mechanical milker took over 50 years. An article in an 1879 issue of *The Agricultural Gazette* compared that slow progress to the speed of the development of the grain binder. By that year, 5000 U.S. and English patents had been filed for improvements in harvesting machines. The article suggests that the rapid development of the grain binder was aided by a great deal of testing and suggestions by farmers. Testing a grain binder offered no risk, while testing a milking machine could (and did) do great harm to the cow, or at least, her milk production. Farmers were understandably reluctant to offer their herds as guinea pigs, and this may have been the greatest obstacle to development of the milking machine.

In Wisconsin the rapid adoption of new techniques, methods, implements, and markets inevitably led to the switching over from traditional dairy cows like Guernseys and Brown Swiss to the Holstein cows because of the significant increase in daily output per cow. Once farmers had the ability to store and cool milk more efficiently they could handle more volume. In southwestern Wisconsin, farmers also had lots of land to grow more hay and silage to satisfy the greater appetites of the Holsteins. Cousin Fred wrote this overview of the relationship between milk production and handling processes.

I think the issue of milk production really was handling the volume and cooling on the farms. The “rule of thumb” was about one cow per 10 acres of land on a diversified farm. In Iowa, a 120-acre farm had 12 cows, a 160-acre farm had 16. The number of stanchions in the barns proved the rule. This was on a farm that had all tillable ground. The southwest Wisconsin farms were bigger, but had more pasture land, hence the ability to support more cows. Most of the farms in Eastern Iowa had Holsteins. I know some who had Brown Swiss cows would say their cattle “fit the farm and fit the market”, meaning the cows (and calves) were meatier and could be used for both dairy and meat. Some farms had a few Guernseys, or maybe a Jersey to boost the butter-fat average of the cream, as the cream was tested at the creameries for butter fat and paid according to the weight of the cream and the butterfat test. But I think the biggest impetus to change was when farmers started selling whole milk instead of just cream. It saved so much work! No more separating, and the milk truck picked up the whole milk from the bulk tank. Before, the milk was handled carrying it to the can, carrying the can to the separator, sometimes located in the basement of the house, carrying the skim milk to the slop barrel for the hogs, carrying the cream cans to the cooler.

The Holsteins produced a greater volume of milk, and overall, it was the weight of the cream that farmers were focused on. More volume meant more weight. If a farmer had 15 cows producing 2.5 gallons, or 20 lbs. of milk per milking (an average—a newly freshened cow who had just had a calf produced closer to 4 gallons of milk a milking), it would take four 10-gallon milk cans to hold the milk from one milking and eight cans from two milkings (morning and night). If the farmer sold the milk daily, he would need space to cool 8 milk cans, and the biggest electric coolers on farms had a capacity of about 8 cans, so the milk would have to be hauled daily. If the farmer separated the milk into cream and skim milk, he might need only one can to cool. And most creameries took cream three times a week. That way, the creamery had two days to collect, churn and package the butter. About 1960, the Holy Cross Creamery built a new, large facility, that bought whole milk, and the small, cream-only coops closed. Farmers installed “bulk tanks” to cool and store large amounts of milk and the “milk hauler” came to the farm with a big tank truck that had a pump and a hose, no more handling heavy cans!

Bad winter weather could create real problems for farmers. I remember some terrible snowstorms when milk trucks could not get into the country to pick up the milk. Those farmers who still had a cream separator, would separate the milk, and, along with the cream producers, load the cans of cream onto big-wheeled manure spreaders and form tractor-cades that drove along the hilltops where the snow wasn't as deep, to get the cream to town. Those who no longer had separators sometimes had to let the milk run down the drain or maybe feed it to the hogs when the bulk tank was full, as there was no other way to store it until the roads were open. And, of course, with all the bulk tanks full, it took longer for the milk hauler to complete the route, because he had to go back to empty the load more frequently. I remember the big topic of conversation was always "when did the milk hauler get to" a farm. Sometimes it was late into the evening.

But in Wisconsin, with more land suited for grazing, land that didn't have to be taken out of corn production, the creameries must have been buying whole milk and really were cheese factories. I think the farms were less diversified and produced fewer hogs. In Iowa, the good corn ground also produced food for hogs, and the hogs were fed the skim milk, mixed with grist (ground oats), so the skim milk was not wasted. And cheese-making became almost an "art". New Glarus in Wisconsin certainly captured that niche. So different from Eastern Iowa, and yet so close geographically!

Getting back to the cooling. Cooling of cans was usually done with water, even with the later electric coolers. The refrigeration system was to cool the water that surrounded the cans. Before that, it was a tank of water that cooled the cream. And these systems were well thought out to use nature. The most common system was to have a cistern that was filled with water, either by a windmill or gasoline pump, or maybe a pump jack that could be run by an electric motor or a power-takeoff or belt with a tractor. The cistern was usually in the highest spot in the barnyard or near the farmstead. The water flowed from the cistern or holding tank, to the cooling tank, and then to the stock tank. The two tanks were often in the same small building, and often the separator was in the same small building. On a hot day, the livestock would drink more water, and through a series of "floats" with valves, more water would be released from the cistern, and flow through the cooling tank. So, on hot days when more cooling was needed, the cattle would drink more water, which would mean more fresh cold water would flow through the cooling tank on its way to the stock tank. On my mother's farm, the cooling tank was located in the tool shed which also contained the well, with a gasoline engine on the pump. That engine was also used to run the washing machine, so they washed clothing in the tool shed until 1929 when they got a home plant and an electric-motor washing machine in the basement. On hot days, they watered the hogs at noon by taking the water from the cooling tank and dumping it into a spout that extended out of the ground by the tool shed, next to where the slop barrel was half buried, so they didn't have to lift the buckets of skim milk and water so high. The spout was at the end of a pipe that ran underground to a trough on the hog floor beneath the corncrib. They then replaced the water in the cooling tank with fresh cold water from the well, by running the pump and using a diversion pipe to conduct the water to the cooling tank. Refrigeration must have been such a welcome gift to the farm! The story of cheese in Wisconsin is a real story of creating a market that is still there today!

By 1910 there were 222 rural crossroads cheese factories in Green County (the number-one county in the state for cheese factories thanks to New Glarus) and 195 more in the surrounding counties of Lafayette, Dane, Iowa, and Grant. Lafayette, Iowa, and Grant Counties border Green County to the

west, so they would have had the most crossroads cheese factories. Grant County, where Bloomington is, has 1147 square miles of land, not all of it devoted to dairy. Lafayette County has 635 square miles and Iowa County 768 square miles. Dane County (Madison) has 1197 square miles of land. If we discount Dane County because the large city of Madison consumes so many square miles, and propose that the other three counties had 80% of the rural crossroads cheese factories, and then apportion the factories among these three equally, we find a cheese factory approximately every 16 square miles. (850 square miles per county, 80% of 195 factories = 156 factories divided by 3 = 52 factories per county divided among the square miles = 16 square miles catchment area per factory.) Not all of the areas in a county produced the same amount of cheese, so the factories would be consolidated in those areas of heaviest production, meaning that in some areas there would be so many cheese factories that each farmer was within four miles of one. On an old map of Greene County there were cheese factories literally everywhere, often a “mom and pop” type of business venture. Later the farmers formed coops when the farms became larger or produced more milk, so they would have bargaining power with cheese factories. That must be when the cheese making business moved from the local cheese factories to the large ones, probably with the evolution of trucking, which made it possible for a large cheese factory to get enough milk for a big business. For Johnnie and me the rural crossroads cheese factories were a huge boost to our success. As our business grew, we started delivering directly to nearby cheese factories thereby eliminating the middleman, the local creamery. Nearby Beetown had a good cheese factory, and there was one on the way to Lancaster that had started in 1905 and which was a very large and efficient operation. The villages had creameries where the cream was separated out from the milk before sending the milk on to the cheese factories. Creameries made butter, but not cheese. Cheese would then be transported from the cheese factories to the nearest railway station for shipment. In 1900 the Chicago/Milwaukee/St. Paul Railroad went through Platteville (30 miles from Bloomington), Fennimore (24 miles from Bloomington), and Lancaster (15 miles from Bloomington.) So milk from the Bloomington creamery traveled to the nearest cheese factory and from there to Lancaster as cheese for shipment east and west. “By 1916 Platteville was shipping \$830,000 worth of butter and cheese and 650 railroad carloads of livestock per year.”