

INTRODUCTION

OVERVIEW

Wheat was the earliest of cash crops for the pioneer settlers in Wisconsin. It required little initial capital investment and was comparatively easy to grow. After plowing and sowing, the fields could be left unattended until harvest time. Wheat's high rate of financial return made it an especially attractive crop.

Wheat had its risks and disadvantages, however. It was hard on the soil, depleting it of nitrogen. The yield varied from year to year, depending on the vagaries of the weather and insect infestation. And, of course, the price fluctuated in response to supply and demand. By the late 1850s the price for wheat began to drop as yields and quality diminished and the fields of Iowa and Minnesota began producing in competition.

Wheat remained "king" in Wisconsin for little more than a generation. Falling from favor first in the southeastern section of the state, where it had first been produced, its decline moved westward in the ensuing decades. Its waning years were concentrated between 1860 and 1880, but there was considerable overlap before and after those dates.

In order to develop alternatives to wheat, Wisconsin farmers began experimenting with a variety of crops, which ultimately led to agricultural diversification. Some of these agricultural experiments were no more than fleeting endeavors, such as the hops craze of the 1860s. Others developed over the years into profitable farming enterprises, such as the production of feed crops, vegetables, and livestock, and dairying. Some areas of the state began to specialize in particular crops. Farmers in Waushara County, for example, pioneered the state's cranberry industry in the boglands just north of Berlin and production soon expanded into the boglands of the sand counties. Another speciality crop, tobacco, was grown in southern Wisconsin, especially in the Dane, Rock, and Vernon county region.

A change from cash crops to feed crops better adapted to the state's soil and climate characterized much of Wisconsin's agriculture during the last quarter of the nineteenth century. Livestock production also rose to prominence. As a result, a relatively stable agricultural base was established in the state that continues to this day.

In the mid-nineteenth century, dairying began to emerge as Wisconsin agriculture's most valuable alternative to wheat. During the last two decades of the nineteenth century the number of dairy cows in the state increased rapidly, and by 1899 they could be found on more than 90 percent of Wisconsin farms. Much of the success of Wisconsin dairying can be attributed to the efforts of William Dempster Hoard, who promoted the industry with a religious fervor for nearly a half century, and the University of Wisconsin School of Agriculture, also active in promoting dairying. Dairying remained the dominant agricultural pursuit throughout the nineteenth and twentieth centuries. However, a number of Wisconsin farmers turned to hog and poultry production and vegetable cultivation (especially peas) as well.

While many farmers prospered in the older, settled regions of Wisconsin, others staked claims in the northern Cutover counties. To encourage settlement, some land companies extended credit to carefully selected and informed settlers and furnished the use of farm and stump-removing machinery at low cost. The state provided assistance to Cutover settlers as well. Some land was free of taxes for three years if farmers settled and worked on it, and the University of Wisconsin School of Agriculture provided soil surveys and economic inventories to give guidance to farmers.

Despite strong promotional efforts and state aid, few settlers were attracted to the region. Those who did settle there cleared nearly a million acres between 1900 and 1920, yet most of the land remained in stump and unsettled. The area was not conducive to farming. Acidic soils and vast tracts of stump-ridden land, vestiges of the earlier lumber industry, severely handicapped most agricultural pursuits.

While farming the cutover region was less than successful, agricultural production throughout the rest of the state has flourished. In fact, few states can equal Wisconsin's contributions to the nation's agricultural economy.

The words "America's Dairyland" on the state's license plates is no idle gesture. Throughout the world Wisconsin has become identified with dairying. But dairy farming constitutes only one segment of the state's agriculture. Other historic crops have varied from large scale production of wheat and peas to the production of less well-known crops as hops and cranberries. The following study units examine the most important aspects of Wisconsin's agricultural production and attempt to identify significant resources associated with a broad range of agricultural pursuits.

PROTECTION

Threats to Resources

Wisconsin agriculture has experienced tremendous changes since the early years of settlement and continues to evolve as a result of rapid technological advances and economic changes. Perhaps the greatest threats to agricultural resources within the state are the general decline in family farming and the subsequent rise in corporate farming. During the past few decades, Wisconsin agriculture, paralleling the general trends in American agriculture, has become a "big business." Agricultural consolidation threatens to alter every aspect of the traditional family farm, event to the point of farm configuration.

Another threat to agricultural resources is obsolescence. Few structures survive from the pioneer farming period because of their construction methodology. These structures were built quickly and cheaply and deteriorated easily because of their wood construction and lack of foundations.

Other structures were made obsolete by changes in agricultural cultivation. Widespread hops cultivation, for example, was primarily a "boom and bust" phenomenon of the 1860s. The production of that crop required the construction of specialized structures, hop houses, but as soon as the craze passed, these structures were converted to other uses or abandoned. Other structures have been made obsolete through technological advances. In the case of wooden silos, for example, the use of a more substantial building material, concrete, led to their obsolescence.

Abandonment has always threatened Wisconsin's agricultural buildings. During the first half of the nineteenth century, farmers sometimes abandoned their farms for better farm lands further to the west. During the late nineteenth and early twentieth centuries, several colonization efforts were attempted in the Cutover region of the state. Poor soil quality and the stump-ridden terrain soon discouraged settlement. Large numbers of farms and even entire settlements were abandoned, their structures left to deteriorate.

During the past few decades, the downward trend in family farming has resulted in the abandonment of countless numbers of agricultural resources. More often than not, these structures are left to deteriorate or are demolished to make way for large scale corporate farming or suburban development. The continual pressure from suburban, and even in

some cases urban, development continues to result in the destruction of agricultural resources.

Even today, Wisconsin is a leading agricultural state. The state's farmers have changed their practices with the times and have constructed new buildings to meet their changing needs. Many of our historic barns have been replaced with metal sided pole barns, the usual post-war choice for new barn construction. The efficiency and lower cost of these barns have made the traditional bank barn and other wood sided barns practically obsolete.

Survey Priorities

- Thematic survey of tobacco associated resources in the Southern Tobacco District (Rock, Dane, Green, and Jefferson counties).
- Thematic survey of the tobacco associated resources of the Northern Tobacco District (Vernon, Crawford, Grant, Richland, La Crosse, Monroe, and Trempealeau counties).
- Study of prototype farmsteads and building types promoted by the University of Wisconsin School of Agriculture and Experiment Station and Extension Service; identification of model forms.
- Identification of landscape features associated with farming: drainage features, windbreaks, fences.
- Study of soil conservation in Wisconsin and identification of related resources.
- Thematic study of cranberry associated resources belonging to Jacob and Andrew Searles in Wood County.
- Thematic survey of cranberry associated resources in Jackson, Juneau, and Monroe counties.
- Define and survey specific cultural landscapes associated with fruit and vegetable cultivation.
- Thematic survey of ginseng related resources in Marathon County.
- Statewide thematic survey of fox farms.
- Thematic survey of resources associated with mink production throughout the state.
- Thematic survey of hemp and breaking mills in Fond du Lac and Dodge counties.
- Thematic study of large scale poultry related resources in south-central and southeastern Wisconsin.
- Thematic survey of resources associated with hog raising in Lafayette and Grant counties.
- Statewide thematic study of flax and linseed mills.
- Thematic survey of hops related resources in Sauk and Waukesha counties.
- Thematic survey of early wheat associated resources in the historic wheat producing areas of the state.
- Thematic survey of potato warehouses and other potato related structures in Portage, Waushara, and Waupaca counties and in the north-central and central counties of the Cutover region.
- Complete reconnaissance surveys of the Cutover region (Vilas, Langlade, Marathon, Shawano, Menomonie, Barron, Oconto, and Forest counties).
- Intensive study of resources in the Cutover region associated with such "colonization" communities as Ojibwa, Crivitz, and Athens.
- Thematic survey of cheese factories of the Fox River Valley.
- Thematic survey of cheese associated resources in southwestern Wisconsin's Cheese District.
- Thematic survey of creameries in southeastern and western Wisconsin.
- Thematic survey of condensories in Jefferson and Walworth counties.
- Determine typical outbuildings associated with each type of agriculture discussed in the study units.
- Identification of Finnish barn types and thematic survey of Finnish farmsteads.
- Thematic survey of centric barns.

Registration Priorities

Structures associated with early wheat production that have not been extensively modified for later agricultural use as they come to our attention.
Stovewood barns (and other buildings) as they come to our attention.
Half-timbered agricultural buildings as they come to our attention.
Structures associated with Searles cranberry production in Wood County should be listed if they retain sufficient architectural integrity.
Edgerton and Stoughton tobacco warehouse districts, and others identified as eligible in thematic surveys.
German Fachwerk Barns of Washington County.
Sparta Fruit Growers Union associated structures in Monroe County.

WHEAT CULTIVATION

Temporal Boundaries: 1830-1870.

Spatial Boundaries: All of Wisconsin settled during these years, with concentrations in the southern third of the state and along the Mississippi River and its tributaries.

Related Study Units: Milling, Agricultural Machinery and Implement Manufacture.

HISTORICAL BACKGROUND

Pioneer farming is the story of settlement in Wisconsin. Except for those who settled in urban areas like Milwaukee or the lead mining region in the southwestern part of the state, the people who immigrated to Wisconsin intended to become farmers, most especially wheat farmers. The chronic shortage of specie on the frontier required that farmers plant a cash crop as quickly as possible so that they could purchase those provisions that could not be grown or handmade. Wheat was seen by most farmers as the best possible choice because of the low initial cost of planting and the relatively high rate of return on new soil. Pioneer farming and wheat cultivation were inextricably intertwined - when we speak of one we tell of the influence of the other.

Wheat followed the frontier as the line of settlement moved from southeast to northwest. Its decline followed the same path. By the time most of Wisconsin was settled, wheat had lost its influence on the state's agricultural economy. But in its wake, wheat left a tremendous number of cultural resources; it provided the impetus for many of the industries that made Wisconsin famous, and it helped populate the land.

The very early settlement pattern of Wisconsin resembled the cross-section of a heavy bottomed water glass: with the center empty, the glass, thick at the base, becomes progressively thinner as one moves up either side to the lip. Likewise, settlers moved into Wisconsin from the southeast and southwest, filling in the bottom tier of counties, then settling along the Lake Michigan and Mississippi River shores, leaving the forested center of the state nearly empty until after the Civil War. Other than those white people left over from the slowly declining fur trade centers at Milwaukee, Green Bay, and Prairie du Chien, the first concentration of settlement occurred in the southwestern lead mining region. Undaunted by the efforts of the federal government and the local Indian tribes to keep them from moving into the area, miners arrived in rapidly increasing numbers. They traveled by paddlewheeler up the Mississippi and the Fever rivers to Galena, then overland. At the time, agricultural pursuits were furthest from most of their minds; the miners were willing to pay the exorbitant prices charged for provisions imported from Galena and St. Louis. Even if he hoped to farm, the standard mining claim was a 300 yard wide strip of land on which the miner was allowed to grow only enough food for personal consumption. The government land leasing system that applied to the mineral lands therefore virtually prohibited agricultural development. In 1836, non-mineral lands were opened for sale and "land-hungry frontier farmers, lured by exaggerated tales of Wisconsin's fertility and fed by the notes issued by wildcat banks," flocked to the region (Wright 1966:51). By the late 1840s, with the decline in lead production and the opening of all lands for sale, agriculture assumed the predominant economic influence that it had long held in southeastern Wisconsin.

When Wisconsin became a territory in 1836, a census of the population revealed that half of the 11,000 residents lived in the lead region. Four years before, Milwaukee County, which then extended to the west side of present-day Madison, had had only a trading post; now it boasted almost 3,000 residents. The completion of the Erie Canal in 1825 had

opened the Old Northwest to settlement from the east without the horrendous overland trek. Lake steamers now moved whole families and their belongings to Wisconsin. "Owing to their financial plight, the settlers usually sought a piece of land that would yield a commercial crop in the shortest possible time" (Lampard 1963:16). If possible, they generally settled on land that provided a mixture of forest and prairie, with an adequate water supply. This land went quickly, however, and late-comers, or those who could not afford to buy improved land from those moving further west, settled on the more heavily timbered acres. Because these had to be cleared before the first crop could be planted, heavily forested lands were often the last to be settled. The earliest settlers, and those late arrivals with cash or a line of credit, "sought only arable land with no problems of drainage; they were determined to be grain growers. Thus a majority of the first settlers in a number of southeastern townships, for example, chose lightly-timbered prairie which was naturally drained" (Lampard 1963:18). These sites went quickly and few of them were available after 1838. "The latecomer was forced to look further afield for a tract of prairie which combined woodland and meadow. Hence the pattern of settlement in the early forties billowed out to the north and west in what appears to be a conscious effort to avoid the higher prairie still available in Milwaukee and other lake counties" (Lampard 1963:18).

In their search for the appropriate land, the settlers were influenced by the patterns established by their predecessors. Locating a tract required a knowledge of the unfamiliar countryside. Many relied on the information provided by settlers already in the area, but the earliest settlers were forced to rely on notes and description of the land made by surveyors. The established road network and the availability of a marketplace also were important considerations. These were commercial crop farmers, not mere subsistence farmers, and the necessities of good transportation and a ready market were foremost in their minds. These two needs were what, in part, prompted the development of plank roads and canals. "Only when projected improvements inland failed to materialize and the physical burden of transportation became prohibitive did the course of settlement turn back to neglected sections, such as the 'big prairie' in Racine County. . . . When the demand for wheat reached fever pitch, almost any kind of prairie would be taken up if it but offered a season or two of high yield" (Lampard 1963:18).

Despite the sale of vast acres of land, the settlers' almost chronic shortage of cash prevented agricultural development on the same grand scale. Though wheat was the one commercial crop open to almost everyone because of its low start-up costs, only 15,151 acres were planted to the grass in 1839. Ten years later, wheat acreage increased almost 2,000 percent, to 306,152 acres, but still accounted for only a minute amount of the total area removed from the public domain. However small this acreage in terms of total land sales, it still accounted for a third of the total improved acreage and made wheat the single most commonly grown crop in the state.

Wheat production increased dramatically during the 1850s largely because of the development of mechanical agricultural implements suited to prairie conditions. Before 1850 even draft animals were in short supply. With the development of the self-scouring plow by John Deere and the replacement of the heavy, clumsy, wooden breaking plows with more efficient steel ones, the prairie farmer could plant more acres. And he harvested them with McCormick, Beloit, Esterly, Manny, or Kirby reapers. By 1860, Wisconsin "ranked second among the great wheat-producing states in the Union, being surpassed in that year only by her southern neighbor, Illinois" (Merk 1916:19). The decade opened with the greatest crop in the history of the state; almost 30 million bushels were harvested, nearly twice the previous high yield. During the next five years, Wisconsin farmers harvested over 100 million bushels, of which approximately two-thirds were exported. Wheat production peaked statewide in 1870, but signs of its decline had been evident as early as the mid-1850s in some parts of the state. Three factors combined to cause the decline of wheat production in Wisconsin: soil depletion, cheaper money, and the railroads.

Just as wheat production first began in the southeastern counties, its decline also was first evident there. The earliest signs of trouble began with the decrease in the size of yields during the late 1850s. Blamed on a bad year, or low rainfall, the real cause was soil depletion. The bumper crop of 1860 may have been the result of nutrients stored up in the soil during the bad years. These poor harvests and the unsteady price of wheat prompted some of the early experiments in other cash crops that were tried in the 1850s and 1860s. However, the force of habit kept many farmers producing wheat and the high prices of the Civil War era expanded wheat production to northwestern Wisconsin. Railroad development further encouraged expansion by making eastern markets accessible to these new areas. A sharp shift in production to the northwestern counties occurred between 1870 and 1880. "The northward movement of the crop is reflected by the fact that the leading county in production in both 1869 and 1879 was St. Croix - northernmost of the western group of counties in which over 50 percent of the land was converted to farms in the years 1860-1880" (Ebling 1948:10). High prices had overcome the onslaught of rust, smut, and chinch bugs that reduced yields during the Civil War years, but soil depletion continued in the eastern counties at the same time the railroad was opening the more fertile lands of western Wisconsin, Minnesota, and the Dakotas. In "the 10 years after 1880 wheat acreage declined more than 1.2 million acres, the reduction being quite general throughout the state but most rapid in the southern, central, and eastern counties where corn, oats, hay, and other feed crops were being substituted for wheat" (Ebling 1948:28). By 1910, total land in production was down to less than 200,000 acres. Despite a burst during World War I that increased wheat production to over 500,000 acres, decline soon followed. By 1945, only 57,000 acres (less than one percent of the land in farms) were planted with wheat.

Most of the goods that the early settlers acquired were locally produced. Even if they lived in the southeastern part of the state where specialized industry began in Wisconsin, most of the settlers' food and goods were produced no further away than Milwaukee. Though their life may have been simple, their political economy was not. Many facets of their lives were closely interwoven, none of them more than the relationship between farming, milling, and manufacturing. The wheat culture of the pioneer created the need for agricultural implements that could operate efficiently under prairie conditions. In turn, the development of better equipment helped expand wheat growing, eventually to the disadvantage of Wisconsin's own farmers. Wheat cultivation also spawned local mills that ground flour for the farmer. There "were 117 such mills in the state in 1849, and their great number, reaching 705 in 1879, shows how they spread over the state with the culture of wheat" (Raney 1940:222). Eventually a milling industry, located primarily in the major shipping areas, flourished in Wisconsin for a short time, only to move on to Minneapolis and Duluth in the late nineteenth century as wheat growing shifted westward. These large mills form a study unit of their own, but the small, locally owned and operated mill that catered to the surrounding community more properly fits into this study unit, as do the properties associated with the early inventors of improved farm machinery. Just as wheat followed the frontier, so too did milling and early agricultural implement development. The three combined to form the wheat culture that prevailed in pioneer Wisconsin.

IDENTIFICATION

Resource Types. Early farmhouses and farm outbuildings, especially log structures associated with wheat cultivation; granaries; wheat elevators; grist and flour mills; residences associated with agricultural implement inventors or prominent agricultural farmers.

Locational Patterns of Resource Types. In rural areas across the lower half of the state the cultivation of wheat dominated early Wisconsin agriculture. Milling and grain storage sites were commonly located adjacent to major transportation routes (roadways, railroads, waterways). In addition, many of the associated early manufacturing and processing industries required available water power sources.

Previous Surveys. While no systematic survey of properties associated with the early era of wheat cultivation in Wisconsin has been conducted, the intensive surveys of Geneva Lake, the communities in the southwestern mining thematic survey (Lancaster, Potosi, Dodgeville, Belmont, Gratiot), New Richmond, Green County, and communities in Trempealeau County all address the development of early agriculture to some degree in the local areas.

Survey and Research Needs. Intensive studies of rural areas that supported wheat agriculture are needed to obtain a solid base of information on the various property types that may be associated with early wheat cultivation in the state. Specific research into the existence of residences or workshops associated with such important inventors as E.W. Skinner of Madison (reaper); John Appleby of Mazomanie (twine binder); and George Easterly, S.D. Locke, and Charles Withington of Janesville (headers and wire binders), could provide substantial information in associated fields.

EVALUATION

National Register Listings and Determinations of Eligibility

Schoenicke Barn (1855), Town of Lebanon, Dodge County (NRHP 1979)

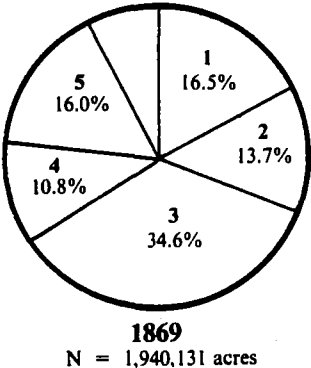
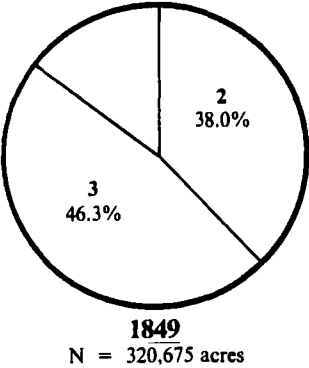
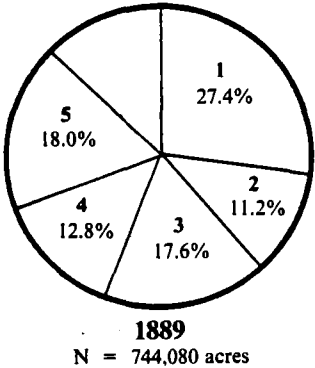
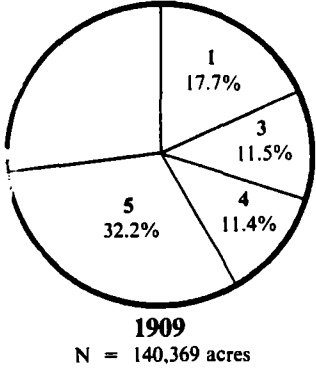
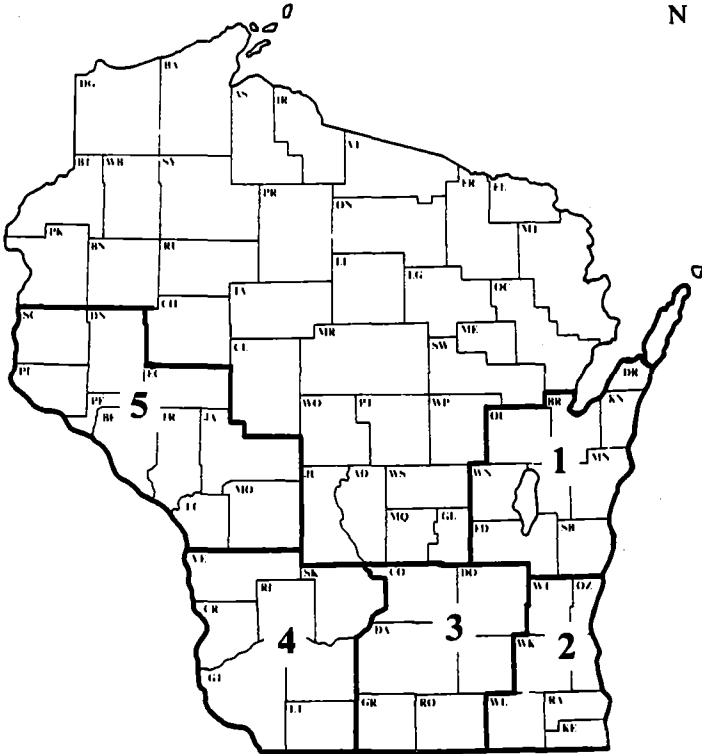
Pilgrim Family Farmstead (1850s), Town of West Kewaunee, Kewaunee County (NRHP 1979)

Hanchett-Bartlett Homestead (c. 1857), 2149 St. Lawrence Ave., Beloit, Rock County (NRHP 1977)

Context Considerations. The majority of extant farm resources have been considerably modernized and altered in attempts to stay abreast of contemporary farming practices. The existence of intact farmsteads and farm complexes (farmhouse, associated outbuildings, and crop fields) rather than simply industrial structures, is an important factor to consider when evaluating potential properties. Little permanent machinery is associated with these properties. In general, extant sites need to be evaluated in relationship to the extent of early wheat cultivation in their surrounding region.

WHEAT CULTIVATION

N = Total acreage of wheat cultivation



Wheat Acreage in Wisconsin by Crop Reporting Region, 1849-1909

Source: Eric Lampard, *The Rise of the Dairy Industry in Wisconsin* (Madison 1963), Appendix, Table C-1.

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EARLY SPECIALTY CROPS CULTIVATION

Crops: Hops, Flax, Sorghum.

Temporal Boundaries: 1840 - 1870 (with small scale cultivation of some crops continuing until approximately 1900).

Spatial Boundaries: Entire state south of northern line of settlement at 1870.

Related Study Units: Specialty Agricultural Production, Fruit and Vegetable Cultivation, Brewing.

HISTORICAL BACKGROUND

Wheat was the earliest cash crop for the pioneer settlers in Wisconsin. Getting started required little capital investment, and the high rate of return made it an attractive first crop for most farmers. In the 1850s, Wisconsin quickly developed into a one-crop state. But before decade's end, the price for Wisconsin wheat began to drop as yields and quality declined, and the fields of Iowa and Minnesota began producing in competition. By the 1860s (shortly after the state's greatest yields), Wisconsin wheat growers experienced a decline similar to that which Ohio and New York farmers suffered when Wisconsin wheat farming expanded decades earlier.

To compensate for loss of income (and the depletion of fields), Wisconsin farmers experimented with a variety of substitute cash crops in the next few decades. Some of the experiments were get-rich-quick booms, such as the hop craze in Sauk County; others were weak and short-lived attempts, like the cultivation of sorghum during the Civil War decade. Still, other specialty crops which started at this time--cranberries and tobacco, for example--fully matured in the late nineteenth century, and thus provided a long-term supplement to the state's agricultural economy. (These crops are discussed in the study units in the Diversified Agriculture topic.) But early attempts at specialization, however fitful and brief, represented the first full experiments to find a successor to wheat. The endeavors did not, however, provide a final answer. The real replacement for wheat would come only when the state's farmers accepted the change in both work habits and products that led to the rise of dairying and livestock production after 1870. But before then, Wisconsin farmers sought the one cash crop that would prove as lucrative as wheat. The three main efforts at early specialty farming--the cultivation of hops, sorghum, and flax--are outlined below.

HOP CULTIVATION

Widespread hop cultivation in Wisconsin was primarily a "boom-and-bust" phenomena of the 1860s, though the first plantings occurred decades earlier and cultivation continued on a small scale until after 1900. Cultivation was begun by New Yorkers or English immigrants who brought hop roots and the knowledge of their cultivation with them when they settled in Wisconsin. These earliest cultivators settled in Waukesha and Sauk counties, the latter area becoming the center of the hop boom in the state. By 1870, the boom was a bust, and farmers turned to other forms of agriculture. Many investigated the rising possibilities of the dairy industry. The hop boom, along with the other experimental crops of the 1860s and 1870s indicated the end of the farmers' dependence on the decreasing returns from wheat farming and their desire to investigate alternative crops.

Probably the earliest hops grower in Wisconsin was James Weaver, an Englishman who

immigrated to New York in 1830. In 1837 he journeyed to Wisconsin and settled in Waukesha County, bringing New York hop roots with him (Calkins 1972:20). Fifteen years later, in the spring of 1852, an English immigrant named Jesse Cottington, who had managed the hop yards of C. D. Palmer of Waterville, New York, for the previous seven years, planted some of Palmer's roots on his farm in the Town of Winfield, Sauk County. Within the next several years, both William Harvey Canfield and Benjamin Colton began hop cultivation using Palmer's or Cottington's roots. Most of these early crops were small, and although profitable, did not achieve the remarkable returns that would come in the 1860s (Anon., History of Sauk County: 619).

In the early 1860s, the rise of Wisconsin's brewing industry and a recent devastating attack of the hop-louse on New York fields created a great demand for Wisconsin hop. Prices doubled, tripled, and quadrupled in only a few years, and Wisconsin farmers saw hops as an opportunity to get rich quickly. Much money was spent building hop houses for drying and storing the plant and for the poles and other equipment required for its growth and harvesting. Hundreds of pickers were hired at a time for the harvest, and credit was extended for all these purposes. New homes were built; expensive luxuries such as pianos were purchased on the credit of the harvest.

But in 1868, due to a poor growing season and a recent invasion of the louse, production declined. Soon, New York fields began once again to produce at their normal capacity. Combined with the Wisconsin harvest, the increased production caused the market to flood with bales of the sticky plant. Many Wisconsin farmers held their crop off the market, believing the 30 to 35 cents per pound price would rise once again to the 55 to 60 cents per pound to which they had become accustomed. However, as the season advanced, the price fell to as low as 10 cents per pound (only three cents more per pound than Cottington's first crop brought in 1837), and the farmers lost a great deal of money. The price of hops did rise again in 1870, but only to about 20 cents per pound. The boom years were over. Often the only way to achieve a profit was to sell the hop poles for stovewood. In 1871, the Eastern fields again underproduced and hop prices rose slightly, but most Wisconsin farmers had already abandoned hops production. After this point, prices and production stabilized. Most of the remaining hop cultivation in the state ceased by the end of the century (Merk 1916:37-43).

Although the boom covered most of the agricultural lands in Wisconsin it was centered in Sauk County where the vast majority of area was under hop cultivation. The end result was general economic growth for the area. Residents benefited from the opportunity to purchase better breeds of livestock, build larger homes, and generally improve the capital base of the area. Ultimately, many of the hop houses were converted to storage sheds or small barns. Many were built of lumber on limestone foundations.

FLAX CULTIVATION

According to historian Eric Lampard, the story of Wisconsin flax had much in common with hops. In his words:

During the first wheat crisis at mid-century a few farmers experimented with the (flax) plant, though the initiative had come from manufacturers interested in the production of linseed oil. As a substitute for wheat, however, flax was never very successful for it did not take well on 'tired land.' The crop of 1860, amounting to 13,000 pounds of flax and 18,000 pounds of seed, was less than a third of that credited to the state in 1850. The reduction of New England's cotton supply after the outbreak of war caused several state governments and agricultural societies to offer valuable premiums to investors who could devise some means of spinning common flax fiber into a thread on standard textile machines. In 1863 the United States Congress voted \$20,000 to the same end. In the same year eastern capitalists moved into Wisconsin handing out seeds and

contracts to farmers with a largesse that apparently convinced even the most skeptical; linen factories and linseed oil plants were constructed in several parts of the state and the industry seemed destined to a golden future. Wartime prices may have made such ventures feasible, but the necessary manufacturing techniques were never developed and, with the resumption of cotton supplies after the war, the flax industry of Wisconsin collapsed almost as rapidly as it had begun. Like hops and sugar, flax could be produced more cheaply elsewhere (Lampard 1963:49-50).

Among the earliest of these pioneer flax growers was John Galbraith, a Scottish immigrant living in Mukwonago. He planted his first crop in 1849, intending to use the flax straw to make linen. The long, tedious process of growing and processing flax required a great deal of hand labor for pulling (harvesting), bundling, stacking, and drying the crop. Lashing the bundles to remove the seed and finally water-rotting the flax in ponds, dug specially for the purpose in creek beds, also necessitated much hand labor. After drying and sun-bleaching, the flax was processed in a mill that Galbraith built for breaking and scutching the stalks. The flax fiber was then shipped to an eastern market. Galbraith's Symington Flax Mill was constructed by a Mr. Marlin of South Genesee from drawings made by Horatio Harrison of Spring Lake near Mukwonago sometime between 1847 and 1849. Farther south and west, at the same time that Galbraith was growing flax to provide his mill with raw material, two men named Hatch and Weed of Beloit were purchasing flax by the ton from area farmers (probably from Illinois and Wisconsin) to provide material for their breaking mill. Hatch and Weed's process differed from Galbraith's because the hot water vats they used to rot their flax gave them the potential for year round operation.

In addition to providing straw for linen and paper, the seed of the flax plant provided raw material for the linseed oil mills that were being built in different parts of the state. In 1850 or 1851, partners named Weed and Gumaer were erecting an oil mill on a tributary of the Wolf River near Oshkosh. Whether the Weed of this operation is the same or a relative of the Weed operating the breaking mill in Beloit is not known. But some relationship is likely, given the easy transportation connection between Oshkosh and Beloit provided by the Rock River. Linseed oil was produced in this mill as it was in a similar plant built by Samuel Moore in Platteville in 1854. (Weed probably operated the mill in connection with his dry goods and grocery business on Main Street.) Moore's mill consumed about 60 bushels of seed per day - not many by modern standards, but more than could be provided by area farmers.

To encourage flax growing, both Moore and the partnership of Weed and Gumaer distributed free seed to any farmer willing to attempt cultivation. Flax cultivation, and the related industries, grew slowly during the 1850s. In late 1855, Samuel Moore's addition of a two-story storage building to his operation provided room on the second floor for the operation of the fanning mill and raw grain and flax cake storage on the first floor. During the next year, area farmers sowed about 1,000 acres of flax and encouraged Moore to begin construction of a 25 x 40 foot brick building to house his new mill. He hoped to provide the Northwest Paper Company of Beloit (the predecessor of the present-day Beloit Corporation) with fiber for paper production, especially newsprint. He sold his linseed oil in Galena and Dubuque, probably for use in the manufacture of white lead.

After the Civil War boom, flax cultivation in Wisconsin dropped off dramatically. Much of the cultivation moved farther west. Today, it is centered in western Minnesota and in North and South Dakota. This westward movement closely paralleled settlement, because flax provided a good breaking crop for new farmland. By the 1870s about two-thirds of the nation's production occurred in Iowa, Illinois, Indiana, and Wisconsin, with most of the Wisconsin crop grown in the newer, more northern counties. This production probably supplied the hydraulic press of the linseed oil plant operated by Spencer Kellogg and

Company in Superior, Wisconsin around 1900. This plant, later operated by the Archer-Daniels Linseed Company, ceased operation before World War II (not extant).

The post-World War I period witnessed a large movement toward consolidation of the linseed oil business, with the Archer-Daniels Company emerging as one of the giants. Their acquisition of the William O. Goodrich Company of Milwaukee, which had operated a large operation since 1875 and whose production of refined linseed oil supplied 80 percent of the market, certainly aided their growth. Disease resistant varieties of flax were developed in the 1920s, and there was some indication that the crop would rebound. Two "flax tow" mills - one in Union Grove (Racine County) and one in Baraboo - had been buying flax straw in that decade, but the crop generally lost out to feed and grain crops (Wright 1923:1-2, 1926:3, Torrie 1944:1). Today, Wisconsin grows less than 1,000 acres of flax, if that, and there are no production facilities operating in the state.

SORGHUM CULTIVATION

Sorghum cultivation was another of the boom crops in Wisconsin during the Civil War. The boom-and-bust cycle of its cultivation was very much like that of flax and hops. Early experimentation began before the outbreak of hostilities, boomed during the war period, and then quickly died out after the fighting ended. As with flax, hops, and other examples of Wisconsin's increasingly diversified agriculture, the cultivation of sorghum represents two trends in Wisconsin agriculture: the increasing frustration with poor profits realized from wheat cultivation and the desire to become rich quick. As with flax, the patriotism of the moment created further justification. Americans of all classes were accustomed to a ready supply of sugar. With the Louisiana supply of cane sugar cut off by the war, it was necessary to find an appropriate substitute. Tax levies on foreign sugar were extremely high, and many hoped that sorghum, in the form of syrup and, if possible, in the form of sugar crystals, would be the ready replacement for this lost commodity.

Experimental cultivation of sorghum in Wisconsin began about 1857. The exact location and entrepreneurs are unknown. Cultivation grew slowly before the Civil War; in 1860 there were only 314 acres planted in the state. But by the end of the Civil War, cultivation had increased 400 percent to 1736 acres. The realities and profits of this business became well known. A year later, in 1866, before the canefields of Louisiana returned to production, farmers doubled their sorghum production to 3486 acres. However, as Southern fields began to produce again and as crop after crop of Wisconsin sorghum failed to ripen in the fields, Wisconsin farmers looked to other crops and to dairying for economic security. A successful process for making sugar crystals from sorghum syrup was never developed, and the Wisconsin State Agricultural Society never awarded the premium offered annually to any farmer able to produce 10 pounds of dry sugar from sorghum. By 1867, the boom was over. Sorghum production all but ceased in Wisconsin. The agricultural implement manufacturers stopped advertising their wares, and the industry moved farther south.

In the 1890s, however, sorghum growing and processing for strictly home and local use was promoted by the University of Wisconsin Agricultural Extension as part of its efforts to populate the cutover region of Wisconsin. But since the plant thrives under the same conditions as corn, it thus did best in the west, central, and southwest counties. By 1920, sorghum syrup could not be bought in Wisconsin because the labor costs were too high to produce for consumers. In 1919, however, about 125 sorghum "mills" located near small patches produced 50-500 gallons a day in an area of the state southwest of a line from Burnett to Racine counties (Wright 1920:1-10).

Other than the homes of the prominent growers, there appear to be very few resources associated with the production of sorghum. Most of the potential resources tend to be associated with the making of syrup from the cane. Those resources associated with the

processing were often low, oven-like structures housing machinery or boilers. These machines ground the cane, which was then boiled. The water was evaporated from the mixture in large wood and metal evaporator pans. The likelihood of extant structures of this type is minimal.

IDENTIFICATION

Resource Types. Structures associated with hops cultivation: hop houses, houses and farms associated with early prominent growers. Structures associated with flax cultivation: houses and farms associated with flax cultivation flax mills. Structures associated with sorghum cultivation: homes of prominent growers, farm outbuildings associated with the manufacture of sorghum or sorghum syrup.

Locational Patterns of Resource Types. Resources associated with hops, flax, and sorghum cultivation are located in or near the fields of production; resources associated with processing and marketing are located near railroad tracks in communities in regions of greatest concentration. Easy access to major transportation routes is the strongest locational factor for such concerns. As noted in text, the Sauk County region was by far the largest center of mid 19th century hops cultivation.

Previous Surveys. Reedsburg Intensive Survey briefly examines hops cultivation in Sauk County and describes structures associated with its production. A 1977 survey conducted by Charles Calkins and William Laatsch (see bibliography) identifies the sites of 16 historic hop houses in Waukesha County. At that time, only two remained extant, including the Beaumont Hop House (NRHP 1977).

Survey and Research Needs. Surveys of the regions of greatest production should be undertaken to identify extant structures associated with the various phases of early specialty crop cultivation. A study of archival materials and publications of the period would provide background information and assist in the identification of associated property types.

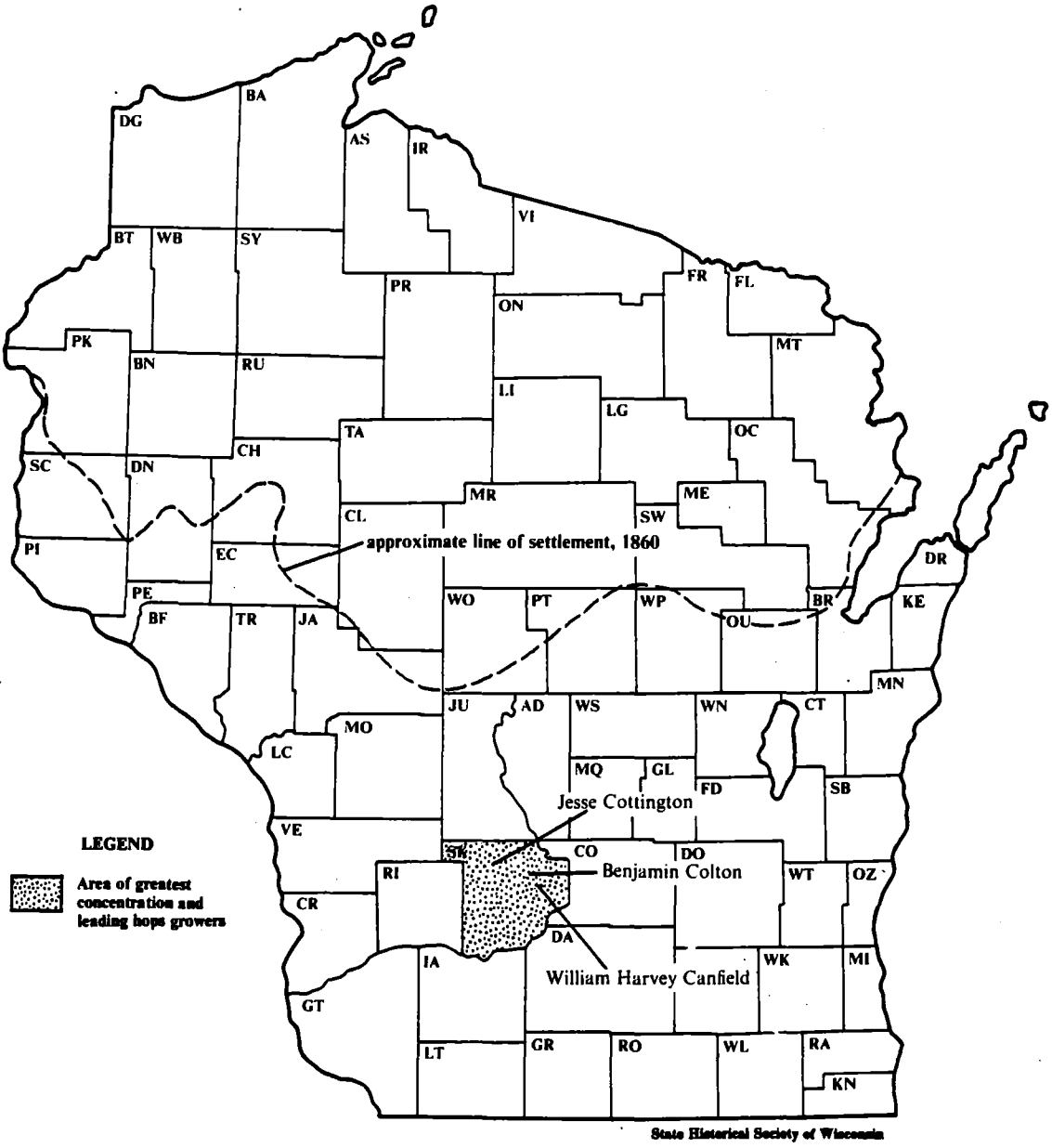
EVALUATION

National Register Listings and Determinations of Eligibility

Beaumont Hop House (c. 1863-65), Town of Merton, Waukesha County (NRHP 1977)

Context Considerations. Structures associated with cultivation and processing of specialty crops should be evaluated as part of the total complex. Because the cultivation of flax and sorghum necessitated the construction of few specific building types and or farms, the integrity of the overall farmstead complex is an important aspect of consideration in the evaluation process. While individual hop houses may be potentially eligible on their own, their existence within a larger farm complex should be taken into consideration and their role in the overall development of the property should be evaluated and compared with that of other extant resources. In all cases, evaluation within the context of the density of historic specialty crop cultivation in the surrounding area is important.

EARLY SPECIALITY CROPS



Hops Cultivation in Wisconsin, 1860-1865

Source: *History of Sauk County* (Chicago, 1880), pp. 365-366.

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FARMING THE CUTOVER

Temporal Boundaries: 1885-1935.

Spatial Boundaries: Roughly the northern half of the state.

Related Study Units: Logging and Lumber Milling.

HISTORICAL BACKGROUND

To many individuals, the destiny of the forested land of northern Wisconsin was no different than it had been for like regions of the northern United States - it would become farmland. The plow had always followed the axe as the fur and lumbering frontiers gave way to the farm frontier. But the stumpland of the Wisconsin Cutover did not become new, lush farm fields. Time and circumstances were different, as was the land itself. Just as earlier settlers on the Illinois and Iowa prairies had proved the old myth wrong that good farmland only came from forests, so the Cutover settlers discovered the reverse - that forested land did not always produce good crops.

The initial problem was an old one and simple enough; what to do with the land after the trees were cleared. And the usual answer seemed the correct one again. "As early as 1859, one Oliver Gibbs was able to describe the St. Croix Valley as a veritable farmer's paradise where there had been no crop failure for fifteen years" (Helgeson 1962:1). Everyone hoped to make a profit from the settlement of the Cutover. The railroads and lumber companies had lands to sell; the speculators and promoters bought the land for resale to new arrivals or were hired by the large landowners to sell the land for them. "Railroads, speculators, newspapers, lumber companies, voluntary colonization societies, state boards of immigration, even the [University of Wisconsin] College of Agriculture encouraged the settlement of northern lands" (Clark 1956b:5).

Among the earliest efforts was prominent Bostonian Caleb Cushing's unsuccessful attempt in the late 1860s. Cushing had invested in timber lands and power sites in the St. Croix River Valley in the 1840s. He, and the other stockholders of the St. Croix Manufacturing and Improvement Association (founded 1857) had little interest in agricultural settlement until after the Civil War, when Cushing developed a scheme to settle European immigrants in the valley.

In 1868, Cushing became president of the newly incorporated New York-based Great European-American Emigration Land Company. He planned to sell to colonists all the state agricultural college lands that he had recently purchased in Polk County. But when the first colony of Swedes arrived in the summer of 1869 to find that none of the land would be available for another year, the misrepresentations and mismanagement by the company's European agent came to light. Cushing spent the next several years straightening out the mess.

Despite the failure of Cushing's schemes, others pushed ahead undaunted and with greater success. "The Wisconsin Central [Railroad] . . . hired agents to work eastern and European cities, offering land at around five dollars per acre. . . . By 1895, the company had sold nearly 300,000 acres" (Clark 1956b:5). Although most lumbermen resisted selling their cutover land, fearing that settlers' demands for county services would increase taxes on their still-forested acreage, the success of the Knapp and Stout Lumber Company of Menomonie changed their minds. Early colonists included Heronymous Zech, who began a Polish settlement at Crivitz in Marinette County, and Milwaukee lawyer Frederick Reitbrock, whose Reitbrock Land and Lumber Company built a "thriving"

agricultural community at Athens, Marathon County. Reitbrock's interest in progressive farming techniques "led to the establishment in the early 1900s of one of the earliest forerunners of county agent work in the nation, when the Reitbrock family and the Athens Advancement Association hired a young Wisconsin College of Agriculture graduate to come to Athens and help the logger settlers build better dairy herds and improve their farms" (Helgeson 1962:7).

One of the most ambitious colonization attempts was made by Eau Claire businessman Ben Faast in his various incarnations as the Rusk Farm Company, the Faast Land Company, the Wisconsin Colonization Company, and the Chippewa Valley Colonization Company. Faast recognized that the settlement of the Cutover required more than merely selling land to promising pioneers. The twentieth century pioneer's standard of living was too high for them to undergo the usual early privations that previous settlers experienced. Through the Wisconsin Colonization Company, Faast sought to overcome this by selling ready-made farms that included house, shed or barn; tools, and some animals and seed. He also provided liberal credit terms. The town that he planned and partially constructed, Ojibwa, in Sawyer County, was to be the centerpiece of Faast's colony. "By 1921 [four years after operations began] Faast could report to his stockholders that the model village had a railroad station, a state graded school, and several business buildings, carefully planned and finished in the white colonial style of architecture called for in the original plans" (Helgeson 1962:57).

Although initially successful--the company sold land to 56 buyers in 1917, to 119 in 1918, to 173 in 1919, and by January 1920 "had constructed 173 houses and 133 barns for settlers" (Helgeson 1962:63)--the company survived for only a dozen years. During the 1920s, more and more settlers failed to meet their payments and Faast was soon overextended. By 1929, he could not even pay 25 percent of the debt owed on the Sawyer County land. Foreclosure quickly followed.

The blame for the failure to create golden fields out of the Cutover stumplands was laid at many doors. The promoters blamed the settlers; they were not tough enough to withstand the early rigors of the Northland. And the increasingly restrictive Immigration Acts of 1921 and 1924 prevented the heartier souls from immigrating. Settlers, in turn, blamed the promoters for overselling the potential of the land and for squeezing them dry of capital. Many undoubtedly did just that, but Ben Faast and others expressed a genuine, if somewhat paternal, concern for their settlers. After all, the more successful their purchasers, the better their chances of making another sale. Profitable business practices did not mean that the customer had to be dissatisfied.

Although some failures resulted from overly enthusiastic promoters or weak-hearted souls, other causes interacted to create the final disaster. Primary among them was the land itself. Not all the cutover land was good for farming. Much of it "was in appearance most forbidding. It showed gaunt, ghostly looking dead pines still erect, giant trunks burned off at the base and in falling arrested by other dead but standing timber, half-buried logs overgrown and hidden by underbrush or by groves of saplings; in short, timber living and dead inextricably intermingled and nearly all worthless" (Schafer 1922:141-142). Underneath this forboding picture lay land of varying quality, often highly acidic from the years of pine forests. And then there were the stumps, always the stumps. The hardwood ones eventually rotted but the pine stumps never did. Grubbing them out by hand and horse was slow, back-breaking work. Steam powered stump pullers could clear one to two acres a day, but were difficult to maneuver. And the widespread root system of the pine stump disturbed a lot of soil when it was pulled out. "The [University of Wisconsin] College of Agriculture experimented with dynamite and put out a bulletin on its use in 1912. Four years later the Department of Agricultural Engineering worked out a plan to give Cutover farmers on-the-spot education in getting stumps out of the soil" (Clark 1956a:3). But everyone knew that dynamite was touchy and despite several "Land Clearing Special" trains that toured the north country between

1916 and 1919, dynamite never caught on. After World War I, the College of Agriculture acquired tons of surplus TNT, a cheaper, more powerful, yet more stable, cousin of dynamite. John Swenehart of the Department of Agricultural Engineering again gave field demonstrations to convince farmers of its usefulness. This time he convinced farmers of its safeness as he fired bullets into cartridges of it and "vigorously tamped the explosive into stumps with hardwood sticks." Orders for TNT flooded in.

However, just as it became easier to clear the fields and to fertilize them with new commercial fertilizers, the post-war agricultural depression hit. Prices dropped precipitously as European fields were put back into production. The efforts of the University of Wisconsin College of Agriculture to teach farmers to grow thousands of bushels of crops were useless when they lost money on each bushel harvested. The Depression that struck most Americans during the 1930s besieged the farmer at the end of World War I. Settlers abandoned thousands of acres of land as they looked for opportunity elsewhere.

Abandoned acreage, whether left by farmers or by lumbermen, burdened the tax rolls once again. Reforestation seemed the only answer. It had been tried a generation earlier when the efforts of early promoters had been in full swing. At that time the forestry movement in Wisconsin was part of the growing national conservation movement sponsored by, among others, Theodore Roosevelt, Gifford Pinchot, and Wisconsin's John Muir. Here in Wisconsin, it also was tied into the growing resort industry. Since the 1880s, railroads had been promoting vacations in Northern Wisconsin. "By 1897 it was claimed that sportsmen left \$20,000 annually in the north woods. Summer vacationers spent many more thousands there" (Clark 1956b:13). The public, private business, and the state legislature were beginning to realize that the infinite resources of the United States were finite, that the previous lumbering practices had been wasteful, and that reforesting the land unsuitable for farming could be profitable for all.

In 1903 a State Forestry Commission was established with Edward Griffith, a co-worker of Gifford Pinchot, as forest superintendent (later State Forester). Over the next dozen years Griffith could count among his successes the acquisition of nearly 200,000 acres of Cutover land (to build the total forest reserve to 500,000 acres), increased fire protection in timber areas, the establishment of nurseries at Tomahawk and Trout Lake, a 1907 woodlot tax exemption law, and the location of the federal Forest Products Laboratory in Madison in 1909. But opposition from settlement boosters like Ed L. Peet of the Grantsburg Journal of Burnett County eventually influenced the legislature to investigate state land buying. Though given a clean bill, the state forestry program came again under fire when the State Supreme Court agreed to hear a case that protested the land purchasing program. The court, choosing to examine the entire forestry program, declared it unconstitutional in 1915. The conservation program then was restructured and the acquisition of potential forest land ended. With the rise in food prices during World War I and the end of the reforestation threat, many Cutover boosters once again wore rose-colored glasses.

The agricultural depression following World War I revived interest in reforestation. While investigating reform of the Cutover's tax problems, a legislative committee found that the "Nekoosa-Edwards Paper Company of Port Edwards had already started a forestry program to maintain a pulp supply. That company wanted timberland tax reforms" (Clark 1956a:14). Other measures to revive the state's forestry program also were underway. A 1924 amendment allowed the state to purchase additional stumpland for reforestation and the next year a law was passed that permitted the federal government to purchase land for the same purpose. With the passage of the Forestry Crop Law that reduced the tax on growing trees and rural zoning laws that prevented settlers from establishing isolated farmsteads that dramatically raised the cost of public services, serious efforts to solve the problems of the Cutover were underway. The changes in tax laws encouraged numerous separate reforestation efforts by businesses, communities,

schools, and private clubs. Zoning laws aided federal and state reforestation programs. During the 1930s two national forests, Chequamegon and Nicolet, were begun and the state continued to purchase land, acquiring nearly 220,000 acres in eight state forests by 1942. In 1982, nine forests with over twice the 1942 acreage were managed by the state. And "thanks to reforestation, increased travel by automobile, and improved highways, Wisconsin's 'resort industry' became more and more important" (Clark 1956a:18).

IDENTIFICATION

Resource Types. Colonization company homes and villages such as Ojibwa, Crivitz, or Athens, pioneer cabins/farmsteads, structures related to promoters of colonization in the cutover areas, rural historic districts.

Locational Patterns of Research Types. Although widely scattered across the northern portions of the state, many communities and farmsites still relied heavily on the adjacency of railroad and waterway transportation routes for sustained development.

Previous Surveys. Little intensive study has been completed on the rural areas of the Cutover region as of April 1986.

Survey and Research Needs. An intensive study of the various colonization villages and company farms such as Ojibwa, Crivitz, or Athens should be completed, and research into the existence of other such resources should be undertaken. Analysis of the differences between farm complex patterns and farming practices on the Cutover, versus those in the southern regions of the state is necessary in order to identify any particularly significant characteristics.

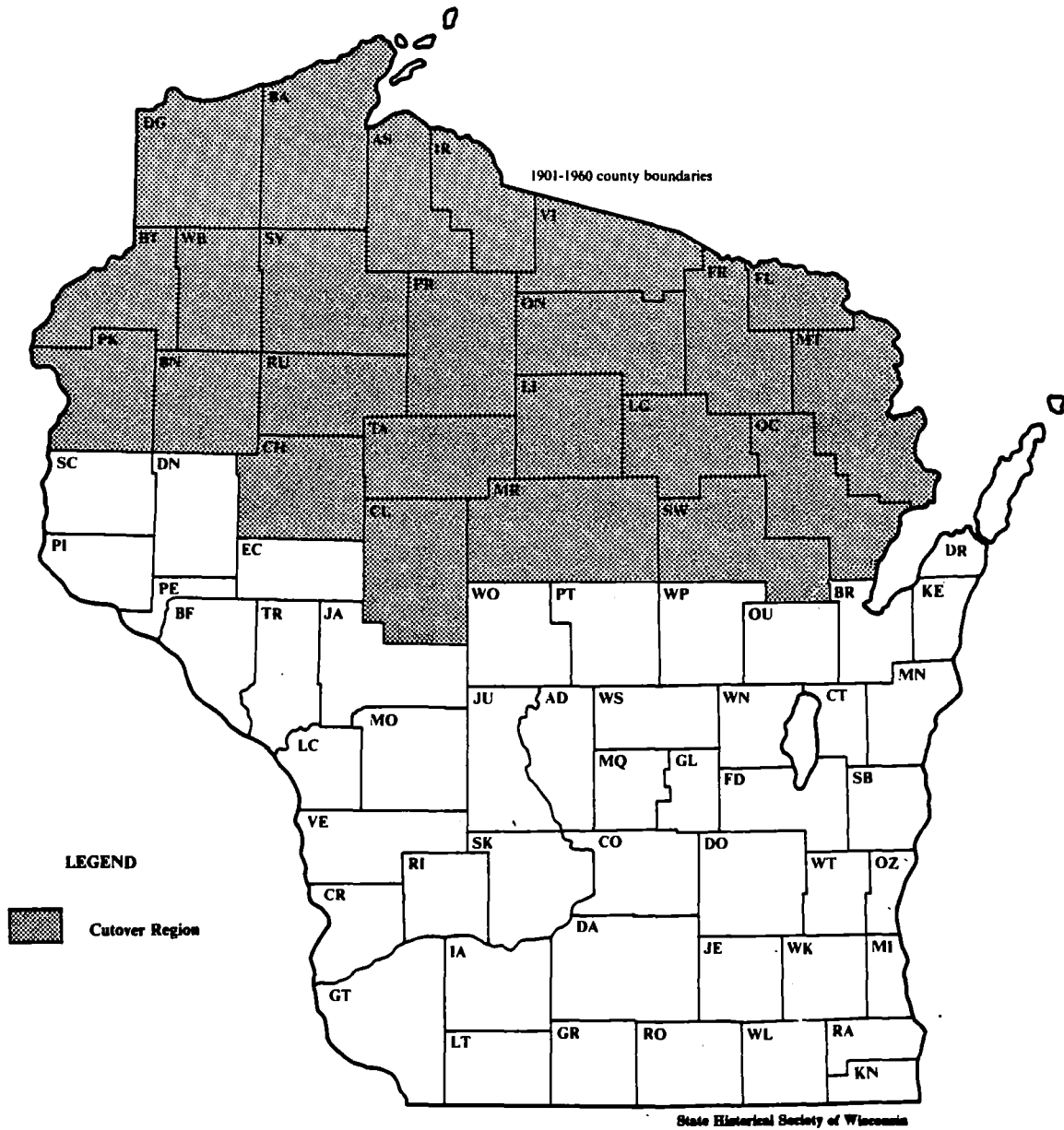
EVALUATION

National Register Listings and Determinations of Eligibility

Annala Round Barn (1917-21), Town of Oma, Iron County (NRHP 1979)
Davidson Windmill (c.1900), Town of Lakeside, Douglas County (NRHP 1979)
Ojibwa Courier Press Building (1922), Town of Ojibwa, Sawyer County (NRHP 1982)

Context Considerations. In the case of entire farming (colonization) communities, the overall integrity of the resources as they relate to a specific time period, with only limited numbers of "modern" intrusions is an important contextual factor. Individual farmsteads should be evaluated both in context with any specific local farming traditions in their vicinity and in relationship to the general significance of farming activity in the broader area. The integrity of farm complexes over individual farm buildings is again an important consideration.

FARMING THE CUTOVER



The Cutover Region, 1885-1935

Source: Loyal Durand, *The Geographic Regions of Wisconsin* (Ph.D. dissertation, The University of Wisconsin, 1951).

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FEED CROP AND GRAIN CULTIVATION

Crops: Corn, Oats, Hay, Seed Crops, Barley, Rye, and Other Minor Feed Crops.

Temporal Boundaries: 1860-present.

Spatial Boundaries: Entire state.

Related Study Units: Wheat Cultivation, Livestock Production, Farming the Cutover, Agricultural Machinery and Implement Manufacture.

HISTORICAL BACKGROUND

Feed crop and grain cultivation has dominated Wisconsin agriculture since the late nineteenth century, reflecting the importance of livestock to the state's economy. As the state's wheat harvest declined after 1870, Wisconsin farmers increasingly planted the crops--corn, oats, and hay--that fueled the rise of animal husbandry. By 1890, the transformation was nearly complete: Wisconsin agriculture rested upon a foundation of feed and forage, the harvest of 90 percent of the state's cropland, consumed largely on the farms where it was grown and marketed as livestock and livestock products (Ebling 1948:26).

Feed crop cultivation was as old as agricultural settlement itself, a necessary supplement to the wild vegetation upon which pioneer livestock grazed. Oats and corn were the principle feed crops in territorial Wisconsin (Smith 1973:521). But farmers at mid-century were dependent upon the sale of cash grains. As cash crops, feed grains did not rival the rewards of wheat. Large scale production of corn, for example, was considered unsuited to Wisconsin's cool climate and too expensive to ship out of state (Hibbard 1904:122). Oats and hay--important cash crops when sold in the cities and lumber camps of the state--found only a local, and thus less profitable, market. Not surprisingly, between 1850 and 1870, the combined acreage planted to oats, hay, and corn barely equalled the acreage planted to wheat alone (Ebling 1948:89-91).

But if feed crops were unprofitable when raised for cash, the crops were essential to the dairy and livestock farming that developed after wheat's decline. To make animal husbandry profitable, farmers needed to raise large amounts of cheap feed to increase stock production or milk flow at lower unit costs. Thus feed crops were cultivated not only in former wheat regions of southern and western Wisconsin, but in northern counties as well, where dairying followed the lumber frontier. Pioneers of animal husbandry became pioneers of field crops, testing and refining cultivation with an eye toward supporting a herd and increasing its profitability. Despite initial apprehension, farmers in the 1860s and 1870s found the warm summers and well drained soils of the southern and southwestern counties adaptable to large scale production of corn for grain and fodder, a necessary component of hog and cattle production. At the same time, dairy pioneers like Chester Hazen of Ladoga and W.C. White of Rosendale grew corn in their northern locales as supplemental fodder for dairy cows. Nearly everywhere in the state, including regions where climate precluded corn, farmers discovered that Wisconsin's plentiful rainfall and lime-rich soils yielded strong crops of grasses and legumes, which fed cattle and helped replenish depleted soils. By the early 1870s, progressive farmers like dairyman Hiram Smith of Sheboygan proclaimed that nature imposed no limitations on the extent of Wisconsin's feed crop potential (Lampard 1965:149-151).

As feed crop cultivation expanded in the late nineteenth century, so too did scientific knowledge about the crops. As early as the 1870s, farmers like Smith and dairy advocate William Dempster Hoard of Fort Atkinson heralded the advantages of using feed crops as a supplement to pasturage. Extra feeding, reported Smith in 1874, had a double benefit: it increased milk flow and allowed the farmer to feed more cows per acre (Lampard 1965:151). A more revolutionary advance came in the 1880s, when the development of the modern silo provided an inexpensive and efficient way to store nutritious forage (usually corn, less often clover or legumes) to feed dairy cows throughout the year. The widespread adoption of the silo over the next few decades had a profound impact on the cultivation and distribution of feed crops. Corn cut for silage was grown well to the north of the traditional corn belt because it could be harvested earlier than corn grown for grain. By 1895, Fritz Woll of the College of Agriculture further outlined the impact of silage on feed crop cultivation: because silage crops were cut earlier, land could be cleared and seeded again to grain or grasses; crops unfit for hay making could be preserved in the silo and changed into palatable feed; where hay making was precluded by late cropping, the silo would preserve the crop and its full feed value would be retained (Lampard 1965:160). With the introduction of the silo, feed crop cultivation became a year-round, statewide concern.

Throughout the second half of the nineteenth century, cultivation of feed crops was championed by the advance-guard of diversified agriculture, including the Wisconsin Dairyman's Association, the Wisconsin State Agricultural Society, and progressive farming journals like Wisconsin Farmer and Hoard's Dairyman. But the most important scientific advances--and most thoroughgoing outreach program--came from the classrooms and research stations of the University of Wisconsin's College of Agriculture. From the first, the College tested feeds and silos and regularly reported conclusions to the neophyte dairy and livestock farmers of the state. In the classic text Feed and Feeding, first published in 1898, Agriculture Dean William Henry provided the state's farmers with scientific insight into the dietary needs of dairy herds and the nutritive value of feed crops. By understanding the protein component of grasses and legumes, or the benefits of succulent silage as opposed to coarser feeds like hay, acceptance of these crops advanced throughout the state (Lampard 1965:166). As early as 1898, the College of Agriculture sponsored research of "pure-bred" hay seeds through the Wisconsin Agricultural Experiment Association. By the twentieth century, as early-maturing and high yielding varieties of several crops were produced (often the result of University of Wisconsin research), feed cultivation boomed in every county where dairy cows or other livestock were raised (Ebling 1948:26-27). The mechanization of farm life was also significant. Labor and time saving machines, including reapers, plows, planters, and threshers, greatly expanded the ability of the Wisconsin farm to grow feed crops.

Census statistics provide benchmarks for the changing agricultural landscape. As wheat acreage declined after 1880, acreage in feed crops grew dramatically. Between 1870 and 1890, for example, acreage planted to corn surged 142 percent, hay acreage rose 134 percent, and acreage in oats climbed 197 percent while acreage in wheat fell 61 percent (Ebling 1948:89-91). By 1900, nearly 90 percent of the state's cropland was devoted to the three leading feed crops with most of the harvest consumed on the farms where it was grown. The acreage continued to climb throughout the twentieth century, placing Wisconsin consistently first in the nation in corn grown for silage and hay and a leader in oats and in corn grown for grain (Ebling 1948:26). The following summaries chart the rise of the state's major feed crops and small grains.

CORN

Cultivated by Indians as far north as Lake Superior well in advance of European settlement, corn was an essential staple of pioneer life. As early as 1839, corn became the principle crop of the territory (with cultivation centered in the lead mining region where farming was making tentative inroads). By 1848, the crop was grown in all settled

regions, with the largest acreage reported in the southern counties where well drained soils and long summers proved favorable to the dent and flint varieties of the day. An important source of food, for farmer and livestock alike, corn was largely eclipsed as a cash crop at mid-century by wheat. But with wheat's decline in the 1860s, the first substantial concentrations of corn production emerged in the southern tier of counties, grown as both cash grain and fodder for expanded livestock production in the region.

By 1870 (and continuing until the present day), a well defined "belt" of cultivation (with emphasis on feed production), stretched across the south-central and southwestern counties where the growing season was long enough to support hog and beef cattle production. Centered in the corn belt counties of Grant, Rock, Lafayette, Dane, and Green, the region recorded a surge in corn production after 1880, as the raising of livestock assumed larger proportions in the area's economy. By the twentieth century, corn cultivation was statewide, reflecting the adoption of the silo after 1880 and the development in the twentieth century of early maturing varieties that were harvested in about 100 days--40 fewer than regular varieties. (By 1940, 90 percent of the state's corn was grown from hybrid seeds). With corn serving as the principle ensilage material, farmers continuously expanded acreage devoted to the crop, growing corn for silage far north of areas where corn was grown for grain. By the early twentieth century such east-central dairy counties as Dodge, Columbia, Fond du Lac, and Calumet joined with the southern counties of Dane, Grant, Lafayette, and Rock as leading producers of corn. Wisconsin led the nation in corn grown for silage throughout the twentieth century. In 1924, for example, over 100,000 silos punctuated the state's agricultural landscape, with Dane, Dodge, Fond du Lac, and Marathon counties leading the state in silo construction. By mid-century, 50 percent of the state's corn crop was grown as a feed grain (mostly in the southern tier of counties) and 50 percent was grown for silage, clearly reflecting the bifurcated nature of corn cultivation in Wisconsin (Ebling 1948:26,89). Today, Wisconsin ranks first in corn grown for silage and seventh in corn grown for grain (Wisconsin State Department of Agriculture 1983:3).

Corncribs of various sizes and configurations were part of nearly every farmstead in Wisconsin. The classic crib was a long, narrow, gabled roof structure whose sides were wider at the top than at the bottom. The crib sides were constructed of horizontal boards laid a few inches apart so that air could circulate. Most cribs were elevated a few inches off the ground (built on concrete pillars) to prevent infestation from rats and mice. The typical crib featured two pens for corn separated by a drive-through (Apps 1977:120).

OATS

From earliest settlement, the cultivation of oats has been an important part of Wisconsin agriculture, more widely grown on nineteenth century farms than corn. By 1900, oats, well suited to the state's cool climate, were grown in every county in the state. An essential feed for livestock and poultry (especially critical in a horse powered society) between three and five percent of the state's farmland was planted to the crop before 1870. Large scale acreage, grown for both the market created in the state's growing population centers and for consumption on the farm, was centered in the southern counties stretching from Grant to Kenosha. Oat production universally accompanied agricultural settlement so that by 1870 the fertile wheat farms of the St. Croix River valley planted extensive oat acreage as well. Cultivation followed industrial and urban growth too. Ready markets for oats developed in the milling centers and lumber camps of the north, providing a lucrative cash market for the increased cultivation reported by 1870 in Chippewa, Polk, and Marathon counties. Oats were also grown for ensilage, hay, bedding straw, and oatmeal.

The most substantial upsurge in oat cultivation came with the rise in livestock production after the Civil War. Although important cash markets within the state continued to exist, most of the new acreage reported after 1880 (especially in the dominant southern

counties) was grown for feed, and by 1920, fully 90 percent of the state's oat crop was consumed on the farms where it was grown. From 1880 until 1930, oat acreage in Wisconsin expanded rapidly, becoming the state's principal grain crop, with concentrations in the southern counties (with the greatest acreage reported in the livestock regions of Dane, Grant, and Lafayette counties), east-central counties (greatest acreage in Dodge and Fond du Lac), and northern counties (greatest acreage in Marathon and Dunn). Oat production declined somewhat after 1930, handicapped in the depression decade by disease and drought as well as the decline of horses. But as stronger varieties of oats were developed, oats continued to be a major farm product and an important source of feed for livestock throughout the state, especially in northern counties where corn cultivation was limited (Ebling 1948:26-27,89,98). Oat production in Wisconsin ranked fifth nationally in 1983 (WDOA 1983:26).

Granaries were an ubiquitous feature of the Wisconsin farmstead. Sometimes the granary was simply a bin built into the haymow of the barn. But just as often, the granary was a separate structure placed far enough away from the main barn so that the rats and mice, which were inevitably attracted to it, did not invade the barn. Inside the granary, separate bins stored oats (as well as wheat and rye) and sometimes featured a second story for additional storage (Apps 1977:122). Only about three percent of the crop was sold at market by the mid-twentieth century, usually at threshing time, so no special storage facilities were required for the crop (Brereton 1955:6).

HAY

Since 1890, Wisconsin has led the nation in the production of tame hay, reflecting both the state's climate (blessed with sufficient rainfall to generously support fields of clover, timothy, and alfalfa) and its livestock economy. But the early history of the state's hay production was less auspicious. In the cash crop economy of the 1850s and 1860s, when livestock was limited, hay was raised principally to feed draft animals. A cash market for the product existed in the state's cities and lumber camps, but hay was considered too bulky to ship long distances and was largely consumed on the farm or sold in nearby markets (with the largest acreages in 1850 reported in the populated southern counties of Kenosha, Walworth, Dodge, Waukesha, Rock, and Dane).

Hay followed the growth of settlement. As population increased throughout the century, so too did the hay crop, expanding most rapidly in southern counties near the state's population centers. Increases in tame hay were most dramatic after 1870, paralleling the increase in livestock production. Between 1850 and 1880, for example, hay acreage increased 700 percent, occupying 1.5 million acres (and 10 percent of total farmland) with the largest concentrations in Dane, Fond du Lac, and Dodge counties. Not surprisingly, areas of greatest hay production were regions of substantial livestock holdings. Hay was also a favorite feed among northern dairy farmers because it grew well in cooler climates, replenished the soil, and did not require frequent reseeding. In the cutover area, hay was easier to raise on stump filled lands.

By 1910, more than 3,000,000 acres of tame hay were harvested annually in Wisconsin (16 times the 1850 acreage, despite the fact that farmland only increased sevenfold), making the state a national leader in hay production. In fact, the state's tremendous hay crop was one reason Wisconsin was a favorite winter home to many nineteenth century circus troupes, which needed to have a cheap supply of feed for the animals. One-third of the state's cropland and about 17 percent of its total farmland was planted to hay crops by 1930. By 1944, the state had 18 percent of its farmland in hay (exceeding four million acres). By this time, the importance of hay as a cash crop had declined; most hay was used for feed and was consumed on farms where it was grown. The largest percentage of cropland in hay was in the northern counties with Marathon, Clark, Dane, Grant, and Barron leaders in 1945, although the largest crop was produced in the southern two-thirds of the state. Today, Wisconsin remains the nation's leading producer of tame hay (Ebling

1948:44,90,91).

Although many barns included second story haymows, farmsteads often included a separate hay shed, particularly when the main barn was not large enough to store sufficient quantities. Occasionally, the shed was no more than a board roof supported by cedar posts braced to withstand wind storms. The roof raised and lowered according to the amount of hay being stored. Other sheds were enclosed frame structures (Apps 1977:120).

SEED CROPS

Hay seed (mostly clover seed) has been harvested on Wisconsin farmsteads since the early settlement period. By the late nineteenth century, a large percentage of seed for the state's hay crop was produced locally. Large scale production, however, began with the introduction of better harvesting machinery (and the introduction of combines) after World War I. During that period, an average of 200,000 acres of clover seed yielding about 270,000 bushels was harvested annually.

Ninety percent of the state's hay seed production was red clover, with notable concentrations in the west-central and east-central counties. The remainder of the state's seed crop was white and sweet clovers of which Wisconsin has been a leading producer. Since the late 1920s, alfalfa has been grown for seed and by mid-century was the second most important hay seed crop (although the yield fluctuated greatly according to late summer weather conditions), with a belt of production stretching along the Lake Michigan shoreline from Calumet to Door counties. Timothy seed, by contrast, is a minor crop, although widely grown in Columbia, Rock, Dunn, Eau Claire, Chippewa, Wood, and Portage counties. The state does not, however, rank nationally in such production and must import timothy seed for home use (Ebling 1848:47).

BARLEY

One of the oldest commercial crops in Wisconsin, barley was a leading cash crop throughout the nineteenth century, due partially to the emergence of the malting and brewing industries in the state. Although only .3 percent of the state's farmland was devoted to the crop in 1850 (comprising only 7,000 acres), the demand of the industry created a concentration of barley sold for malting purposes in the southern, east-central, and lakeshore counties. By 1870, acreage doubled in these regions and continued to increase until 1900, responding to the growth of the brewing industry. By the late nineteenth century, Wisconsin produced about one-fifth of the nation's crop, with production concentrated in two major barley regions. About one-half of the state's crop was produced in east-central Wisconsin, stretching from Green Bay through the Fox River Valley south to Rock and Walworth counties. Within this region the most important counties were Dodge, Fond du Lac, Calumet, Manitowoc, Sheboygan, and Washington. A secondary area of concentration developed in the west-central district, especially in Pierce and St. Croix counties. By 1910, over 800,000 acres (four percent of Wisconsin farmland) of barley were grown in Wisconsin (up from 55,000 in 1866), constituting one-eighth of all barley grown in the United States (Moore 1911:3).

But the heyday of barley production was cut short by the rise of the dairy industry in the early twentieth century. At that point, barley began to be grown more as a feed crop than a crop for market. After World War I, acreage declined sharply, partially due to Prohibition, and did not increase again until the 1930s in the malt and barley district of the east-central counties. After 1940, the dominance of other feed crops led to its final decline, with only .7 percent of farm lands, notably in the Dodge-Dane area, still planted in barley (Lampard 1963:35,98). The crop remains a minor grain today.

RYE

Rye was first grown as a market grain, cultivated universally in the state's agricultural counties for flour, reflecting in part the central European heritage of many of the state's nineteenth century settlers. Between 1850, when less than 5,000 acres were grown, and 1870, less than one percent of land planted in grains was devoted to rye. Some rye cultivation took place in the south and southeastern counties, with smaller acreage reported in the southwest and east-central regions. By the 1860s, rye production was concentrated in central Wisconsin, where the light soils of the plains were suitable for the crop. By 1870, concentration was notable in Marquette, Adams, Waushara, and Portage counties. Rock County led the southern region in rye production, while Manitowoc and Washington counties had sizeable acreage devoted to the crop in the lakeshore region.

Gradually, rye production expanded between 1880 and 1920 with cultivation extended to the west-central district (Moore 1921:5). By the 1890s, 300,000 acres (concentrated in central areas) were grown and record acreage was reported in 1922 (over 525,000 acres). Following World War I, acreage declined dramatically and rye fell to a position of minor importance except in the central counties where most of remaining acreage is now grown for hay.

MINOR FEED CROPS

Among the earliest crops grown in Wisconsin, buckwheat was reported in the first census after statehood (1850). For the next several decades, over 35,000 acres (yielding about 275,000 bushels) was grown annually. Milled into flour in the early years, but increasingly used as a livestock feed, the grain never played an important role in the state's farm economy. After World War I, production declined from its nineteenth century level. Grown mostly as a supplemental feed for livestock and poultry in the twentieth century, buckwheat cultivation was concentrated in the central and western counties (with the greatest acreage reported in Waushara and Adams counties).

At about the time that buckwheat was beginning its long decline, one of the state's newest crops was gaining favor. Introduced in the teens and twenties, soybeans were first interplanted among other feed crops, and their production remained quite small until the drought and Depression years of the 1930s when the crop was enlisted as an emergency feed for livestock. In 1930, only 14,000 acres were planted; four years later, over 250,000 acres were grown. After the Depression, the crop declined, but at mid-century its popularity was renewed. As the century wore on, soybeans were increasingly planted in separate fields, with the crop divided almost evenly between acres planted to feed and those planted for the bean; the remainder was used for forage or silage. Soybean acreage at the mid-century was concentrated in the west central counties (especially Dunn and Trempealeau) and the south-central counties (especially Rock) (Ebling 1948:47).

Field peas and various root crops also served as fodder for the state's livestock. Peas were considered a particularly suitable feed for fattening hogs, while roots like mangel-wurzel beets and rutabaga turnips were cheaper than dry grains and excellent feed for sheep, cows, and hogs. To store roots, farmers often constructed stone cellars. At times, these were separate structures, other times they were located beneath a house or barn. In some instances, "root houses" were built in lieu of cellars. These low rectangular structures were constructed of rough boards, their thick walls packed with dirt and covered with sawdust.

PASTURAGE

Historically, pasturage has occupied a large part of Wisconsin farmland, and was a critical factor in the rise of dairying and livestock production. Although pioneer farmers too often ignored the cultivation of tame grasses, insufficient spring rainfall and a cool climate ensured extensive pasture lands. In every county, pasturage (including pastured cropland,

woodland, swampland, marshes, and hillsides) has accounted for a significant percentage of total farmland--approximately 40 percent since the 1920s. By 1944, however, nine counties (Crawford, Florence, Forest, Iowa, Lincoln, Marathon, Richland, Vernon, and Washburn) had more than 50 percent of their farmland in pasture, and only one county (Milwaukee) had less than 20 percent of its farmland in pasture. Southwestern Wisconsin (where permanent grass lands, steep hillsides, and overflow lands along streams accounted for much of the pasture), leads the state in pastured farmland. In northern Wisconsin, pasture, much of it woodland, exceeded cropland in 1944, while the eastern and southern counties had the lowest percentage of farmland in pasture (Ebling 1948:20).

FEED CROPS AND SILOS

The story of silo development in the late nineteenth century is an integral part of the dramatic upsurge in feed crop cultivation. By providing inexpensive storage for nutritious, succulent green fodder--usually corn, sometimes clover or alfalfa--the dairy farmer could milk his herd through the winter, thus realizing more consistent profits from reduced feeding costs and increased milk production. So essential was the silo to dairy farming by the early twentieth century, that University of Wisconsin officials considered it "an indispensable adjunct to successful farming" (Knapp 1905:6). The impact of silage on the cultivation of feed crops was clear. Corn cut for silage could be grown well to the north of the traditional belt of southern corn-growing counties. By 1895, Fritz Woll of the College of Agriculture further outlined the impact of silage on feed crop cultivation:

Because corn could be cut earlier for silage, land could be cleared and seeded again to grain or grasses; crops normally unfit for hay making could be preserved in the silo and turned into acceptable feed; where hay making was precluded by late crops, the silo could preserve the crop and its full value as a feed would be retained (Lampard 1965:161).

The use of underground structures to preserve grain for winter consumption is millenniums old. But during the mid-nineteenth century, the preservation of annual forage, or ensilage, in earth-covered pits, sometimes lined with wood or cement, was studied in central Europe, especially Hungary and France. When the United States Department of Agriculture published the first American article on the subject in 1875, it inspired at least one Wisconsin farmer--Levi Gilbert of Fort Atkinson--to experiment (in the summer of 1877) by digging a trench six feet wide, six feet deep, and 30 feet long, filled with green corn fodder and alternate layers of rye straw. The result proved encouraging: Gilbert wintered three cows for the previous price of one (Lampard 1965:156). More widespread interest, however, resulted from the 1877 French publication of Auguste Goffard's study of pit silos (translated into English the following year) "which laid the foundation of all modern practice" (Fish 1924:161). By 1882, the USDA reported 91 pit silos in the nation, three of which were in Wisconsin--one each on the farms of Henry Lapham and L.W. Weeks, both of Oconomowoc, and one on the University of Wisconsin farm in Madison (Apps 1977:109). From these rudimentary beginnings, silo technology went through a 30 year period of experimentation, often encouraged by the University of Wisconsin College of Agriculture, spread through the bulletins of the Extension Service and the classes of the Farmer's Institutes of the late nineteenth century. The limitations of earthen pits were soon addressed by erecting wooden structures over them.

Soon, above ground square silos, constructed of stone or wooden stave, were proven more effective for storing ensilage than trenches or long, narrow buildings. The first above-ground silo in the state was built by Dr. H.S. Weeks of Oconomowoc, whose stone and cement silo (12' deep) was extended by a "wooden superstructure, double boarded on the inside, bringing the entire depth to about 20 feet." Week's experiment proved that above ground silos would not be damaged by frost. Almost simultaneously with Weeks, John Steele of Adderly, Dodge County, built a stave silo of 23' depth (12' above ground).

In 1881, Steele (a state legislator) helped the University of Wisconsin acquire state appropriations to experiment with rectangular above-ground silos (Lampard 1965:157-158).

Square silos of stone or wood were built into the corners of barns so that the feed would be conveniently at hand. This technique also kept down initial construction costs. Most of the supposedly two thousand silos in Wisconsin in 1889 were of this type (Adams 1889:3). (Lampard believes this to be "an exaggeration, since a silo census carried out by the Experiment Station in 1904 listed only 716, of which 87 were located in Dodge County. The first annual census in the state in 1915 reported 55,992, and by 1924 the number exceeded 100,000, making one each for about two-thirds of Wisconsin farms" (Lampard 1963:161-162).) After realizing that spoilage could be minimized by eliminating the corners within the silo, many square structures were modified to create an octagonal interior. The exterior of new structures soon reflected the interior shape, but it was not until 1891, when F. H. King of the UWAES publicized the advantages of the round silo that the silo began to assume its present form.

Franklin H. King did not invent the round silo. Mention of the merits of the form was made as early as 1882 by the United States Department of Agriculture and in 1888 John Steele, an early builder and promoter of silage built a round silo on his farm near Alderly, Dodge County. In 1889, two years before the advent of the King Silo the UWAES recognized that "theoretically a circular silo comes the nearest to perfection" because it required a minimum of materials and eliminated the corners in which silage spoiled. However, they admitted that "as we have had no experience with this form of building nothing can be said about it at this time" (Adams, 1889:6). King provided that experience. After a lengthy study of silos in the Midwest, he designed a functional round silo that could be built by almost any farmer. With building plans disseminated through the UWAES bulletin, it "marked an epoch in silo building" (Knapp 1905:12).

The basic design of the King silo was substantial, but far from perfect. Silage acids caused the wood lining to deteriorate quickly and the curved exterior clapboard pulled away from its fastenings. The Gurler silo improved upon the finishing phases of the King by lining the interior with cement. Designed to be placed inside another building, the exterior clapboards were replaced with widely spaced wood hoops that were added for strength. If meant to be placed outside, the exterior was sheathed with beveled siding for strength and to protect the silage from freezing (Knapp 1905:14-26).

Other round silos, of primarily wood construction, quickly appeared. Stave silos were probably the most popular. They were inexpensive and fairly easy to construct; by the turn of the century they could be bought as pre-cut packages ready for assembly. But these were not substantial buildings. Like a wooden barrel, they had to be kept moist or fall prey to raking and twisting. They also rotted quickly and were easily toppled by Wisconsin winds. One solution to this problem was the so-called Minneapolis silo. It consisted of a round heavy timbered frame filled-in with panels that fit into grooves channeled into the frame. If one or more boards rotted, the weaker cousins could be removed, the older boards driven down, and new boards inserted in the top. This silo resisted warping because the short boards, without nails or metal hoops which expand and contract at a different rate than wood, were used. The heavy timbered frame easily resisted strong winter winds.

These are a few of the many advances and changes made in silo design over the course of a few years. The silos described above were generally constructed of wood, but almost every other construction material has been utilized: stone, brick, tile, iron, concrete, cement block, and fiberglass. Some have been reinforced with steel hoops, bands, mesh, or wire. The Christensen silo combined several of these methods of construction to solve the problem of frozen silage. A patent silo invented by J.P. Christensen of Oshkosh,

Wisconsin in 1903, it is constructed of brick inside and out. The outer wall is reinforced with steel bands imbedded in the masonry above the header courses and hidden from view and the weather. By leaving openings in the header course alternately at the front and back of the silo, the dead air space between the brick walls creates a flue. Fireplaces built at the back of the silo could be fired during cold periods to provide warm air circulating through these flues to prevent the silage from freezing. Other variations in silo construction included wood silos with vertical, rather than horizontal board linings, stone silos with wooden jackets, and brick lining or veneers over wood or stone silos.

Monolithic (poured) concrete (reinforced with wire mesh) silos became increasingly popular after 1905. "To encourage the development of permanent structures of this type, but more particularly to aid in the development of the cooperative spirit among neighbors, the [University of Wisconsin Agricultural] Extension Service has built eight sets of galvanized-iron-lined wooden forms, which have been loaned to farmers in communities. At a rent varying from \$7 to \$10 each, depending on the number of farmers cooperating in the circuit, a set of forms is sent to the community, with an instructor to show the farmers how to erect the first silo" (Russell 1910-11:44). Steel-rod-reinforced concrete block silos soon superseded poured concrete ones; they were easier to build and the hollow blocks provided the dead air space necessary to keep silage from freezing without additional construction. Various interlocking methods have been invented over the years, including dove-tail mortice-and-tenon, concave/convex cement staves, and ribstone staves. In addition, many cement stove companies invented their own technique. Recently, of course, the introduction of pre-formed fiberglass Harvistores have begun to supplant concrete silos.

IDENTIFICATION

Resource Types. Historic resources associated with feed crop cultivation are located on the farm itself where the crop was planted, harvested, and consumed; at the experimental farms of the University of Wisconsin; and at the homes of significant farmers or agricultural advocates. In addition to houses and barns (which stored a variety of grains, hay, and cured fodder), resource types include silos, granaries, corn cribs, oat bins, and other storage structures.

Locational Patterns of Resource Types. Resources associated with feed crop and grain cultivation are almost wholly located on the farms themselves. However, structures associated with marketing the crops may be found in small or large communities.

Previous Surveys. No previous surveys have systematically identified actual sites or types of structures associated with feed crop and other grain cultivation, although agricultural buildings of a wide variety were identified in the Mequon, Menomonee Falls and Green County intensive surveys.

Survey and Research Needs. Because little information exists regarding the type and location of structures associated with feed crop and grain cultivation, research and survey information must be directed toward two basic goals: 1) systematic perusal of the publications of the University of Wisconsin Agriculture Extension Service, Wisconsin Department of Agriculture, Wisconsin State Agricultural Society, and Wisconsin Dairymen's Association to study the prototypes of agricultural structures disseminated by these groups and 2) field surveys to identify extant structures associated with the crops.

EVALUATION

National Register Listings and Determinations of Eligibility

Daniel Pond Farmhouse, Town of Rutland, Dane County (NRHP 1980)

Hiram Smith Hall and Annex (1891,1909), 1545 Observatory Dr., Madison, Dane County (NRHP 1985)

Horticulture and Agricultural Physics and Soil Science Building (1896,1915), 1525 Observatory Dr., Madison, Dane County (NRHP 1985)

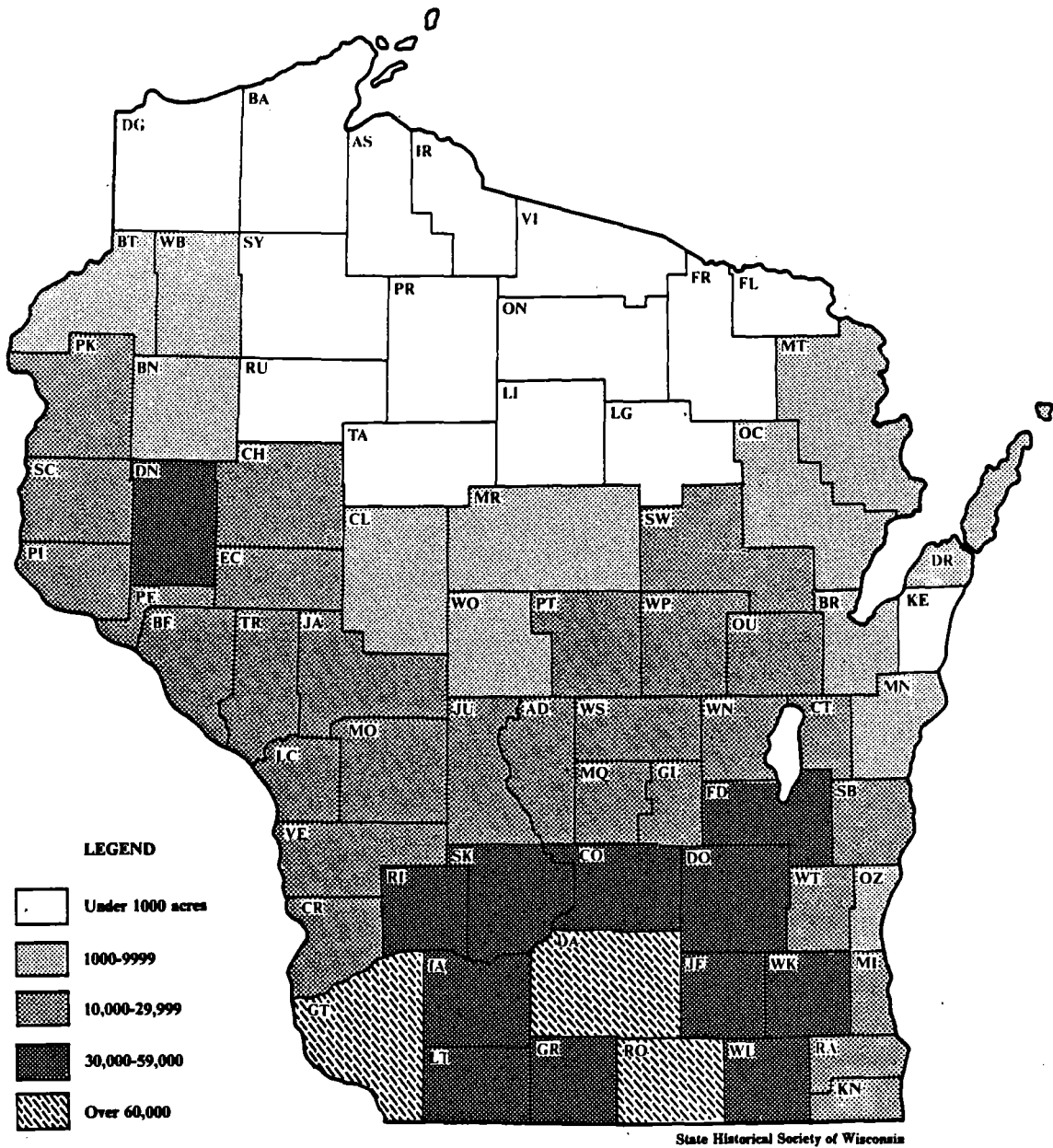
Pilgrim Family Farmstead (1850s), Town of West Kewaunee, Kewaunee County. (NRHP 1979)

North Hall, University of Wisconsin-River Falls (1914,1927), Third St., River Falls, Pierce County (NRHP 1986)

Context Considerations

Outbuildings associated with this study unit should reflect a major aspect of a farm operation. If located on farms, the entire farm should be evaluated as a district. Ideally, the buildings will not reflect subsequent uses different from their original purpose associated with feed crop and grain cultivation.

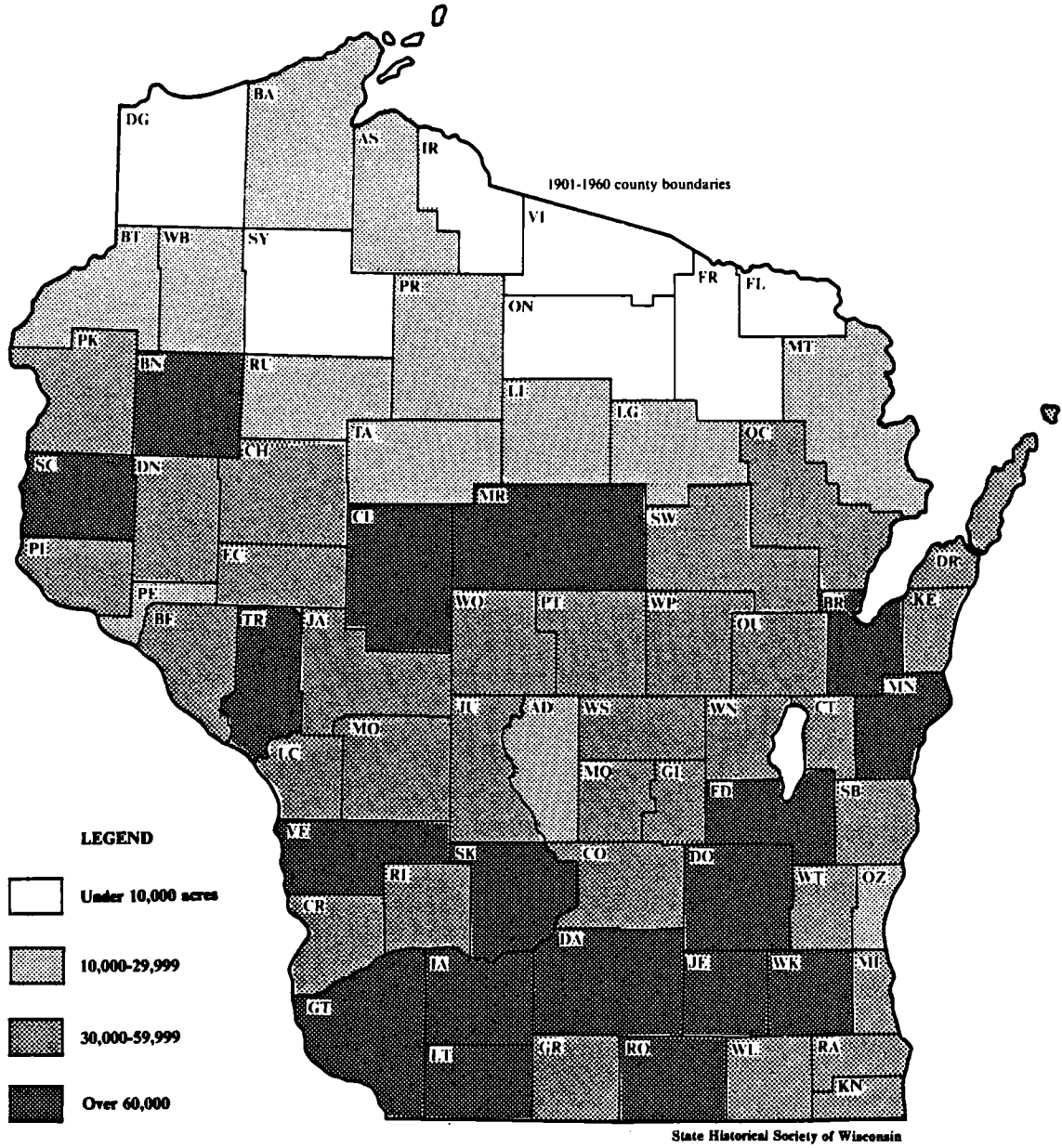
FEED CROPS AND GRAIN CULTIVATION



Acres of Corn Planted, 1910

Source: Thirtieth Census of the United States, 1910: Vol. VII, Agriculture, pp. 928-934.

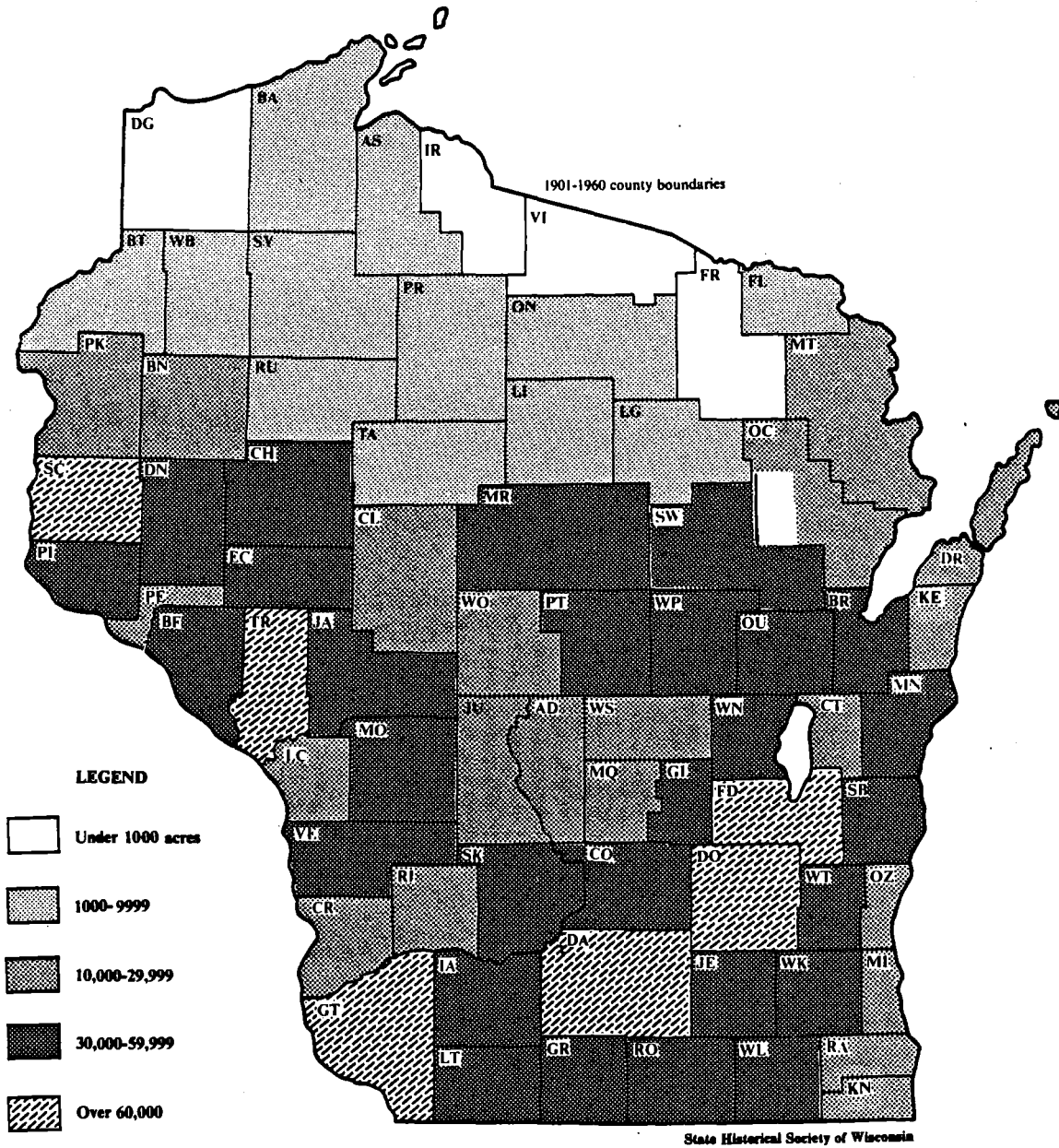
FEED CROPS AND GRAIN CULTIVATION



Acres of Hay Planted, 1910

Source: *Thirteenth Census of the United States, 1910: Vol. VII, Agriculture*, pp. 928-934.

FEED CROPS AND GRAIN CULTIVATION



Acres of Oats Planted, 1910

Source: *Thirteenth Census of the United States, 1910: Vol. VII, Agriculture*, pp. 928-934.

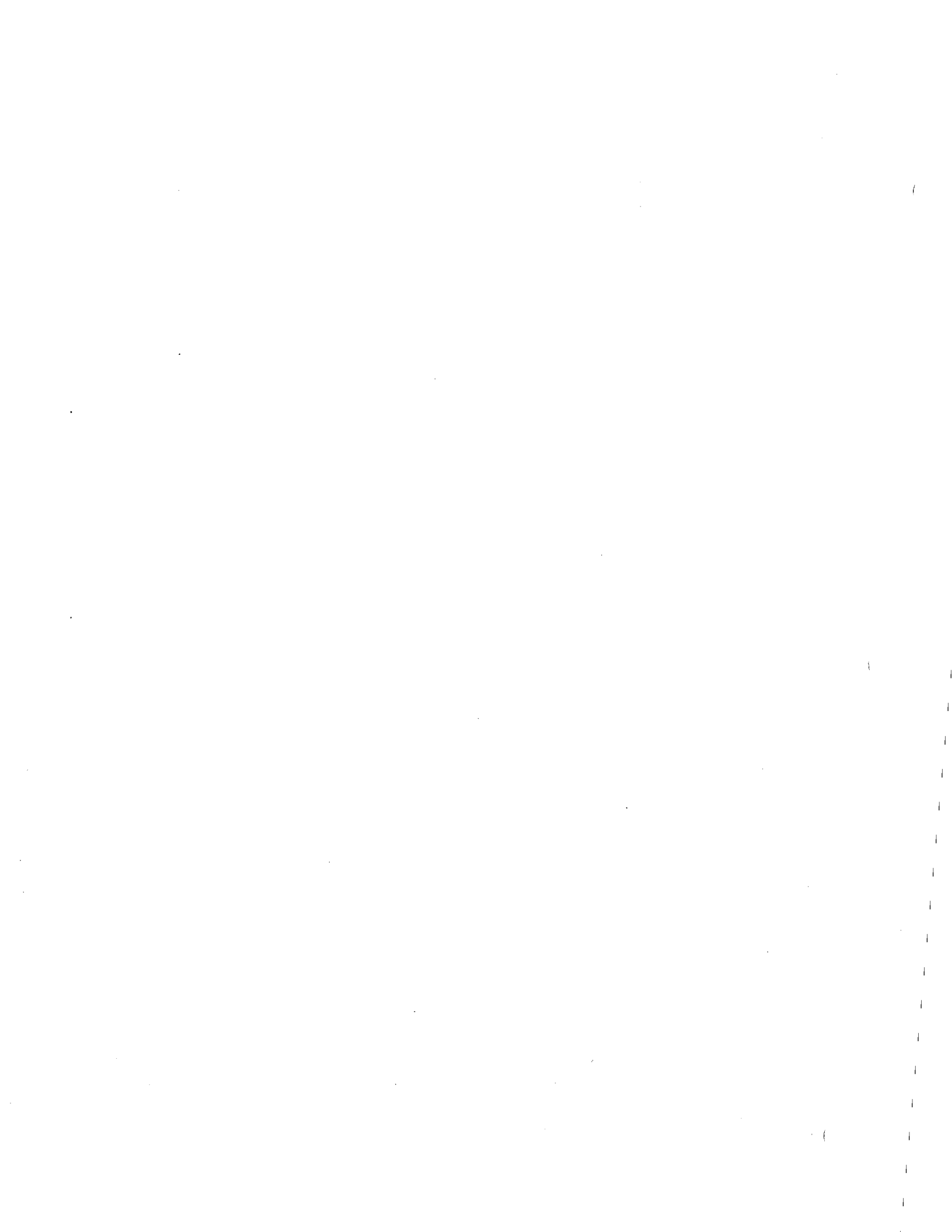
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FRUIT AND VEGETABLE CULTIVATION

Crops: Potatoes, peas, beans, corn, beets, cabbage, apples, cherries, strawberries, cranberries.

Temporal Boundaries: 1880 - present.

Spatial Boundaries: Entire state, with concentrations in the central, north-central and east-central counties.

Related Study Units: Fruit and Vegetable Processing.

HISTORICAL BACKGROUND

While grown in small amounts for home consumption on nearly every Wisconsin farmstead since the earliest years of settlement, the commercial cultivation of fruit and vegetables did not emerge as a significant element of Wisconsin agriculture until the last years of the nineteenth century. So great was the sudden upsurge in production, however, that by the first decade of the twentieth century, Wisconsin farmers ranked among the nation's leading producers of potatoes, peas, beans, cabbage, cranberries, cherries, and other foods for market and processing. The dramatic increase in commercial cultivation between 1890 and 1930 did not reflect a widespread phenomenon. Instead, large scale fruit and vegetable farming remained confined to a small and localized fraction of the state's total farmland (especially concentrated in the central, north-central, and east-central counties) and accounted for a correspondingly low percentage of the state's total farm income. Overshadowed before 1880 in most counties by an abundant wheat crop and later by the dairy industry, fruit and vegetable farming found profit only in those regions where soil and climate conditions made other crops less attractive.

The earliest fruit and vegetable production was neither so concentrated in location, nor so potentially rewarding. Small vegetable gardens and orchards were a regular feature of pioneer farming, spread evenly across the state following the line of agricultural settlement. Early vegetable gardens included patches of potatoes, melons, cabbage, onions, pumpkins, peas, beans, and cucumbers. Small farm orchards included a few fruit trees. Some cultivators considered gardening and horticulture important household arts. But the harvest figured more as sustenance than as a source of cash. Most of what was grown was consumed on the farm, with an occasional surplus bartered at the local general store or sold to neighboring families. The growth of cities and villages at mid-century provided some opportunity for truck farming within the shadow of cities, but pressure from the lucrative wheat market eclipsed the development of other cash crops, and large scale production in the settled counties remained devoted to grain. Early pleas for more balanced farming (trumpeting the soil enriching qualities of legumes and the healthfulness of horticulture) were issued regularly by the Wisconsin State Agricultural Society and the companion State Horticultural Society as early as the 1850s. But pleas were not as convincing as money. By 1860, 60 percent of farm income in Wisconsin was derived from the sale of wheat alone. Farmers followed the promise of profit. Agricultural settlement moved with the wheat frontier in a northwesterly line across the state, largely bypassing the central and northern counties where cool climates and light soils would have favored fruit and vegetable production. Indeed, acreage devoted to those crops rarely exceeded one percent of the state's total farmland throughout the nineteenth century.

The transition from a wheat to a dairy economy did not substantially open new acreage to commercial fruit and vegetable production. The feed crops required by dairy farming

placed a premium on farmland. By 1890, 40 percent of all farmland (and 90 percent of land actually planted to crops) was devoted to cereals and hay, a figure sustained through the twentieth century as farmers increased their production of feed. By 1944, nearly 95 percent of Wisconsin's cropland was devoted to feed and forage; less than 2 percent was used in the production of fruit and vegetables. With crop output increasingly processed in the form of livestock products, income from cash crops dropped to less than 10 percent of total farm income in 1932 (Ebling 1948:18,116). That pattern of agricultural development left little room and less incentive for widespread commercial production of fruit and vegetables.

But if statewide production of fruit and vegetables was limited in the late nineteenth century, growing concentrations of the crops dominated agriculture in the counties of the central and northern regions of the state. Neither the time nor the place of this concentration was accidental. The north-central counties--stretching roughly from Door in the east across the central plains of Waupaca, Portage, and Marathon, dipping south to include Green Lake, Waushara, Waupaca, Juneau, Adams, and portions of adjacent counties, and extending northwesterly to Chippewa, Barron, and Dunn--were not intensively farmed until late in the nineteenth century after the wheat frontier had passed from the state. (Adams, Barron, Chippewa, Clark, Door, Jackson, Juneau, Marathon, Polk, Portage, Shawano, and Wood had less than 50 percent of their land in farms until between 1880 and 1910) [Ebling 1948:111]. Developed after more accessible or profitable lands were taken, these counties boasted a combination of light soil, cool climates, and just as importantly, little competition from other crops.

Thus, the geography of commercial fruit and vegetable production assumed a profile far different than the pattern of general agricultural settlement. The three central counties of Portage, Waushara, and Waupaca, for example, accounted for nearly 30 percent of the state's potato acreage throughout the early twentieth century, while two counties accounted for over 40 percent of the state's pea acreage and four counties accounted for most of the state's bean acreage in 1910 (Ebling 1948:90). As production concentrated, harvests soared. Potato acreage in Portage County, for example, increased 300 percent between 1890 and 1910 (the second greatest acreage of all counties nationwide); bean acreage in Columbia county rose dramatically between 1900 and 1910. Similar concentrated booms occurred with other fruits and vegetables (Ebling 1948:90).

Throughout the period, production benefited from the experimental work of the University of Wisconsin College of Agriculture. As early as 1890, the University was growing fruit and vegetables on trial farms and orchards. The State Board of Agriculture (later the Department of Agriculture) carried forward the work of the State Agricultural Society after 1898, and studied varieties, disease and pest control, soil fertility, and standard grading procedures (Norgood 1924:482).

The abundant crops thus produced exhausted the available pool of local labor and far outstripped the demands of the local market. To bring in the crop required thousands of laborers--men, women and children recruited to the fields each summer and fall, creating communities of seasonal workers. These harvests found ready markets, however. By the 1890s, rail transportation carried products from the central plains to the cities of Milwaukee and Chicago and to the northern lumber camps as well. In addition, an upsurge in food processing plants located in the region itself--vegetable and fruit canneries, pickle and starch factories, sugar beet refineries and the like--provided a new, nearby market for crops in the early twentieth century (see Fruit and Vegetable Processing study unit).

As the markets for Wisconsin crops grew in complexity as well as distance, an extensive marketing network developed, utilizing warehouses, middlemen, and agents in an effort to capitalize on the cycles of supply and demand. Even then, however, the farmer was not guaranteed a good return. In response, cooperative organizations formed to protect the

farmer from the vagaries of the marketplace and the surcharges of middlemen. Such cooperative ventures arose among the growers of nearly every crop. Common goals included cooperative storage and marketing, maintenance of uniform quality, and fair prices. By 1916, the Division of Markets of the Department of Agriculture established grading procedures for potatoes, cabbage, strawberries, cherries and other crops (Norgood 1924:482). The result of large scale production and integrated marketing was big business. By the twentieth century, the products of commercial fruit and vegetable farming were a major facet of agriculture in the dairy state.

POTATOES

Potatoes were a basic source of food for mid-nineteenth century farmers. The earliest concentration of the crop emerged, not surprisingly, in the south and southeastern counties where settlement was heaviest and urbanization provided a convenient market for surplus. Between 1850 and 1870, potato acreage increased nearly four-fold (from 13,000 to 62,000 acres), reflecting both the spread of settlement across the state and the upsurge in the population of the southeast, with the largest acreages reported in Rock, Dane, Dodge, Waukesha, and Walworth counties. Yet, despite increased acreage, potatoes grew on less than one percent of all Wisconsin farmland between 1848 and 1880 (Ebling 1948:28,90).

Against that backdrop, potato production in the 40 years after 1880 can only be described as phenomenal. Between 1880 and 1890, as agricultural development intensified in the sandy plains of the central counties, a dramatic new concentration of potato production took shape. While potato acreage in southern counties grew slowly during the period or actually declined (as in Rock County where potato acreage decreased 35 percent), the potato fields of Portage, Waupaca, and Waushara counties posted tremendous increases. Between 1870 and 1890, for example, Portage County recorded an 800 percent increase in potato acreage. During the same period, Waupaca's potato acreage grew 1,000 percent. Together with Waushara, the three counties, which in 1870 constituted 0.5 percent of the state's potato acreage cultivated 20 percent of the state's 1890 acreage (Ebling 1948:90). The concentration of potato farming reflected the favorable conditions of the region: sandy, well drained soil that did not harden upon drying; cool summer nights; and available acreage not yet devoted to other crops. In addition, the northwoods lumber camps and the state's growing cities provided strong markets.

By the 1890s, potatoes were grown in every county of the state (with sizable acreage found in heavily populated Milwaukee and Waukesha counties), but large scale production was clearly centered in Portage County, a position maintained in the twentieth century. Between 1900 and 1920, potato acreage in Portage, Waupaca, and Waushara counties continued to climb dramatically and accounted for nearly one-third of the state's total acreage. By 1910, a new, secondary potato region emerged in the north as well. Centered in Barron, Chippewa, Dunn, and Marathon counties; it was encouraged by disease free soil and the agricultural development of the "cutover" region. That year, 11 north-central and central counties--Barron, Chippewa, Dunn, Juneau, Marathon, Marquette, Portage, Sauk, Waupaca, and Waushara--produced about one-half of the state's potato crop (Ebling 1948:90).

If limited in area in the early twentieth century, the potato crop was bountiful on a large scale. From 1900 to 1930, potatoes were the state's chief cash crop. Wisconsin ranked third among states in potato production; Portage County had the second greatest acreage of all the nation's counties. Marketed in Chicago, Indiana, parts of the Midwest and the upper South, Wisconsin potatoes accounted for one-fourth of the nation's interstate trade in the crop by 1915 (Taylor 1915:2).

Like most commercial fruit and vegetable crops, harvesting large quantities was labor intensive, requiring hundreds of men and women (often brought to the fields from miles

away), as well as children (home from school for the annual "potato vacation"). Once harvested, most farmers stored the crop in their own storage cellars or in the cellar of a neighboring farmer. Although smaller cellars were located beneath the farm house, large cellars (often stone) were separate rectangular structures, measuring up to 25' by 50'. They were often built into a hillside and had a gable roof superstructure of stone or frame above the cellar which contained bins for the storage of potatoes until marketing. Ventilated by small openings, the shed was entered by wagon through two large doors on either end. The crop was dropped through chutes in the floor to the bins below. The floor of the shed (the ceiling of the cellar) was typically constructed with 2" by 8" joists covered with matched lumber flooring on both the upper and lower sides. The space between was filled with sawdust insulation. Stoves kept the temperature above freezing in winter. Smaller root cellars were used for the storage of seed potatoes (Apps 1972:124).

Other farmers stored their potatoes in a commercial warehouse before shipment. The warehouse system was an integral part of marketing Wisconsin potatoes. Farmers would haul their crop to these railside structures, and agents or middlemen would grade, price, and purchase the potatoes. From here, the crop would be shipped by rail to markets in Chicago and elsewhere. The largest warehouses (in cities like Stevens Point and Wautoma) were large multi-storied brick structures that could store surplus potatoes to regulate supply during times of shortage. In some cases, warehouses were operated on a cooperative basis to protect against the uncertainties of distant markets or unscrupulous middlemen. But smaller warehouses, actually railside storage sheds, were simply one story, gable roofed, stone or frame storage sheds used to store the crop for a few weeks until shipping. Often owned by a local merchant, or run in conjunction with a mill or other storage facility, they were essentially ancillary structures in the larger marketing process.

Before their marketing, potatoes were sorted (with the best of the crop saved for seed) and hauled to the nearest shipping center. This was normally undertaken in the fall or spring, although potatoes were marketed throughout the year--whenever the farmer needed cash. It was at the shipping centers--Stevens Point, Hancock, Wild Rose, Plainfield, Wautoma, Waupaca, Barron, and later Antigo and Rhinelander--that the intricate marketing system was called into play, with potatoes sorted, graded, bought, or stored in the railside warehouses to adjust supply. The potato farmer made or lost his fortune on the dealings that transpired there (Taylor 1915:1-6). So great was the supply of potatoes hauled to shipping centers in certain years of the early twentieth century that one observer noted "the yield can only be handled by warehouses," which could store excess supply in anticipation of future demand, or guard against the periodic potato blights which drastically cut production (Campbell 1913:467). To facilitate marketing, cooperative associations were formed to operate warehouses, grade potatoes, and supervise the marketing procedure.

1922 was a bumper year for Wisconsin potatoes, with a record yield exceeding 38,000,000 bushels grown on over 300,000 acres. After that, potato production declined throughout the state except in a new potato district centered in the Antigo area which continued to expand during the 1930s. However, decline in the Portage County area after World War I was so steep that increases in Langlade, Marinette, and Marathon counties could not make up for the loss. In 1940, the state's harvest had slipped to seventh place nationally with fewer than 100,000 acres in production (an amount smaller than that reported in 1882). By the mid-twentieth century a new concentration appeared still further north in Vilas and Oneida counties (centered in the Rhinelander area) fueled by the cultivation of new soils and supported by price supports instituted during World War II (Espeseth 1952:56). However, potato blight, high labor costs, and increased competition from the potato fields of western states made potato farming increasingly less attractive for all but the largest growers in the state.

VEGETABLES FOR PROCESSING: PEAS, BEANS, CORN, BEETS, CABBAGE

Several major vegetable crops have been grown on a commercial scale for processing since the late nineteenth century in Wisconsin, most importantly green peas, sweet corn, cucumbers, snap beans, lima beans, and beets. Like potato patches, small garden plots appeared uniformly across the state in the nineteenth century, increasing proportionately with the spread of settlement. An early but substantial cash crop of peas and beans for fresh market sale had developed by 1880 in Door, Kewaunee, Sheboygan, Manitowoc and other lakeside counties. But nationally significant concentrations of large scale production did not appear until the turn of the century when commercial production surged in the central counties of Columbia, Dodge, Fond du Lac, Green Lake, Marquette, and Waushara, where light soil and cool climates proved conducive to canning crops. Since the early twentieth century, Wisconsin has led the nation in the production of vegetables for processing (Bufton 1958:1).

Environmental conditions were not the sole reasons for the boom. More important to the upsurge in production was the development of canning technology at the turn of the century and the concurrent growth of canneries throughout the state. The earliest Wisconsin cannery did not appear until 1887 when Philadelphia seedman Andrew Landreth, impressed by the quality of peas in the lakeshore counties, purchased land in Manitowoc and built a factory to process the peas he grew (Stare 1952:35). Although not early by Midwestern standards--nearby states had canneries 10 to 20 years before--Landreth's plant, and the branch operation he established in Sheboygan in 1890--set an important precedent. William Larson was the first to follow suit, when he established a canning factory in Green Bay, supported by the production of 2,500 acres that he owned, and by the labor of thousands of women and children whom he employed during picking season (Stare 1952:35). In the 1890s, when the University of Wisconsin College of Agriculture began exploring proper preservation techniques and varietal improvement, these three factories were alone in the field; by 1915, 90 plants across the state processed peas, beans, sweet corn, and other vegetables. Sometimes owned by private corporations and sometimes managed by cooperative associations, canneries varied greatly in capacity and quality. Located near fields of production, canneries owned one-fifth of all processing pea acreage in 1920 and were numerically greatest in Manitowoc, Calumet, Sheboygan, Fond du Lac, Dodge, Columbia, Washington, Ozaukee, Jefferson, Dane, and Brown counties (Macklin 1921:4). So prolific were the operations of the canneries that by 1920, the state was packing one-half of the nation's total crop of canning vegetables (See Fruit and Vegetable Processing study unit).

The first and dominant vegetable grown commercially for processing in Wisconsin was the green pea. Before the onslaught of processing plants, concentrations of dry peas had been discernable as early as 1880 in Door, Manitowoc, and Kewaunee counties, where temperate lakeshore conditions boosted production. By 1906 (coinciding with the spread of canneries), canning pea production extended into the east-central counties of Columbia, Dodge, Fond du Lac, Green Lake, and Dane (where 70 percent of mid-twentieth century production occurred). By 1906, Wisconsin led the nation in peas grown for processing and the pea became the state's second most important cash crop after potatoes (Bufton, 1958:25). After World War I, acreage devoted to its production surged from less than 50,000 to over 150,000 by the 1940s (Ebling 1948:51).

Although grown in smaller amounts, snap bean production soared between 1900 and 1940 as demand from processing plants spawned new concentrations in the central and northern counties. By 1910, Columbia, Marquette, Waushara, and Green Lake counties dominated production, accounting for over 70 percent of the state's total bean acreage. From fewer than 2,000 acres in 1920, snap bean production expanded to more than 10,000 acres in the 1940s, with production moving northward into the cooler climates favorable to the crop (Ebling 1948:49). Lima beans first appeared commercially in the central counties in 1929 when 260 acres were grown; by 1947, 4,800 acres were harvested (Ebling 1948:101).

Sweet corn for canning expanded dramatically after World War II when hybrid varieties allowed early maturing breeds to be grown profitably in the central counties. Between 1920 and 1947, production expanded 1,000 percent, surpassing 100,000 acres in 1947. Since 1944, Wisconsin has been the leading sweet corn state in the nation, with heaviest concentrations in the east-central counties of Columbia, Fond du Lac, Dodge, and Green Lake counties (Ebling 1948:49).

By the early twentieth century, Wisconsin was a leading producer of cabbage for both kraut production and fresh market sale, with over 10,000 acres grown annually in the first decade of the century. Perhaps the most highly localized of all cash crops, large scale cabbage production was virtually limited to three major areas: Racine-Kenosha; Outagamie-Milwaukee; and Brown counties, with each region growing several thousand acres annually (Ebling 1948:51). By 1918, over 16,000 acres were grown statewide; that figure rose to 23,000 in 1930 and then declined due to increased competition from southern states. As early as 1914, Wisconsin led the nation in production, and cabbage growers organized cooperative warehouses to facilitate marketing the crop.

Cucumbers grown for pickles have been an important cash crop since the late nineteenth century, placing Wisconsin among the leading states in the production of pickles since the early twentieth century. Like other cash vegetables, the principal area of concentration was the light soil regions of central and northeastern counties (especially in Waushara, Portage, Waupaca, and Oconto counties). Average production between 1923 and 1943 ranged between 10,000 and 15,000 acres with peak harvests, recorded in 1925, 1930, 1937, and 1941, yielding more than 1,000,000 bushels. Harvested by hundreds of pickers, the crop was sent by truck to pickle canneries for processing (Ebling 1948:51).

Like sorghum production at mid-century, sugar beets were cultivated in the late nineteenth century for their sugar content. Although plans were drawn as early as 1863 for an Oconto County beet farm and refinery, the first plant in operation was started in 1868 by several German farmers who rented land near Fond du Lac and erected the refinery. It was one of the earliest attempts in the United States, but the operation lasted only a year and the proprietors moved the company to California. In the following few years a dozen such plants opened in southern and eastern counties, encouraging area farmers to plant a large sugar beet crop. The most successful of these early operators was clearly the First Sauk County Farmers Association for the Fabrication of Beet Sugar, a group of 30 German farmers who produced 134,000 pounds of sugar in their one year (1871) of operation. But success was ephemeral. A lack of beets and lack of capital caused all companies to close their doors by 1875 (Woll 1905).

At the turn of the century, renewed interest in beet sugar production was reported by the University of Wisconsin College of Agriculture, which itself had been researching the subject since the late 1880s. In 1896, a new factory opened at Menominee Falls, followed by plants in Chippewa Falls (1904), Janesville (1904), Menominee, MI (1903), and Madison (1906). Although sugar beet production in the nineteenth century was spread across 44 eastern, northwestern, and middle northern counties, the twentieth century crop was concentrated in about 20,000 acres stretching in a line from Dodge County up the eastern shore of Lake Winnebago to Green Bay with the center of production near Fond du Lac and the lower Fox Valley. A secondary concentration existed in the Kenosha-Racine area. Twenty-one thousand acres of Wisconsin farmland were planted to sugar beets in 1924; by 1948, however, only 10,000 acres of land produced beets for the two factories (one in Green Bay - the other in Menominee, MI) that remained in operation (Ebling 1948:50).

Vegetable crops associated with truck farming were grown in small amounts in the late nineteenth century. Less than 2,000 acres each of other vegetable crops--onions, lettuce, carrots, spinach--were grown for processing or fresh market sale by the mid-twentieth

century. However, "farmers' markets" were an important source of food in Wisconsin villages and cities in the nineteenth and early twentieth centuries. With the advent of "modern" grocery stores and highways, roadside fruit and vegetable stands gradually disappeared.

COMMERCIAL FRUIT PRODUCTION: APPLES, CHERRIES, STRAWBERRIES

Although fruit was brought to Wisconsin by the first settlers, pioneer horticulturalists soon discovered that varieties from New York and New England rarely withstood the climatic hardships of Wisconsin winters. Discouragement soon led to disfavor among farmers leery of the unproven crop.

In 1854, the Wisconsin Fruit Growers Association was created to dispense mutual aid and encouragement among the state's fruit producers. Over the next 50 years, it attempted to discover the varieties and techniques that would make fruit growing a profitable enterprise and to dissuade skeptical Wisconsin farmers, such as Judge Elisha Keyes, who claimed that the "Omnipotent fiat was pronounced long ago that Wisconsin was not a fruit growing state and whoever put in his time in this state, and his money, would be sure to get no returns" (Wisconsin State Agricultural Society 1889:362).

Traces of progress countered that prevalent belief before the Civil War. In 1854, for example, farm orchardists displayed nearly 100 varieties of apples, pears, peaches, grapes, and quinces at the State Fair in Milwaukee. Local fruit growers organized societies in Milwaukee (1855) and Madison (1858). But severe winters in the late 1850s, followed by the Civil War, forestalled real progress and the Wisconsin Fruit Growers disbanded in 1859 (Wisconsin State Horticultural Society 1943:9).

After the war, the effort to discover a limited, profitable list of hardy varieties expanded. Reorganized in 1865 as the State Horticulture Society, Wisconsin fruit growers met annually to discuss the progress and impediments of home and early commercial orchards. It was there that pioneer fruit growers established, through a method of trial and error, several varieties that survived the pests, blights, and severe winters of the 1870s and 1880s. Local horticultural societies assisted the individual grower. The first post-Civil War groups formed in Janesville (1866), Grant County (1867), Kenosha (1867), and Oshkosh (1868). The University College of Agriculture also pledged assistance, via a trial orchard, as early as 1868 (Wisconsin State Agricultural Society 1943:9,68). But the private experimental endeavors of growers lay at the heart of efforts to establish commercial fruit growing in Wisconsin. In 1899, the Horticultural Society acknowledged that success would be "built upon the failures of past years. For among the masses of [farmers] horticulture... suggests ruined hopes and dead orchards" (Wisconsin State Horticultural Society 1943:21).

By the close of the nineteenth century, systematic advances held promise for commercial fruit growing. Most importantly, the University appointed its first professor of horticulture (E. S. Goff) in 1889. The next year, the Horticultural Society joined with Goff to establish a series of trial orchards in Sparta (on the farm of M. A. Thayer), Ithaca (on the farm of A. L. Hatch), and Weyauwega (on the farm of W. H. Hardin) to test varieties, propagation, and cultivation.

The orchards proved a boon to growers in each area, and trial orchards were soon established in Door County (1892), Wausau (1897), Poplar (1904), Maple (1906), Manitowoc (1907), Gays Mills (1907), Whitehall (1907), Lake Geneva (1908), a second at Sparta (1908), Pewaukee (1912), Baraboo (1912), and Holcombe (1913) (Wisconsin State Horticultural Society 1943:38). Testing varieties, disease control, and the like, trial orchards served as the nucleus for commercial fruit production in several areas. A. L. Hatch, for example, moved from his Ithaca farm to establish the trial orchard near Sturgeon Bay, thus leading Door County into its preeminent position in the state's

twentieth century fruit industry. Likewise, trial orchards in Gays Mills and Galesville spawned commercial production in those regions. By 1904, the Horticultural Society, already publishing a magazine and maintaining a Capitol office, appointed its first full time administrator.

Encouraged by experiments at the trial orchards, commercial growers increasingly specialized, limiting production to a few varieties of one fruit. By the first years of the twentieth century, it was clear that a limited variety of apples, cherries, cranberries, and strawberries would prove profitable in Wisconsin. Other orchard and small fruits, including peaches, pears, quinces, grapes, and plums, continued to be grown on a small scale (grapes, for example, were grown in the Fox Valley and Sauk County), but did not develop into important commercial crops.

Specialization resulted in increased production, harvested by thousands of laborers and sent via refrigerated railcar to distant markets or processed in the fruit packaging companies that appeared in fruit regions in the early twentieth century. As markets expanded beyond regional bounds, cooperative associations were organized throughout the state's leading fruit districts to encourage better horticulture, market surplus, and establish uniform standards. Wisconsin's first fruit cooperative, the Sparta Fruit Growing Association, was organized in 1897 to help commercial growers market their fruit without the intervention of profiteering middlemen. Within the next decade, strong cooperative and industry associations appeared in all the well defined areas of commercial fruit production. These groups included the Door County Fruit Growers Union, Sturgeon Bay Fruit Exchange, Bayfield Peninsula Fruit Association, and Washburn Fruit Growers Association (Campbell 1913:466). In other areas, farmers with home orchards established county fruit growers associations to collectively market any surplus. By the 1920s, these groups merged as the Southeastern Wisconsin Fruit Growers Association, headquartered in Waukesha (Kuehner 1943:76). Between 1913 and 1920, the University of Wisconsin College of Agriculture's Experimental Stations organized the first cooperative spray rings, wherein 10 to 12 farms would spray their orchards using machinery collectively purchased. By the 1940s, over 2,000 rings had been established (Kuehner 1943:76).

By the early twentieth century, commercial production of apples, cherries, and strawberries was concentrated in regions where climatic conditions were favorable. By 1910, commercial apple growing centered in three regions--Door, Bayfield, and Crawford counties--with other important commercial production in the Fox Valley, Trempealeau, Ozaukee, and Milwaukee counties (Moore 1911:3). By 1916, apple production had increased 700 percent from the turn of the century, and constituted 95 percent of the state's fruit crop. Most of these apples were marketed within the state, with only a small percentage sold outside Wisconsin.

Cherry production was generally limited to Door County, where the lake insured more stable temperatures and less frost than similar locations in the same latitude; a secondary cherry growing district also existed in Bayfield County. Wisconsin cherry growers harvested 4,500 tons in 1919. By 1946, the figure stood at 20,000 tons a year, which was sufficient to place Wisconsin among the top three cherry producing states in the nation (Ebling 1948:51).

Commercial production of strawberries began in the 1870s in the Sparta area, and although spread throughout the state, large scale production continued to be concentrated in Jackson, Monroe, and La Crosse counties (with a lesser industry in Bayfield and Door counties). Throughout the first half of the twentieth century, acreage devoted to strawberry production was reported at over 2,000 acres. Strawberries were the leading small non-orchard fruit in the early twentieth century (Moore 1915:3). The early cooperative marketing efforts of Sparta strawberry farmers led to the formation of the Sparta Fruit Growers Union, the earliest cooperative organization of fruit growers in the state.

COMMERCIAL FRUIT PRODUCTION: CRANBERRIES

The cranberry grows naturally in Wisconsin just as it does in much of the northeastern United States and in eastern Canada. Before commercial cultivation developed in the 1860s, the wild fruit was gathered from the bogs and marshes by landowners for their own use and for shipment to other parts of the country. The recognition of the cranberry's market value was institutionalized by state laws that prevented the possession of unripe fruit before a particular date--a law that was enforced in Waushara County in 1859 when eight persons were arrested for possession and bound over for trial. It was in the southeast corner of this county that the first cultivation of wild cranberries in Wisconsin probably occurred.

About 1860, Edward Sacket of Sacket Harbor, New York, arrived in the Berlin area to examine land he had purchased through agents only to find himself the owner of some 700 acres of "shaking bog." Included among the tangle were numerous cranberry vines which Sacket, drawing upon the knowledge of eastern growers, decided to cultivate. He built a warehouse to store the barrels of picked fruit and built dams and dug ditches in order to flood the land to prevent early frost damage. By 1865, he shipped 938 barrels of cranberries to Chicago at \$14 to \$16 per barrel. Four years later his sons shipped enough cranberries to quadruple their gross receipts to \$70,000. The Wisconsin cranberry boom was on.

The land north of Berlin, centering in the Town of Aurora in Waushara County, quickly developed into the major cranberry growing area in Wisconsin. Most of the cranberry marshland was located between the Carey Brothers farm, just outside of Auroraville at the northwest, and the Sacket farm at the southeast corner of the Town. The Carys and the Sackets were among the largest growers, a group which also included N. D. Rundell, Rounds and Company, and H. Spencer. By 1871 there was an active Berlin Cranberry Association.

In the autumn of 1871, the Berlin marsh burned. It had been parched by the same drought that helped cause the great fires in Chicago and at Peshtigo that year. Two years later, the Carey Brothers decided to insure an adequate supply of water by tapping nearby Willow Creek. They dug a mile long canal and encouraged the flow with two "water powers." It cost them approximately \$7,000. Ten years later, they dug a similar canal to the Willow from the northeastern edge of their marshland and installed a large, steam powered water wheel to overcome the slight incline to their property. In 1885, the Sackets followed suit by dredging a mile long, 40 foot wide by four foot deep canal to the Fox River. Two huge pumps purchased in New Orleans, each powered by its own boiler, were installed to siphon water from the river. But these remedies for an unsure water supply resulted in permanent damage to the marshland. The alkaline waters of the Fox and the Willow counteracted the natural acidity of the marshland, severely inhibiting cranberry development. When this major mistake combined with an alternating series of damaging frosts and high water which rotted the fruit, cranberry production was curtailed drastically. In fact, the 1880s canal efforts, constructed to help Berlin growers compete with the more profitable fields in the west-central part of the state, served only to hasten their decline.

Directly west of the Berlin region, another cranberry growing area developed in the early 1870s under very similar circumstances. Speculators, mostly from the Berlin area, heard of the quantities of wild cranberries that were being gathered in the area and bought marshland for cultivation. However, unlike the Berlin cranberry area, the marshes in Jackson, Juneau, Monroe, and Wood counties still produce high quality cranberries thanks in large part to the efforts of Andrew Searles. In 1873, about three years after the first serious efforts began, Jacob and Andrew Searles began cranberry cultivation near present-day Cranmoor in Wood County. As well as being successful growers, they became

active in the Cranberry Growers Association and in varietal cultivation. In 1893, Andrew Searles developed the varietal called Searles Jumbo. Today, it is used extensively in Wisconsin cranberrying, especially in the marshes developed in northern Wisconsin after 1900, and is propagated in many parts of the United States. In the meantime, "the Cranberry Growers Association delegated to Andrew Searles the task of investigating the possibility of artesian wells. He drilled at Walker, on the Bennett marsh, on the Arpin marsh, and at the experiment station, always without success. Windmills were tried, also with small success. Finally Andrew Searles dredged on his own marsh a two and a half mile ditch for water storage. This was a great step forward and since then many similar deep ditches have been dredged. Finally in 1933, the growers in the Cranmoor district constructed a canal twelve miles in length from the Wisconsin River at a cost of \$50,000. In most of the newer northern marshes, water for flooding is taken directly from natural lakes or streams. Sometimes such a stream is dammed to form a "reservoir" (Stevens and Nash 1944: 286). These northern marshes were cultivated after 1900. They are considered 'modern' because the beds were first prepared by ditching and sanding them with gravel, and then were planted with varietals only. These beds, located in Burnett, Washburn, Rusk, Barron, and Price counties, can be recognized because they contain no knolls as do many of the older beds.

Until the development of modern harvesting techniques, cranberry picking was done by literally thousands of laborers. Since many of them came more than a days travel time, the landowners were required to erect housing. Among the early Berlin growers, Rounds and Company had housing for 800 pickers and H. Spencer could house 100. By 1890, Andrew Searles was building a dance hall and providing part of the music for his pickers. By World War I, every fully equipped marsh was similarly equipped. Today, cranberry growing remains a substantial cash crop in Wisconsin, providing over \$20 million in receipts in 1979.

IDENTIFICATION

Resource Types. Like all agricultural endeavors, historic resources associated with fruit and vegetable production can reflect one of three broad phases of the agricultural economy: field cultivation, marketing, or processing. The structures related to field cultivation are found on the farm itself and include barns, storage structures, machinery sheds and other utilitarian structures commonly associated with every aspect of crop farming. Historic landscapes that reflect the unique geographical features of this type of agriculture and its associated structures may be important resources. Because of the limited "life" of fresh fruit and vegetables, most products were marketed soon after harvest and hauled to processors or shippers shortly thereafter. Limited storage was available on the farm in sheds, barns, or temporary shelters until ready for shipping. Other crops required on-the-farm storage in cool, controlled environments like root cellars. Specialized structures unique to this study unit include on-the-farm potato storage sheds and cellars. The cultivation of cranberries required its own special resources: canals, water wheels, pumping equipment, all related to the flooding of marshes. Other fruits and vegetables were stored in cellars, sheds, and barns. The harvest of fruit and vegetable production was labor intensive, requiring thousands of seasonal, sometimes migratory workers. To house the surge in rural population during "picking season" required boarding houses and other facilities associated with farm laborers. Because of the extensive marketing network for fruits and vegetables, many cash crops were stored in warehouses in the shipping and processing centers where the product was sorted, graded and made ready for shipping. Other structures associated with the marketing phase of production include cooperative association headquarters and the offices of buyers.

Locational Pattern of Resource Types. Resources associated with fruit and vegetable production are located on farms themselves while resources associated with marketing (warehouses) are found at shipping points near rail depots.

Previous Surveys. No previous surveys of sites associated with fruit and vegetable production exist. The Sturgeon Bay intensive survey identifies sites associated with the Door County fruit industry.

Survey and Research Needs. Information concerning structures associated with fruit and vegetable farming is somewhat addressed in technical documents relating to production. The University of Wisconsin Agricultural Experiment Station bulletins and Annual Reports and the State Department of Agricultural Bulletins contain guides to production methods. A close perusal may yield specific information on types and locations of structures associated with fruit and vegetable production. Field surveys are needed to identify actual properties associated with all phases of fruit and vegetable cultivation. It may also be possible to define specific cultural landscapes associated with fruit and vegetable cultivation.

EVALUATION

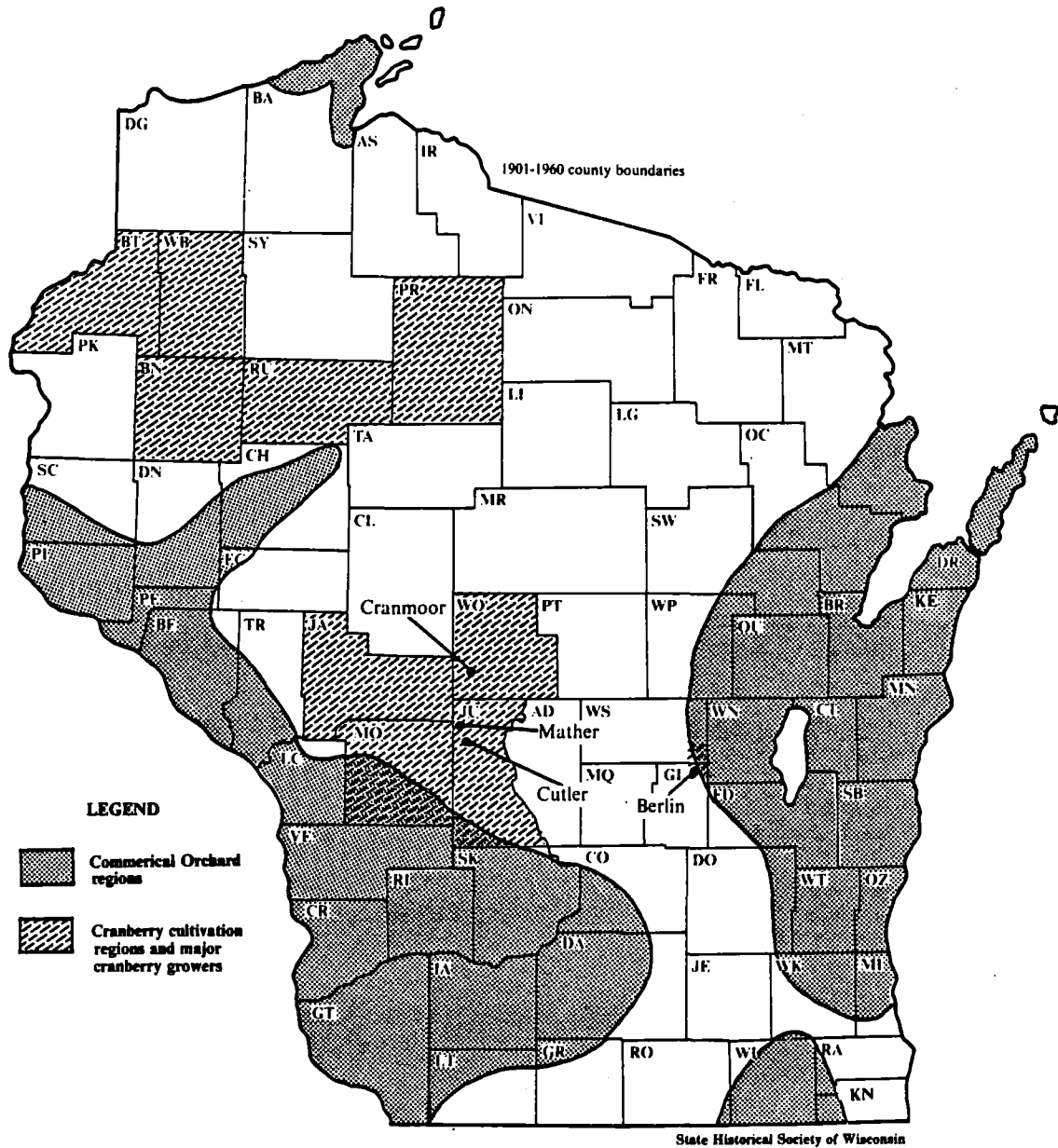
National Register Listings and Determinations of Eligibility

A.G. Tuttle Estate (1869), Town of Baraboo, Sauk County (NRHP 1980)
Kehl Winery, Town of Roxbury, Dane County (NRHP 1976)
Belle Cottage (1854), 1837 Center Ave., Janesville, Rock County (NRHP 1979)
The Lewis-Stare House (cannery owner), 711 W. James, Columbus, Columbia County
(NRHP 1982)

Context Considerations. Outbuildings associated with the study unit, if located on

farms, should be included as part of complexes. Ideally, the buildings will not reflect subsequent uses different from the fruit or vegetable cultivation use.

FRUIT AND VEGETABLE CULTIVATION



Commercial Orchard and Cranberry Cultivation Regions, 1880-1920

Source: Loyal Durand, "Wisconsin Cranberry Industry," *Economic Geography* 18 (1942): 159-172; L.R. Jones and E.T. Bartholomew, *Apple Rust and its Control in Wisconsin*, University of Wisconsin Agricultural Experiment Station Bulletin no. 257 (Madison, 1915), p. 15.

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SPECIALTY AGRICULTURE PRODUCTION

Crops: Tobacco, Maple Sugar and Syrup, Beekeeping and Honey, Ginseng, Hemp, and Mint

Animals: Fox and Mink.

Temporal Boundaries: 1860 to the present, with commercial production of some products (tobacco, maple syrup, sugar, and honey, for example) emerging before the Civil War, while others (hemp, ginseng, mint, and fur farming, for example) reached a zenith in the twentieth century.

Spatial Boundaries: Specialty agricultural production developed in all regions of the state by the twentieth century, but large scale commercial concentrations emerged in areas where climate and topography permitted alternatives to dairy or livestock farming. Tobacco cultivation was concentrated in two distinct regions of the state: the southern district containing parts of Dane, Rock, and Jefferson counties and the western (or northern) district including parts of Vernon, Crawford, Grant, Richland, La Crosse, Monroe, and Trempealeau counties. Hemp production was concentrated in the east-central counties of Dodge, Fond du Lac, and Green Lake. Mint has historically been cultivated on a large scale in Jefferson, Dodge, Marquette, Green Lake, and Waushara counties. Fur farming, while distributed statewide, is notable in the state's lakeshore counties (close to sources of fish) although one of the world's largest mink ranches is located on the outskirts of Janesville. Other specialty crops, supplementary to the family farm, are produced in nearly every county. Apiaries, for example, are found statewide with honey production greatest in the region between Lake Winnebago and the Door Peninsula where pollen producing plants and trees are abundant. Likewise, maple syrup is produced on farms across the state but is notable in north-central counties (like Marathon) where the cool climate and prevalence of maple trees favor such production.

Related Study Units: French, British, and American Fur Control, Early Specialty Crop Cultivation.

HISTORICAL BACKGROUND

Increasingly in the decades after the Civil War, dairy, livestock, and large-scale fruit and vegetable production dominated Wisconsin farms. Livestock products alone accounted for 80 percent of the state's farm income in the early twentieth century and had long since eclipsed the various cash crops (hops, flax, and sorghum) which were once seen as successors to wheat. (See Early Specialty Crop Cultivation study unit). But the diversity of Wisconsin topography and climate and the resourcefulness of the state's farmers gave rise to a few specialized products which gained a permanent foothold on Wisconsin farms beginning in the mid-nineteenth century. Often developed as a supplement to more familiar forms of farming, specialized production never contributed substantially to the state's total farm income. But certain products did provide a lucrative alternative agriculture, and Wisconsin farmers made significant contributions to the national production of such items as tobacco (after 1860) fox and mink fur (after 1920), and mint oil (after World War II). Other specialty products were more ubiquitous and less profitable; these were often common adjuncts to the family farm like honey and maple syrup production. In summary, it was the rare farm that was devoted exclusively to specialized agricultural production, and it was the rare farm that engaged in none at all.

TOBACCO

One of the earliest and most enduring of the state's specialty crops, tobacco was first cultivated on a commercial scale in the 1850s and boomed during the Civil War decade when the secession of southern states created a strong market for the crop. Like other pioneer efforts at diversified farming, the cultivation of tobacco provided a substitute cash crop in the wake of wheat's decline. (See Early Diversified Agriculture study unit for discussion of other crops). But unlike the cultivation of hops, flax, and sorghum during the Civil War, tobacco continued to be a significant crop in two distinct areas of the state. By the 1880s, the crop was grown across southern Dane and neighboring Rock and Jefferson counties. By 1910, a second area of production had developed in several western Wisconsin counties, including Vernon and Crawford. Tobacco cultivation followed the ups and downs of the marketplace for most of the nineteenth century, levelling out to a certain degree by 1900. With the onset of the Depression in the late 1920s and the 1930s, the price of tobacco fell drastically. In order to forestall farmers' attempts to regain their profits by overproducing, one provision of the Agricultural Adjustment Act allowed farmers to restrict the number of acres of tobacco in production to insure higher production as of 1933. This resulted in increased prices and a solidification of control of tobacco production with the present owners (Ibaara 1976:105-107; Lampard 1963:51).

Tobacco cannot be grown in most areas; a particular type of soil is required to produce a high quality leaf. Quality can vary greatly even when the same seeds are planted on a farm's top and bottom land. When Ralph and Orin Pomeroy, experienced Ohio growers, and J.J. Heistand began commercial cultivation in Wisconsin in the mid-1850s, they did so because of the quality of the land they found near Edgerton (Butterfield 1880:677; Johnson, 1911:3; Census, 1880:231; Raitz and Mather, 1971:685-686). The Pomeroy and Heistand appear not to have been the first growers. That 'honor' belongs to one of four men: either to Abel Keyes, who may have grown some for his own use in Lake Mills as early as 1838 (Anon., Wisconsin Tobacco Reporter, November 13, 1885:3); or to William Ackerman whose farm "near the mouth of the Pecatonica River, eight miles from Beloit "produced one ton of tobacco to the acre during the summer of 1840 (Anon., Wisconsin Enquirer, September 16, 1840:2); or to Edward Hall and Robert Johnson of Edgerton, who grew some for market in 1853 but failed to properly cure the crop and lost it (Butterfield 1880:677). Following the success of the Pomeroy and Heistand, tobacco cultivation spread through most of Rock County, the southeastern portion of Dane County, eastern Green and southwestern Jefferson counties by 1880. Today, this area is known as the Southern Tobacco District in Wisconsin.

Tobacco production varies greatly depending upon market and climate. For example, when the 3,500 cases that were shipped from Wisconsin in 1870 brought 15 to 20 cents per pound, local growers produced nearly 10 times the amount the following year. This resulted in prices dropping to six cents per pound. Over the next decade, production rose and dropped, leveling out at about 16,000 cases at a price of six to nine cents per pound, depending on quality (Lampard 1963:51; Butterfield 1880:677-678). Although it experienced tremendous surges and declines in this period, the overall production level had gradually increased. The 1,000 acres under cultivation in 1870 grew to 13,359 a decade later and to 17,241 by 1890 (Johnson 1911:3). Many of these new growers were of foreign birth, especially Norwegian.

Tobacco cultivation was not native to Norwegians but was taught to them by the Americans for whom they worked as field laborers. Migrating to southern Wisconsin beginning in the 1840s, and often short of cash, the Norwegians hired out to the tobacco farmers in the areas as part of the necessarily extensive labor force required for tobacco cultivation. Along with their wages, they acquired an education in the techniques of tobacco growing. Many of the laborers saved their money to purchase land of their own and began growing the cash crop. Even those immigrants who could afford their own land at the outset and had once farmed wheat gradually turned to livestock, especially dairying, and tobacco cultivation, as the price of wheat declined throughout the century (Smith 1930:426; Sanding 1936:112). Gradually, tobacco cultivation became associated

with Norwegians. This strong ethnic-tobacco-growing correlation helps explain the increased importance of Vernon and Crawford counties as tobacco producers in the twentieth century. As Norwegians migrated to the more recently opened lands in the western part of the state, they brought their knowledge of tobacco growing with them. By 1910, these counties and the others that make up the Northern Tobacco District of Wisconsin (Grant, Richland, La Crosse, Monroe, and Trempeleau) were important contributors to the state's production. Today the Northern District grows about one-half of the total state production.

What attracted Norwegians in particular to tobacco cultivation in the first place is not clearly understood. Although their need for cash and the farmer's need for a short-term labor supply may be part of the reason, other immigrant groups equally short of cash did not flock to tobacco as did the Norwegians. Also Norwegians could have found short-term work in any number of areas. The factor that attracted them to tobacco cultivation in particular could be that tobacco growing and harvesting practices resembled agricultural patterns that were familiar to them in Norway. The similarity between the types of handwork needed to cultivate and harvest hay in the Norwegian fields is strikingly similar to the hand labor necessary for tobacco growing. In addition, the hanging of the tobacco plants for drying must have been equally familiar to the recent immigrant who was used to hanging his field hay to dry for winter forage for his animals. In contrast, the increasingly mechanized methods of farming in the United States, and especially in the fields of the Midwest, must have been quite foreign to the Norwegian and, though later practiced, required education over time.

Before tobacco can be marketed, it must be properly harvested, dried (cured), sorted by grade, and crated. Because much of the Wisconsin crop serves as cigar wrappers, this is still done by hand today in order to not damage the leaves. After hand harvesting, the tobacco is hung on poles in specially constructed sheds, or tobacco-houses. "The two tobacco-producing districts of southern Wisconsin have rather different kinds of barn sites. In the southern district, south of Madison centering on Stoughton and Edgerton, the tobacco barns commonly are in or adjacent to the farmstead, and they are located with respect to the effect of topography and trees on air circulation. The northern district is centered near Viroqua in the Driftless Area, and here many barns are situated in valleys because there is no alternative location for the cultivated land and the farmstead" (Hart and Mather 1961:289). In 1880, tobacco barns in Wisconsin were "generally very inexpensive frame buildings, 14 feet high, 28 feet wide, and long enough to harvest whatever number of acres the farmer may wish to raise. The height between the tiers is usually four and a half feet ... The height of the shed gives three tiers from top to bottom ..." (Tenth Census of the United States, 1880: vol. 3, Agriculture, 235). These can be recognized by their movable side panels. The doors in the end are large enough for a tractor and a wagon load of tobacco.

In tobacco cultivation, "the markets followed the crop." Tobacco buyers and manufacturers were willing to build warehouses in tobacco districts in order to concentrate purchases until one large shipment could be made to their manufacturing center. In 1869, the New York house of Schroder and Bond were the first to build more than 50 warehouses in Edgerton. It had a capacity of 2,500 cases of 400 pounds of tobacco each. Over the next several decades Edgerton and Stoughton grew into the commercial centers of the Southern District as tobacco houses from Chicago, New York, and other eastern cities established competing agencies and warehouses in the villages. Stoughton eventually had 17 warehouses, some of which still stand, and several cigar factories. Janesville, Evansville, Milton, and Madison all had warehouses; cigar factories were also located in Madison, but their number never reached the 152 factories operating in Milwaukee in 1880 (Tenth Census of the United States, 1880: vol. 3, Agriculture, 235).

Just as with Edgerton and Stoughton to the south, the villages of Prairie du Chien, Viroqua, Westby, Richland Center, and Blue River were the centers of commercial activity

for the Northern District, though at least one cigar factory (Pamperin) operated in La Crosse (Raitz and Mather 1971:686).

One significant change in the tobacco industry in the twentieth century was the formation of the "tobacco pool." Before that, the farmer acted as his own agent and sold to buyers in the field, on the road, or in town. After the pool was formed, the crop was sold before it was picked and the transactions became more centralized.

MAPLE SUGAR AND SYRUP

The maple trees of Wisconsin, like those in a broad region of eastern North America, produce an abundant flow of sap early each spring. When collected and heated, the sap transforms to sugar and syrup. Through a simple process of evaporation, human inhabitants of the region have continually processed that sap. Indians were familiar with the product and for pioneer white settlers, whether arriving from New England, New York, or the Southeast, tapping the "sugar bush" was a well established tradition. Indeed, in pioneer Wisconsin, maple sap was the primary sweetener and an essential staple of farm life (Weber 1956:1).

Not long after statehood, however, the availability of superior imported cane sugar challenged the native maple product, and eventually supplanted it by 1870 when the low price of cane made it more affordable. But, as maple sugar lost its standing as a staple, the state's maple sap was converted to the sweet syrup that became a favored luxury item on the nineteenth century table (Weber 1956:16,19). Through the twentieth century, maple syrup continued to be produced as a specialty product (notably in the northern counties), and although production historically has accounted for only a small fraction of farm income, Wisconsin ranks third among the states in the production of maple syrup (Wisconsin Agricultural Reporting Service 1984:3).

That high rank is not surprising. Both the sugar (or rock) maple and the black maple--the only varieties with a continuous, plentiful flow of sap--are found on the state's rocky soils. Just as importantly, the climate is ideal for tapping. In the weeks between mid-March and mid-April, as winter slowly gives way to spring, and frosty nights alternate with sunny warm days, an uninterrupted flow of sap is released. Sap cannot run when temperatures are below freezing and does not run when daytime temperatures reach 50 degrees. Trees best suited for tapping are generally at least 30 years old, readily accessible to farmers, and clustered in so-called "sugar bushes" (or groves) ranging from a few dozen to over one thousand trees. In addition, a tapping area is usually kept off limits to grazing livestock that might damage younger trees (Weber 1956:2).

Tapping sap is a simple process largely unchanged since the early nineteenth century. A hole is bored in the tree (about four feet from the ground), a spout is inserted, and a bucket hung from the spout to catch the drip-like flow of sap. Once collected in the bucket, the sap is transported by cart, sled, or wooden or metal "pipeline" to a "sugar house", a frame shed containing evaporators. Transforming sap to syrup or sugar is usually accomplished by passing sap through a shallow pan heated by an open fire. As the sap moves back and forth over the heat, it condenses, first to syrup and eventually into sugar. Syrup is drained of impurities and finally bottled for sale (Weber 1956:3).

Maple products were among the earliest agricultural products in the state, pre-dating white settlement. To the pioneer, maple sugar was less expensive and more available than imported cane sugar. Wisconsin maple sugar production reached a zenith in 1860 when over one and a half million pounds were produced across the state (almost entirely for local consumption). But by 1870, with the availability of more uniform cane sugar, maple sugar production dropped precipitously. By 1880, fewer than 450,000 pounds of sugar were produced in the state; by 1900, commercial maple sugar production was almost extinct (Weber 1956:16).

As sugar production declined, however, syrup production (a cheaper and quicker process) constituted the bulk of the state's maple products. In 1870, 70 percent of maple sap was being converted to sugar; within five years, the maple product was evenly divided between sugar and syrup. By 1900, syrup constituted 100 percent of commercial maple sap production (Weber 1956:18). Nevertheless, syrup production in the nineteenth century was erratic, fluctuating with the weather and with the destruction of maple trees. It was never as substantial as sugar production had been, since syrup was viewed as a luxury rather than as a staple. Consequently, it was not of significant commercial importance. Syrup production reached a peak of almost 150,000 gallons in 1917 (as compared to 84,000 gallons in 1860), but farmers rarely relied on the product for anything more than supplemental income (Weber 1956:19).

Syrup production initially was concentrated in the state's eastern counties, especially in Dodge, Calumet, Outagamie, Kewaunee, and Richland counties, and most of the product was consumed on the farms where it was produced. By 1890, production was more widespread, with new concentrations in western and northern counties, notably Oconto, Shawano, Waupaca, Clark, Barron, and Pierce. Syrup production continued to spread in the early twentieth century (reported in all settled counties) with a decided center in the northern counties of Marathon (the twentieth century leader), Shawano, Clark, and Pierce (Weber 1956:23-24). By 1917, maple syrup production reached a peak of 144,000 gallons, after which it underwent a continual decline.

Some of the decline in maple syrup production after 1920 can be attributed to the decline in available trees. Without the demand for maple sugar, maple trees were increasingly cut for hardwood rather than tapped for the small syrup market. The decline in trees was especially dramatic in the 1920s when fewer than half of the trees tapped in 1918 were still tapped. Because trees generally yielded a set amount, intense production could not compensate for the loss (Weber 1956:17).

In part, the decline in maple syrup production can be attributed to the product itself. Viewed as a luxury item, and one which varied in quality from sugar bush to sugar bush, syrup was easily abandoned during the Depression. The "industry" itself, largely scattered across the state among hundreds of small-scale producers, was essentially without quality standards or marketing strategy. Not until the Depression, when a serious decline hit the syrup business, did producers unite to improve standards. The Pierce County Maple Sirup Producers Association, founded in 1932 in Rock Elm, was the state's first cooperative association of maple syrup producers. Two years later, the Antigo Maple Sirup Producers Association was organized, using the milk evaporation equipment of the Antigo Milk Producers Cooperative. A further step toward improved marketing came with the establishment of uniform grades established by the Wisconsin Department of Agriculture in the early 1930s (Weber 1956:25-26). In the mid-twentieth century, syrup production was concentrated among fewer but larger operations, with local syrup purchased from farmers by large scale producers who then combined the various syrups to achieve a suitable blend of color, flavor, and texture (Weber 1956:25). But in the years after World War II, the products of maple sap accounted for less than one percent of the state's total farm income (Weber 1956:32).

BEEKEEPING AND HONEY PRODUCTION

Although classified as the state's smallest unit of livestock, the honey bee has played a disproportionately large role in Wisconsin agriculture. It's best known for the products of its hives, but most valued as the pollinating agent for more than 50 principal crops (Weber 1956a:1). Honey bees arrived in North America with initial white settlement; by 1800, the insect had reached the banks of the Mississippi River (Twelfth Census of the United States, 1900: vol. 5, Agriculture, cxxxix). When Wisconsin pioneers took up land in the following decades, beekeeping was a familiar, if still primitive, household art. Through

the mid-nineteenth century, Wisconsin beekeepers collected enough honey to satisfy home demand and sold surplus at local markets (where the sweetener was valued before the widespread availability of cane sugar).

But the expense of purchasing bees each spring, the uncertainty of the honey harvest each fall, and the difficulty of carrying insects through Wisconsin winters made beekeeping an interesting but seldom lucrative sideline. As cane sugar replaced other sweeteners after 1870, few efforts were made to market honey on a large scale. Nor was serious attention paid to the commercial potential of pollination.

Beekeeping remained a backyard industry of small commercial consequence through much of the nineteenth century. But early in the history of Wisconsin, technical advances perfected the beekeeper's craft. In 1841, for example, the world's first human-made hive--complete with broodhouse, storage chamber for surplus honey, and wooden frames simulating honey combs--was developed in Russia. Ten years later, the completely movable "Langthoth" frame was developed, thus facilitating honey extraction. By 1860, the first Italian honey bees--considered the world's finest producers--had arrived in Wisconsin apiaries, completing the essential ingredients for "modern" beekeeping (Weber 1956a:2-5).

Technical advances provided the mechanism for commercial production, but pollen-producing crops provided the raw material. Although some of the state's early cash grains, including wheat, barley, and oats, were pollinated by wind rather than bees, agricultural diversification after 1860 led to a dramatic increase in clovers, fruit trees, and other rich sources of pollen and nectar for bees. The arrangement, of course, was reciprocal. As bees collected their food, crops were pollinated and seed production increased. Not surprisingly, then, by the late nineteenth century, regions of seed crop, fruit, and vegetable production were prime honey regions as well (Weber 1956a:11).

With abundant pollen and modern techniques, honey production boomed in the late nineteenth century. In 1860, fewer than 200,000 pounds of honey were produced on Wisconsin farms (nearly all for home or local consumption). But 20 years later, the figure had jumped to 800,000 pounds with the heaviest concentration in the Lake Winnebago-Green Bay district where nectar secretion was considerably greater than elsewhere in the state. Other regions of concentration included Sauk, Outagamie, Manitowoc, Trempealeau, Dane, Waukesha, Dunn, and Marathon counties. By 1900, over 2.6 million pounds of honey were produced on Wisconsin farms (Eighth Census of the United State, 1860: vol. 2, Agriculture, 191; Twelfth Census of the United States, 1900: vol. 5, Agriculture, 671; Weber 1956a:23-24).

Increased production, however, did not remedy several serious problems that plagued Wisconsin beekeepers in the nineteenth century. Farmers continually struggled against uneven production (reflecting weather and crop conditions as well as colony strength), bees who died in large numbers in the winter from starvation, and foulbrood epidemics which spread periodically from swarm to swarm. Marketing honey also proved difficult with no standards to regulate quality from year to year or colony to colony.

To address these problems, beekeepers assembled at the local level before the Civil War. A statewide organization formed in 1876 when the Southwestern Wisconsin and Northwestern Illinois Beekeeper Association was established in Freeport, Illinois, signalling the first in a series of regional beekeeping associations for the exchange of information and advice. Two years later, the Northeastern Beekeepers Association formed in Appleton. In the next decade, regional groups met annually across that state, including the Northwestern Wisconsin Beekeepers Association (established 1880), the Madison Beekeepers Association (1882), the Southern Wisconsin Beekeepers Association (1884), and the Southwestern Wisconsin Beekeepers Association (1886). In 1885, a statewide organization--the Wisconsin State Beekeepers Association--was established at the capitol in

Madison with the express purpose of lobbying for favorable legislation and fostering practical advice. To that end, the group met with several successes: in 1897, the state legislature enacted measures to assist in the eradication of foulbrood; in 1914, the Department of Agriculture established grades for honey; in 1916, the University of Wisconsin Agricultural College appointed a beekeeping extension agent. Technical assistance has also been offered through the pages of Wisconsin Horticulture magazine since the early twentieth century (Wisconsin State Horticultural Society 1943 34(3):57-59).

Throughout the period, beekeepers emphasized increased and improved honey production even though honey itself was increasingly viewed as a luxury, and therefore dispensable, item. But as Wisconsin farms led the nation in the cultivation of clover, alfalfa, and some fruit and vegetable crops in the early twentieth century, bees increasingly were valued as a necessary component of large-scale agricultural production (Weber 1956a:30).

The appreciation of bees as pollinating agents was not immediate. As late as 1920, some farmers reportedly feared that bees in the clover fields would distract livestock. But scientific evidence (including earlier investigations by Charles Darwin) proved conclusively that clover fields visited by bees produced far more seed than otherwise. By the early twentieth century, Wisconsin farmers realized their dependence on the insect and purchased or rented colonies for placement in the fields (with about one colony for every four acres).

The bees proved to be a critical factor in the state's flourishing seed, fruit, and vegetable production. Fruit growers in Door County, Gays Mills, and the Kickapoo Valley all reported substantial increases as did cranberry and cucumber growers of central Wisconsin (Weber 1956a:16). About 180,000 colonies were maintained in the state during the twentieth century (with some increases reported during World War II when national policy dictated increased seed production), although individual apiaries ranged in size from one to one thousand colonies (Weber 1956a:17).

Although the value of pollination far outstripped the value of the honey thereby produced (about 30 to one), most beekeepers were not rewarded accordingly. But as a happy result, honey production soared. Over 18,000,000 pounds of the sweetener were collected yearly after 1950 (when the state ranked fourth among all states in honey production) (Weber 1956a:1). Today, Wisconsin ranks fourteenth in honey production, with a significant percentage marketed to wholesalers (Wisconsin Agricultural Reporting Service 1984:3). A small portion--about two percent--of the beekeepers' product also includes wax from the hive, usually used for special industrial purposes or for dental wax, candles, cosmetics, polishes, or as an aid in horticultural grafting.

The cycle of honey production is related, naturally, to the seasonal appearance of pollen producing plants. Until March of each year, bees are largely dependent upon honey stored from the previous summer's labors. But in April, honeybees return to the fields and forests and gather nectar from willow and soft maple trees. Dandelions provide an important source of pollen in May, and in June blossoming fruit trees supply pollen. Through the mid-summer, clover and alfalfa - the main sources of Wisconsin honey - are in bloom (Weber 1956a:15).

To house bees and collect the honey and wax, beekeepers since the 1850s have used a wooden box to serve as storehouse and brood chamber. About 10 movable frames which the bees use as a honeycomb hang from the top. The frames, constructed of four bars joined in a square-like fashion, measure 14 inches long, eight and a half inches deep, and one inch thick. Above the box rests the so-called "super-box" with similar dimensions fitted with a frame for the collection of surplus honey. A zinc sheet with perforations large enough for workers but too small for the queen separates the two boxes. Extracting the honey thus collected begins in June and continues through August with about 40

pounds of surplus honey produced from each colony during the season (Weber 1956a:5-6). By mid-August, the clover honey flows have ebbed and extracting intensifies, continuing until about mid-September when demand increases for the fall honey market. Honey is usually stored in a frame shed. Through the nineteenth century, honey sold commercially--which was only a small part of the total honey product--was distributed by farmers through local markets or at roadside stands. In the twentieth century, however, the greatest amount of the harvest goes to wholesalers who re-sell the product in bulk to bakeries and cosmetics manufacturers as well as to syrup, canned fruits, and ham packing companies. About a fourth of the product, however, continues to be sold from roadside stands or other direct farm outlets (Weber 1956a:25-27).

GINSENG

Native to Wisconsin's hardwood forests but prized by Asians for medicinal properties, the herbaceous ginseng plant is a fleshy-rooted crop of limited cultivation but substantial profit to those few Wisconsin farmers who have engaged in its commercial production since 1900. Wild ginseng, which grows in forests through much of the northern and eastern United States, was gathered by pioneers in central and northern counties where the plant flourished in ravines, on hillsides, and in other shady but well-drained areas of oak and maple forests (Williams 1964:5; Van Fleet 1913:5). In its natural habitat, the plant grew to one foot in height, with red berries and blooms at mid-summer. But the plant's true value lay beneath the loamy soil where the mature, spindle-shaped root grew up to four inches in length and one-inch in thickness. When dried and cured, the root was exported to Asia (or intermediate entrepôts like California or Hawaii) where it was prepared for the highly lucrative drug trade (Williams 1964:3-11).

Demand for the root in the nineteenth century provided ample incentive for many Wisconsin farmers (or farm wives and children) to scour the forests with spade in hand in search of the root. After carefully digging the root so as not to damage and thus cheapen it, ginseng was laid on rocks to dry after which it was sold almost exclusively to wholesalers who prepared it for shipment. The pay-off justified the harvest. Reports of high prices at mid-century included the tale of a Sauk County widow who was able to lift a heavy mortgage from her farm through the harvest and sale (at one dollar per pound) of ginseng roots (Cole 1918:55). Although prices remained high through most of the century, native ginseng was continually destroyed with the depletion of forests and the expansion of cropland (Cole 1918:55). By the early twentieth century, the most extensive ginseng habitat in Wisconsin was found in forested areas of the northern counties.

As natural ginseng disappeared, however, a cultivated crop supplied the demand. Introduced in the United States in 1898, cultivated ginseng shortly supplanted the harvest and sale of wild ginseng (although the wild root continued to be more valued by the Asian market) (Van Fleet 1913:5). As early as 1900 Wisconsin ginseng growers like the Schwartz Brothers near Spring Green harvested the plant and sold it for as much as six dollars a pound (Cole 1918:55). But the cultivation of ginseng had a limited appeal for most farmers. Start-up costs were considerable. Initial purchase of the plants was expensive (some years as costly as 50 cents per plant), and because cultivation required considerable shade (to duplicate natural conditions), ginseng farmers had to construct sizable sheds to shelter their crop (although some ginseng was grown in natural shade on hillsides and in ravines). Open to the north and east but covered with wooden slats spaced an inch apart on the top, south, and west sides, ginseng sheds reduced direct sunlight by 75 percent. The investment was sizable, and the return was slow. Fully mature ginseng roots took seven years to grow--delaying profits and increasing expenditure (Van Fleet 1913:7-8).

Ginseng cultivated on Wisconsin farms, however, was nearly unrivaled for the quality of its color, maturity, size, and form, and growers like the Fromm family in Wausau realized considerable profits from large scale enterprises (Williams 1964:3). (See NRHP nomination

"Fromm House"). Harvested between September and October, the mature roots were cured in a room heated to 80 degrees Fahrenheit by a stove or furnace, then spread on lattice-topped tables to dry for a month. Once dried, the roots were stored in a dry and airy room until sold to drug wholesalers. Wisconsin ginseng provided the best breeding stock available in the United States, placing the state at the center of trade (Van Fleet 1913:11-13).

By World War I, ginseng cultivation was a lucrative business for a few commercial growers who could command over four dollars per pound. But throughout the twentieth century, wild ginseng commanded higher prices, and wild ginseng harvesters, attempting to capture that market, continued to dig the root in its natural state, exporting at least 95 percent of their harvest (Williams 1964:3-11). In fact, the wild harvest of ginseng in the mid-twentieth century was so extensive that international trade laws as well as state regulations attempted to intervene to protect the complete destruction of the natural ginseng crop and its habitat. Current (1980) trade restrictions require wild ginseng to be exported only from those states that annually demonstrate that natural growth and reproduction of ginseng is not harmed by such harvest. A state law of 1980 regulates the harvest and sale of wild ginseng to licensed harvesters and restricts the harvest season to the period from August fifteenth to November first (Wisconsin Department of Natural Resources 1980:1).

HEMP

Hemp, a tall woody herb whose stem yields a resilient fiber used in cord, was introduced to Wisconsin farms in 1908 when nine acres of the plant were cultivated on an experimental basis at the State Asylum at Mendota (Dane County), and three acres were grown at the State Prison at Waupun. The experiments, sponsored jointly by the United States Department of Agriculture and the University of Wisconsin Experimental Station, proved successful and by 1912 Wisconsin farmers harvested 125 acres of the crop in a region stretching south from Waupun to Brandon and west from Fairwater to Markesan (Wright 1918:4-5). Commercial hemp acreage remained at that level until the advent of World War I when the outbreak of hostilities created a new demand for the fiber. By 1917, over 700 acres were cultivated in the state; they were concentrated in Fond du Lac, Green Lake, Dodge, and Racine counties (Ebling 1948:162; Wright 1918:8). That year Wisconsin ranked second nationally in both the acreage and the harvest of hemp (Wright 1918:2).

The next year, over 1,000,000 pounds of the plant were harvested (five times more than in pre-war 1916), and by 1919 the state's farmers produced more than half of the nation's crop (Ebling 1948:102; Wright 1925:1). The rapid growth engendered by war slowed somewhat with the arrival of peace, but the Wisconsin hemp harvest continued to lead the nation in the 1920s, with Dodge, Green Lake, and Fond du Lac counties alone responsible for 70 percent of the total United States crop (Wright 1925:1). Hemp production was adversely affected by the Depression, when fewer than 200 acres, yielding about 100,000 pounds were cultivated in the state. But stimulated again by a world war, Wisconsin production climbed dramatically after 1940. By 1943, over 30 million pounds of hemp were harvested from 30,000 acres (Ebling 1948:102). But the boom did not outlast the war, and by the 1950s, hemp production had declined again, with the crop increasingly replaced by synthetic fibers. Today, hemp is grown in Wisconsin only on a limited basis.

Wisconsin hemp farmers seeded their crop thickly, thus encouraging the herb to greater heights (with stalks reaching 15 feet). After harvesting the crop by machine, the stalks were hauled to a "breaking mill" where the plant was dried and crushed to free the inner bast fiber which proved to be strong, pliable, and waterproof.

Processing hemp at the breaking mills followed a pre-set routine. After arriving at the receiving rooms of the mill, the crop was transferred to a kiln to remove moisture and

then to "breaking rooms" where the stalk bark was crushed by machine and the bast fiber removed. The bast was then cleaned, twisted, baled, and finally sold to cordage and spinning mills (Wright 1918:36). By 1917, as commercial production soared, several breaking mills had been constructed in the hemp growing region of the state, including mills at Waupun, Alto, Brandon, Fairwater (two), Markesan (two), Union Grove, Iron Ridge, Milton, and Picketts. Each mill could process between 600 and 1,000 acres of hemp (Wright 1918:36; Wright 1925:2). Two associations were organized to stimulate business during the boom period. The Rock River Hemp Growers, headquartered at Waupun, and the Wisconsin Hemp Order, based in Ripon, were both established during World War I (Wright 1918:8).

MINT

Although the mint plant, harvested for its aromatic and flavorful oil, was cultivated in the United States as early as 1810 when roots imported from England were planted in Ashfield, Mass. and Wayne, N.J., the crop has been commercially cultivated in Wisconsin only since the mid-twentieth century. The perennial *Mentha* plant, which grows to a height of three feet and bears oil glands located on the undersurface of its leaves, has been cultivated extensively since the mid-nineteenth century as a flavoring for medicinal and confectionary products, especially for the chewing gum first made popular in the 1850s. By that time, cultivation had spread westward to the sandy soils and mucklands of the Great Lakes region, particularly to northern Ohio, southwestern Michigan, and northern Indiana, all located conveniently close to the Wrigley chewing gum empire in Chicago. By 1900, large scale cultivation had reached the moist Pacific northwest, eventually supplanting the dominance of Indiana and Michigan fields.

Despite the early commercial concentration in neighboring states, however, mint was not grown on Wisconsin farms until 1943 when, in an attempt to meet wartime demand, a crop was planted on an experimental basis in Jefferson County under the auspices of the University of Wisconsin Experimental Station. Although the mint was grown on a limited scale, the experiments met with quick success (Ewald 1952:1). Within five years, peppermint was of commercial importance in Jefferson County (which subsequently produced 60 percent of the state's crop) and several south and central counties (notably Sauk, Columbia and Walworth) where the loosely-textured, well-drained muck soils associated with onion, cabbage, and other truck crops proved favorable to mint as well. But despite the increase, 17 large scale growers cultivated nearly all the mint grown in the late 1940s (Ewald 1952:2). By the 1950s, however, as cultivation spread to Dodge, Marquette, Green Lake, and Waushara counties, about 30 Wisconsin farmers harvested the crop (Ewald 1956:2). Since then, Wisconsin surpassed Michigan and Indiana and ranks with Washington and Oregon in growing most of the world's supply of the plant (harvesting far more peppermint than spearmint) (Green 1960:2).

Harvested frequently during the growing season, mint "hay" is collected in metal forms which historically have been loaded on low-bodied wagons and hauled to shipping points or directly to "oil mills". The Wisconsin mills that distilled mint oil were typically located on or near commercial mint fields and contained high pressure boilers, tubs, condensories, and receivers. The mint hay was packed into tubs through which steam passed, vaporizing the crop's oil. The vapors, in turn, passed through condensation units where the vapor was reduced to water and oils. The oil was skimmed off the top, drained into storage drums and shipped to medicine and gum manufacturers (mostly located in Indiana and Michigan) (Green 1960:19). By 1951, six "stills" - three in Jefferson county, one each in Columbia, Sauk, and Walworth counties - were owned by large scale growers (Ewald 1952:5).

FUR FARMING

Fur-bearing animals have been trapped or raised in Wisconsin for an international market

since the French and Indians traded valuable beaver pelts in the seventeenth century. Over the next 300 years, trappers captured the state's fox, muskrat, otter, beaver, and wild mink. But the commercial "farming" of Wisconsin fox and mink was a twentieth century industry, stimulated by the state's cold winters (conducive to fur growth), the ready availability of high protein "fur foods" (including fish from the state's long shoreline and horsemeat from its farms), and a strong market for the luxury product. By the 1920s, Wisconsin's young fur farms, although considered a "practically new industry", were booming and thus testimony to the profitability and public acceptance of scientifically "harvested" fur bred in captivity (Ashbrook 1928:1). By that decade, Wisconsin, Michigan, and Minnesota farmers produced half of the nation's pelts (Ashbrook 1928:49). Since then, Wisconsin has led the nation in fur farms (reporting, for example, twice as many in 1940 as any other state). The state's mink harvest continues to dominate national production, and Wisconsin has secured a place at the center of the international fur trade (Wisconsin Agricultural Reporting Service 1984:3).

Fox

North American fox, particularly the red and silver breeds, had long been prized by the world's fashion conscious. Trapped in the wild, an undamaged fox pelt was a rare commodity, commanding unprecedented prices in the last decades of the nineteenth century. European demand alone far outstripped the trappers' supply, and such pressure led to the development, in the 1880s, of Canadian fox "farms" devoted to raising in captivity what proved so elusive and valuable in the wild (Ashbrook 1923:3). Canadian fox farms boomed after 1910 and soon farmers in neighboring New England and New York entered the market (Ashbrook 1923:3). By 1915, fox farms had been established in Wisconsin too, including that of the Fromm family in Hamburg (Marathon County) (Pinkerton 1947:83). Despite initial difficulties - animal disease, damaged pelts, and a public reluctant to accept furs raised in captivity - Wisconsin farmers quickly led the nation, supplying 55 percent of America's fox pelts in the 1920s and 1930s. Government officials conceded that "no other branch of livestock farming returns as high a profit as fox farming" (Ashbrook 1928:3). By perfecting breeds, Wisconsin farmers won a new-found popularity for farm-raised fox. The Fromme empire alone included the world's largest fox fur facilities (in New York City and Merrill, Wisconsin), and in 1938, the family farm in Hamburg raised 30,000 silver foxes (Pinkerton 1947:284,329).

The reign of the silver fox in Wisconsin, however, was short-lived, ending as abruptly as it began. By World War II, prices had dropped precipitously, reflecting the sudden popularity of mink, an animal better suited for mass breeding and more susceptible to the mutation strains which pleased a fickle market (Pinkerton 1947:342). With the decline of the fox market, farmers transferred their operations to mink ranches and other pursuits, often dismantling the structures associated with fox breeding. As a result, the pens and towers of fox farms have rapidly disappeared despite the fact that during its heyday fox farms numbered in the hundreds.

Usually located in an area with moderate rainfall, adequate shade and sufficient room for exercise, the typical fox breeding ground ranged up to 80 acres surrounded by a secure fence (Ashbrook 1923:9-32). The area, known as an "exercise" or "furring" pen, provided exercise room for about 25 foxes per acre. Separate areas were fenced off for fox pups and for use during the mating season. Rising above the area, a tall watch tower (variously constructed of wood, steel frame, or brick) provided a central observation point to guard against escapes or fighting and to monitor the movement and breeding practices of the animals (Ashbrook 1923:28-30). (The watch tower of the Cole fox farm, located near Omro in Winnebago County, was listed in the National Register in 1978). To house the individual animals, fox pens, covered with wire mesh and measuring 10 feet high and 40 feet by 40 feet wide, were placed in rows (raised above ground) and interconnected by chutes (Ashbrook 1923:12). By 1923, the nation's oldest fur breeders cooperative, the Wisconsin Fur Breeders Association, was established in Athens (Marathon County). In

addition, the American Fox Breeders Association was founded in Burlington (Reinig 1954:159).

Mink

As fox fur enjoyed new heights of popularity in the 1920s and 1930s, the lowly mink, raised in captivity, was poised to capture the fur market. The first mink farms in the United States were probably those developed in Chautauqua County, New York during the Civil War (Smith 1981:12). But not until the 1920s did mink farming reach appreciable levels when a sudden interest was excited by the high fur prices and relative ease and low cost of entering the mink business. (The world renowned McArthur mink ranch of Janesville was started as a backyard hobby in 1937 by Mrs. McArthur) (Haynes 1963:8). Mink breeding proved adaptable to Wisconsin's climate, with plenty of cool temperatures and springtime rain (to stimulate growth) and shade (to protect fur). Fur foods, including fish and meat, were also readily available from the state's expansive lakeshore and numerous farms.

As late as 1927, while silver fox was at a premium, the United State Department of Agriculture reported that mink production was "sporadic" and interest remained low until the 1930s (Ashbrook 1927:1). Soon, however, ranches appeared in locations as diverse as suburban backyards and large rural farms (Ashbrook 1927:2). But the most significant advance in mink production came in the early 1930s when two Wisconsin ranchers, William Whittingham of Arpin (Wood County) and Charles Whitaker of Union Grove (Racine County) independently achieved a genetic mutation which produced platinum (or grey) mink, the most significant mutation breed of the twentieth century (Hodgson 1958:33, Haynes 1963:8). The attractive light color of platinum challenged the reign of silver fox and won a new clientele for mink. Success set off a wave of scientific mutations that expanded the spectrum of mink fur from white to near-black (Haynes 1963:7).

The new palette was a boon to the Wisconsin mink industry and made mink fur more popular than silver fox, seal, or other light-colored furs. By 1942, Wisconsin's 565 mink farmers led the nation in mink pelt production (Smith 1981:12). By 1958, nearly 90 percent of the nation's mink sales were in the lighter shades pioneered by Wisconsin ranches, and by 1963, Wisconsin recorded 2,000 mink breeders (Haynes 1963:8). In 1984, the state continued to lead the nation in pelt production (Wisconsin Agricultural Reporting Service 1984:3).

The state's mink farms are as diverse in size as in location, ranging from a few pens to huge ranches. Each animal is housed in a small wood-framed wire mesh cage with an attached wooden "nest box" which is about 10 inches square. The cages and nest boxes are arranged in long rows, elevated on a trestle 18 inches above ground, sometimes sheltered by a shed roof. (Various other pens--breeder pens, whelping pens, and runs--are included on the ranch). The long rows of pens, separated by five foot wide aisles, are in a "colony house" measuring about 180 feet long, 22 feet wide, and nine feet high with open sides for ventilation and doors at either end. A mink farm also includes a refrigerated storage building for fur food (typically measuring 32 by 16 feet) with room for feeding and freezing. (The configuration of mink pens varied over time. See Hodgson 1958:59-162; Reinig 1954:41-57).

The mink breeding season lasts from March until April, and the whelping season from April to May. The pelting season lasts from November until December. Mink farmers have to keep close track of the animals, because pelts are at their optimum condition for only 36 hours. After the pelts are ready for shipping, they are sent to New York, Milwaukee, Minneapolis, or Seattle. Milwaukee annually hosted an International Mink Show for buyers and sellers (Haynes 1963:9).

To facilitate marketing, as well as to provide information on the care and breeding of

mink, several growers' associations and cooperatives have been established since the 1930s, many with headquarters and warehouses in Wisconsin. The most notable national mink associations (which market the pelts of members) included the American Natural Fur Breeders Association Cooperative (Wausau), Mutation Mink Breeders Association (headquartered in Racine), the Great Lakes Mink Association (Kenosha), and the United Mink Producers Association (Janesville), founded in 1934 and the nation's oldest (Hartsough n.d.:30; Haynes 1963:10; Reinig 1954:124). Several regionally based Wisconsin associations were established in the 1940s and 1950s. Other services related to mink farming in the state include the U.S. Fur Rancher Publication (Merrill), the Mink Farmers Research Foundation, Inc. (Milwaukee), the State Experimental Game and Fur Farm (in Poynette), and the National Board of Fur Farm Organizations (Milwaukee, Brookfield).

IDENTIFICATION

Resource Types. Resources associated with specialized agricultural production include tobacco barns, tobacco warehouses, and tobacco (primarily cigar) manufactures; "sugar houses" for maple syrup and sugar production; historic landscapes associated with maple sugar production would include "sugar bushes" (groves); ginseng sheds and drying rooms; hemp "breaking mills"; mint "oil mills"; fox watch towers and pens; mink pens and fur warehouses; and marketing structures ranging from roadside honey stands to the offices of cooperative associations. In addition, the houses and other farm buildings of people prominent in those fields may be directly associated with specialized production.

Locational Pattern of Resource Types. Three distinct locational patterns can be identified for resources associated with specialty agricultural production. Resources associated with the cultivation, harvesting, and storage of crops are located on farms. Resources associated with processing the products are located in communities near the fields of production, accessible by rail or road to both farm and market. Resources associated with marketing the product are located in communities near major transportation corridors.

Previous Surveys. None

Survey and Research Needs. Because of the lack of an understanding of the structures associated with these specialized areas of agriculture, initial efforts must be directed toward a systematic perusal of the publications of the University of Wisconsin Agricultural Experiment Station and Extension Service, the Wisconsin Department of Agriculture, the Wisconsin Agricultural Society, and the popular agricultural press to study both the prototypes of agricultural buildings disseminated by these groups and Wisconsin agricultural conditions over time. After such research, an "inventory" of building types can be compiled. Following that, field surveys should be conducted (focusing on regions of greatest production) to identify extant structures which are associated with the various phases of specialty agriculture production.

EVALUATION

National Register Listings and Determinations of Eligibility

McCoy Farmhouse (1852-1885), 2925 Syene Rd., Fitchburg, Dane County (NRHP 1980)

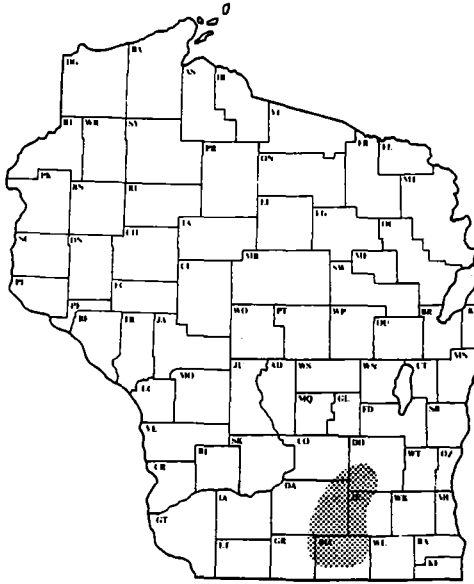
Ole K. Roe House (1891-1982), 404 S. Fifth St., Stoughton, Dane County (NRHP 1984)

Cole Watch Tower (1870,1935), Town of Omro, Winnebago County (NRHP 1978)

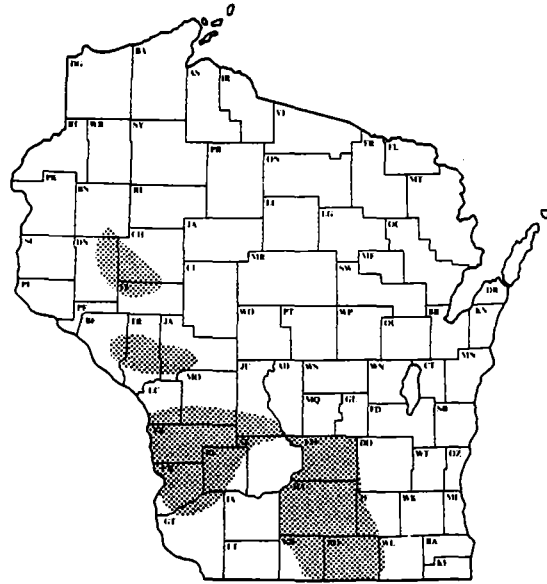
Walter and Mabel Fromm House (1928), R.R. 1, Town of Hamburg, Marathon County (NRHP 1982)

Context Considerations. Outbuildings associated with this study unit, if located on farms, should be evaluated as part of complexes. Ideally, the buildings will not reflect subsequent uses different from their original use.

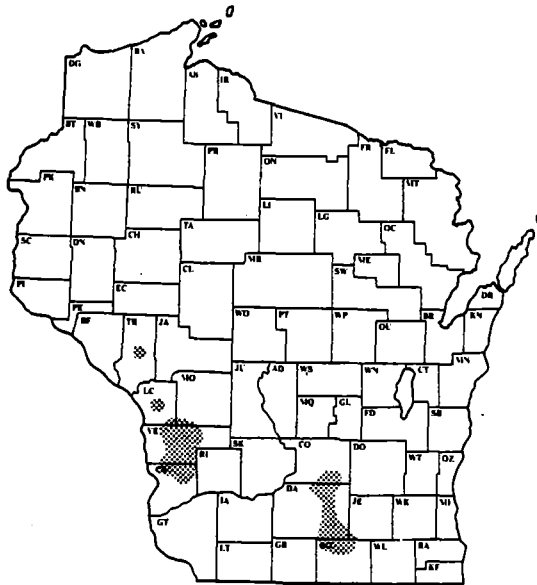
SPECIALIZED AGRICULTURAL PRODUCTION



Area of cultivation, 1880



Area of cultivation, 1909



Area of cultivation, 1949

State Historical Society of Wisconsin

Tobacco Cultivation in Wisconsin, 1880-1950

Source: James Johnson, *Tobacco Culture in Wisconsin*, University of Wisconsin Agricultural Experiment Station Bulletin no. 206 (Madison: 1911), p. 5; *Tenth Census of the United States, 1880: Vol. III, Agriculture*, p. 235; V.E. Buften, A.J. Hintzmann, and M.R. Goodell, *Wisconsin Tobacco Production and Marketing*, Wisconsin Crop and Livestock Reporting Service Bulletin no. 305 (Madison, 1951), p. 27.

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pp.677-678 especially pertinent.

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LIVESTOCK AND POULTRY PRODUCTION

Animals: Cattle, Hogs, Oxen, Horses, Sheep, Poultry.

Temporal Boundaries: 1860 - present.

Spatial Boundaries: Entire state, with commercial concentrations in the north-central, lakeshore, southeast, southwestern, and west central counties.

Related Study Units: Feed Crop and Grain Cultivation, Early Dairy Production, Industrialized Dairy Production, Dairy Expansion, Meat Products.

HISTORICAL BACKGROUND

For over a century, livestock production has been the nucleus of Wisconsin agriculture. The products, crops, and buildings of most Wisconsin farms since the late nineteenth century have reflected this simple fact. As cash crop farming declined, animal husbandry introduced a new system of balanced cultivation, careful routine, and capital outlay for herds and buildings. The effort and expense transformed the agricultural landscape, replacing wheat fields with fields of pasture and feed, punctuated with animal barns, fences, and silos. The change was reflected in economic terms, too. By 1900, livestock production contributed almost 80 per cent of the state's farm income (Ebling 1948:26).

Advances in the late nineteenth century were dramatic, but domestic animals were a familiar feature of Wisconsin farm life long before large scale commercial production. Cattle, hogs, poultry, horses, and sheep were common among settlers at Green Bay and Prairie du Chien in the first quarter of the nineteenth century and on the farms of the southwest lead district by the late 1820s (Smith 1973:164, 186-187). The first permanent settlers in territorial Wisconsin brought some stock with them to their new homes (or purchased it upon arrival from drovers who herded the animals north from Illinois, Indiana, and the Ohio Valley) (Schafer 1925:71). Pioneer life required sturdy draft animals--oxen, mules, and the occasional work horse--to break the prairie, drag plows, and provide transportation. To these valuable beasts of burden went available feed and shelter. Other livestock were kept for limited food and fiber production, but care was minimal, shelter primitive, and selective breeding virtually unknown. Cows, for example, were milked only during spring and summer but left dry (or slaughtered) in fall and winter to save the cost of feed. Sheep and hogs were left to graze at large upon wild vegetation or forage on public commons. Animal shelter ranged from the impromptu (the side of haystacks, for example) to the crude (a framework of poles covered with straw). A lack of adequate fences or pasture afforded a "freedom of movement" that guaranteed poor feeding and breeding as well as public nuisance although not until 1870 did a state law restrict the running of farm animals on public lands (Ebling 1948:52,69; Schafer 1922:167).

Poor treatment reflected the lowly position of livestock in the hierarchy of the territorial barnyard. In the wheat era, when a single grain was easily and profitably grown and marketed, the expense of livestock seemed unduly burdensome. The cost of fences and buildings was prohibitive for most farmers and feed crops were widely believed unsuited to the state's northern climate (Hibbard 1918:122). Marketing, too, posed problems. With few urban centers or processors to create a demand for livestock products, and no way to safely transport perishable meat or dairy goods long distances, animal products were restricted to home consumption or sold at local markets for a small profit.

But while commercial production remained small-scale during the wheat era, the state's

farmers were not complete strangers to the routine of animal husbandry. Settlers from New York, New England, the British Isles, and northern Europe had left regions where cattle and sheep were integral parts of the farm economy (Ebling 1948:52). When the wheat crop finally faltered between 1860 and 1880, leaving a legacy of worn soil and depressed incomes, livestock promised a logical and familiar alternative. Even before wheat's collapse, farmers in the southeastern counties began to fence some lands and create pasture for sheep raising (Lampard 1965:283). In converting land to pasture, alternating cereals, and increasing manure, farmers replenished the soil thus returning fertility as well as profitability. The lesson was not lost on farmers across the state. "The experience of these farmers who first made a shift to animal husbandry during the decade of the sixties," wrote Eric Lampard, "was to provide a useful model for those caught in the later throes of the wheat crisis," thus setting a pattern adopted statewide, first saving and then dominating Wisconsin agriculture (Lampard 1965:56).

The advocates of animal husbandry were vociferous, and not without voice even at the height of wheat's reign. Members of the state agricultural elite warned of the dangers inherent in endless cycles of one crop farming as early as the 1850s, and repeatedly called for livestock production in a larger program of diversified farming. Through the meetings of the State Agricultural Society and especially its annual State Fairs (first held in Janesville in 1851), farmers found a forum for the display of well-bred and well-fed stock. Those able to import purebreds formed a top echelon among Wisconsin farmers. But by 1860, the State Agricultural Society reported a more wide-spread (if still tentative) attention to stock raising, especially in the southeastern counties where the decline of market grains first precipitated the change (see, for example, Wisconsin State Agricultural Society 1855:73). From this nucleus, livestock production moved gradually westward and northward following in the wake of wheat's decline and accompanying the spread of settlement.

By 1870, commercial livestock production had emerged in a well-defined district centered in the south and southwestern counties, reflecting conditions favorable to the abundant harvest of feed crops (especially corn and oats) which made cattle and hog production both possible and profitable. But livestock was not limited to that region. Indeed, dairying proved the most prominent and widespread of the state's livestock industries (especially after the introduction of the silo in the 1880s) resulting in large concentrations of milk cattle in north-central, east-central, and northwestern counties where silage crops and grasses flourished. The emergence of a strong statewide livestock economy took less than three decades. By 1880, more than half of Wisconsin farm income was derived from livestock and the majority of its farmland was covered with feed or pasture (Ebling 1948:26).

But the upsurge in feed crop production and the introduction of the silo were not the only impetus to livestock farmers. The development of large scale production coincided with (and was partly in response to) the rise of dairy factories and meat packing plants in the late nineteenth century. With the growth of urban centers, the expansion of rail networks, and the introduction of refrigerated rail cars in the 1870s, dairy and meat processors reached regional and even national markets. Wisconsin farmland lay at the center of that network, and Wisconsin farmers provided the raw materials to meet the new demands.

As with other advances in Wisconsin agriculture in the late nineteenth century, science and technology played a large role in increased production. Research conducted by the University of Wisconsin College of Agriculture led to improved feeds, careful monitoring of breeds, the control of animal disease, and the dissemination of farm building plans to assist the livestock farmer. William Henry's pioneer work, Feeds and Feeding (1898) was complemented by the veterinary advances of Henry Russell whose battle against animal tuberculosis was waged as early as the 1890s (Lampard 1965:186). Popular Farmer's Institutes and Experimental Station bulletins propagated a wide variety of barn plans for

the proper shelter of animals, and the patenting of barbed wire in the 1870s provided a cheap, efficient fencing. The State Department of Agriculture, adopted a series of regulations and programs in the early twentieth century fostering healthier animals (including the establishment of a Livestock Sanitation Board in 1901 and an "accredited herd policy" in 1915) (Remey 1924:56-59).

In 1913, the state established a department of markets to help regulate the sale of livestock products. Other improvements developed from private initiative. Breed upgrading, for example, was encouraged by the organization of statewide and local breeders associations (beginning with the Wisconsin Wool Growers Association, established in 1864). By the early twentieth century over a hundred community livestock breeders associations existed statewide, cooperatively purchasing and breeding purebred foundation stock. With the increase in production, local livestock shipping associations, generally comprising from 50 to several hundred farmers, collectively assembled and shipped the stock of members, thus eliminating middlemen and increasing profits. The first shipping association was established in 1908 in Pierce County. By 1925, 350 shipping associations had been formed in Wisconsin, handling 21,000 carloads of stock valued at \$25 million (Swoboda 1927:168; Hibbard 1920:2). Once off the farm, livestock were assembled at regional raiiside "concentration yards" or livestock "auction yards" for re-sale or shipment to the terminal markets and stockyards of Milwaukee, Chicago, St. Paul, and other large cities where Wisconsin livestock entered the national marketplace.

CATTLE

The earliest cattle in Wisconsin arrived with the earliest settlers, brought to French fur trading outposts, military forts and southwestern lead mines (where the animals were kept mostly for beef). But to the pioneer Wisconsin farmer cattle were poor relations to the oxen which proved so adept at plowing through unbroken soil and subsisting on cheap and coarse feed. As early as 1838, Martin Morgan of Green Bay introduced a registered Durham Shorthorn bull, but most cattle of the territorial period were indiscriminate "native" or "cross" breeds, driven north from Indiana and Illinois (Nesbit 1973:284). Raised for limited beef production and milked only during the warmer months, cattle were sometimes yoked alongside oxen to help plow fields and then slaughtered with the on-set of winter (Ebling 1948:53).

Nonetheless, by the first years of statehood, cattle were a ubiquitous feature of the Wisconsin farmstead. By 1850, most farms had between five and seven head of cattle (including a few milk cows). The heaviest concentrations were reported in the populous and prosperous south-central and southeastern counties (notably Walworth, Dane, Washington, Dodge, Rock, Kenosha, and Jefferson from which several Shorthorns and Devons were displayed at early State Fairs). Considerably fewer cattle were found in the sandy central plains or more northerly counties of the state. Increases in the number of cattle were reported in the 1860 census (with significant gains in the southeast and in several other counties including Dodge, Fond du Lac, Rock and Grant), but the rate of growth did not keep pace with the increase in farmsteads (Ebling 1948:62).

The real statewide boom in cattle production occurred after 1870, when dairy and livestock farmers, encouraged by the expansion of markets, converted their fields to feed and pasture. By 1880, the Wisconsin cattle population exceeded a million head (a 72 percent increase over 1870), with many counties doubling their herds, especially in the southwest corn belt and east-central dairy district. Dane, Grant, and Dodge counties had already achieved their pre-eminent positions (maintained through the rest of the century), while Green and Jefferson counties had the highest density of cattle per acre (Ebling 1948:620). In the following decades gains were less spectacular but still substantial. Important increases were reported in all regions where dairying became the dominant and year-round agricultural pursuit as well as in the southwest where the climate supported most of the state's sizable beef cattle operations.

In the twentieth century increases were smaller but consistent, especially in the northern, north-central, and western counties. By 1900, over two million head of cattle could be found in the state. Barron, Chippewa, Clark, Dunn, Marathon, Polk, Pierce, St. Croix, and Shawano counties posted sizable increases in the first decade of the new century. By 1920, Wisconsin farms supported over three million head of cattle. Not until 1930 did the first small reduction in cattle occur, with most of the decline reported in the old southeastern counties where urbanization encroached on farmland. But increases in the northern counties at mid-century nearly compensated for the decline elsewhere; Marathon County, for example, ranked second only to Dane in head of cattle after 1930 (Ebling 1948:62). By 1983, Wisconsin continued to lead the nation in dairy cows and ranked among the top producers of beef cattle (Wisconsin Department of Agriculture 1983:69).

Dual Purpose Cattle

In the decades before market specialization, most Wisconsin cattle were not bred exclusively for either dairy or beef production. Instead, so-called "dual-purpose" animals were bred for both products. Such nondescript breeding, however, led to inferior quality, and the state's cattle were distinguished neither by their meat nor their milk. Nonetheless, farmers viewed specialization with skepticism, uncertain that profits would justify the "single purpose" approach. Thus, dairy farmers, for example, happily sent many cows to the slaughterhouse to capitalize on the high price of beef and were reluctant to lose that income. Dual-purpose cattle (including Shorthorns, Devons, and Herefords) were favored by many farmers from the 1860s until the late nineteenth century (Lampard 1965:171).

But increased demand for high quality beef and dairy products after 1870 led farmers to concentrate on one type of production based on climate, region, or other factors. Although the debate regarding single and dual purpose cows was not fully resolved until the early twentieth century, the availability of excellent specialized breeds after 1880--and the inability of dual purpose animals to effectively compete against them--dictated a single purpose approach. "He who specializes wins," predicted one insightful farmer in the 1880s. "The general purpose cow is an impossible animal. Let each farmer decide whether all circumstances point to a beef, a milk, or a butter stock and choose accordingly" (Lampard 1965:173-175). By 1890, most Wisconsin cattle were distinguished according to purpose: Holsteins, Guernsey and Jersey were the leading dairy breeds; Angus, Herefords, and Shorthorns were considered beef animals; Devon, Brown-Swiss, and Red-Polled remained popular "dual-purpose" breeds (although individual animals tended to favor either meat or milk production) (Lampard 1965:174).

Dairy Cattle

The earliest attempts at specialization came from the state's pioneer dairy farmers. By 1870, William Dempster Hoard of Fort Atkinson initiated a long and successful campaign in Hoard's Dairyman to encourage the development of purebred milking cows. Among the earliest breeds favored by Hoard were Ayrshires and Jerseys. Jerseys, which dominated the state's dairy herds during the period, originated in England and were reported in Wisconsin before 1870. But, in 1873, Septer Wintermuth of Whitewater introduced the first registered Holstein-Friesian bull, thus bringing to Wisconsin a breed of specialized dairy cattle which soon became the state's most popular. Holsteins were excellent milkers, favored in all dairy districts (especially in the southern counties), and constituted one-half of the state's dairy herd by World War I (Lampard 1965:173).

In 1881, the first Guernsey bull was introduced by N. K. Fairbanks of Lake Geneva. Second only to Holsteins in popularity, Guernseys were a major dairy breed throughout the period with especially strong concentrations in northern and western counties (Lampard 1965:176). By 1916, Wisconsin farms had more Guernseys than did the farms

of any other state (Wisconsin State Department of Agriculture 1916:28). After World War I, Brown Swiss became more popular as a specialized milking breed, although they never rivaled the strength of the Holstein and Guernsey herds.

The rise of milking breeds in the 1880s fueled the transition to single purpose dairy herds. The high price of beef through the late nineteenth century slowed the change, but faced with strong competition for the dairy market and the inability of dual-purpose carcasses to compete with beef cattle, most dairy farmers became staunch single purpose men.

With the triumph of the special purpose dairy cow came long term attempts to improve individual breeds. Pioneer efforts in the 1880s focused on strengthening the stock of milk cows by raising only the calves of good milkers and sending the "boarders" to the slaughterhouse (Lampard 1965:181). A more precise method to identify good milkers was the "cow census" (carefully recording the productivity of each animal) promoted by Hoard in the 1880s, a forerunner to the cattle testing programs of the early twentieth century. Testing programs conducted by the University of Wisconsin began on an experimental basis as early as 1886 but gained more widespread support after the development of the Babcock butterfat test in 1890 (to ascertain the quality of a cow's milk). Systematic testing by University of Wisconsin officials began in 1899 and within a decade 2,700 cows in 27 counties had been tested and rated according to productivity (Lampard 1965:183). Local cooperative testing associations supplemented the work of the College of Agriculture. In 1905, the Athens Advancement Association of Marathon County collectively paid the cost of testing its members' cattle. By 1916, 45 cooperative associations were testing 29,000 cows across the state (Lampard 1965:184, DOA 1916:25-28).

The improvement of dairy cattle not only strengthened the quality of dairy products, it increased the value of cattle marketed for siring or foundation purposes and generally raised the value of a farmer's herd. By the 1890s, state breeding associations (including the Wisconsin Jersey Breeders Association [established 1889] and the Holstein-Friesian Association of Wisconsin [1897]) adopted "advanced register programs" to certify purebred stock (Lampard 1965:183).

Community breeders associations (which attempted to breed better cattle locally by raising purebred sires) began in 1908 among Waukesha Guernsey owners and spread statewide in the following years. By 1915, 122 local breeding organizations existed, and Wisconsin dairy stock formed the foundation for herds across the nation (Hibbard 1917:3).

The importance of breeding associations to Wisconsin farmers was reflected in the membership of national organizations as well. When the national Holstein-Friesian breeding association was established in 1885, one-fifth of its members lived in Wisconsin. The National Brown-Swiss Breeders Association formed in 1901, established its headquarters in Beloit.

Just as important to the development of high quality dairy cows was the eradication of bovine tuberculosis and other diseases. In the 1890s, Henry Russell and the University of Wisconsin Agricultural College developed a tuberculin test which uncovered the dreaded disease in otherwise healthy-looking animals. The State Livestock Sanitation Board and State Veterinarian made "slaughter tests" around the state in the early twentieth century to demonstrate the efficacy and urgency of the test (Russell 1905:3).

By 1890, 40 percent of the state's cattle were single purpose dairy stock; in the twentieth century the figure ranged as high as 65 percent, and the state led the nation in the number of milk cows (a position it continues to maintain). Heaviest concentrations were reported in the eastern range of counties, running south from Green Bay and Kewaunee County to the state line (excluding Milwaukee, Kenosha, and Racine Counties in the

mid-twentieth century), with strong concentrations in Kewaunee, Calumet, Dodge, Jefferson, Waukesha, and Winnebago Counties. A second region of concentration throughout the twentieth century was centered in Green County and adjacent portions of Dane, Lafayette, and Iowa counties. A third region was concentrated on the rich silt loam soils of the middle northern tier of counties, running from Marathon westward to northern Wood, Taylor, Clark, Dunn, Barron, and St. Croix Counties (but excluding the light soils of the far north and the sandy soils of the central plains).

No farm animal has had greater physical impact on the Wisconsin farmstead than the dairy cow. The ubiquitous dairy barn, through its evolving scale and configuration, has been the mainstay of most Wisconsin farmsteads since the late nineteenth century. Although the first dairy farmers often housed cattle in simple sheds near the threshing barn (often poorly lighted and ventilated), a practice that continued in northern Wisconsin until the twentieth century (Henry 1895:43), "modern" dairy barns evolved as early as the 1880s. The barn typically featured a basement or ground floor stable, with long rows of cow stalls and stanchions, beneath a frame second story hayloft and threshing floor. In the stable, wide aisles between the stalls facilitated movement and cleaning. Multiple stable windows and flues provided both light and ventilation (important factors to a cow's health), while the thick stable walls (often of stone or, later, cement) provided insulation from the cold and damp. Some dairy barns featured forebays or pent roofs projecting above the first floor to protect the exterior stable area. By the twentieth century, the entire barn was sheltered more often by a gambrel or "Gothic" roof (favored over the earlier gable form because of the extra room it afforded the haymow) (Fish 1924:3). The "bank barn"--in which the barn was built into a hillside or embankment--was a popular adaptation in the southern counties throughout the period, providing both protection to the stable on one side and easy access, via the embankment, to the threshing floor above.

The needs of good shelter, movement, and storage of feed required a barn much larger than the threshing barns of the wheat era, and some structures (like the Vogeli barn in Green County [1917]) extended up to 150' in length, 50' in width, and 50' in height (Apps 1977:102). Despite its size, the dairy barn needed to accommodate occasional expansion. As the dairy herd grew, so did the barn. Thus, it is not unusual to see a barn with smaller additions projecting from it (or with attached subsidiary structures like silos, graneries, and milk houses, and smaller "calf barns" for young animals). Indeed, it was the lack of such flexibility that eventually doomed the "round" dairy barns of the early twentieth century, wherein wedge-shaped cow stalls were arranged around a central silo/manager in a pie-like fashion, expediting feeding and cleaning (Soike 1983:58-61). Increasingly after World War I, Wisconsin barns were constructed of light dimension lumber rather than heavy timber beams, with concrete floors and foundations.

Beef Cattle

The early history of beef cattle in Wisconsin is indistinguishable from the early history of dairy cows. Although pioneer stock were valued as much for their meat as their milk, the expense of buying and feeding beef stock limited development. Other factors handicapped early production, too. Not until after the Civil War did markets, packing plants, or transportation facilities exist to sustain large scale production. But when feed crop cultivation surged in the southwestern counties after 1860, stockmen had the basic element for successful beef production. Commonly purchasing year old "feeders" from area farms, stockmen fattened the animals on fodder corn and sold them later for slaughter. Corn, upon which fattening livestock depended, required about 140 days to mature (Wilcox 1950:10), thus making the warmer, dryer southwestern counties (where conditions were similar to Illinois and Iowa) the state's only true "corn-belt," and the largest center of beef cattle production (Lampard 1965:178). Farmers elsewhere, however, relied on hay, oats, and, in the late nineteenth and early twentieth centuries, early-maturing varieties of corn and silage and thus engaged in beef production in a more limited way.

By the late nineteenth century, stockmen were able to identify Herefords, Angus, and Shorthorns as the best beef breeds; the cows yielded little milk other than that needed for their offspring (Bufton 1954:10). Livestock breeders associations were organized in the late nineteenth century to support improvement campaigns. The Wisconsin Shorthorn Association, founded in 1889, was the first (Remey, 1924:56).

The late nineteenth century cattleman could choose from among three methods to engage in beef production: (1) breed his own cattle for fattening and sale to slaughterhouses; (2) breed without fattening and sell yearlings or two-year-olds to other farmers for fattening; or (3) buy yearlings (known as "feeders") for fattening and slaughter (Wisconsin D.O.A., 1915:28-30). Once fattened, a complex marketing process moved the cattle from farm to slaughterhouse. The livestock farmer had several alternatives: (1) he could sell to independent agents who travelled through the countryside and bought up beef cattle (the most common method in the late nineteenth century); (2) he could sell through a cooperative association which handled the entire transaction; (3) he could sell at local buying auctions, held regularly at livestock auction barns or pavilions; (4) he could sell at the large terminal markets or central stockyards in Milwaukee, Cudahy, Chicago, or St. Paul; or (5) he could sell directly to packing plant companies. Most of these alternatives involved several steps in which the cattle would be shipped and kept in cattle sheds by railroad sidings or at fenced "concentration yards" where cattle would be held until sale (Bufton 1954:20). To facilitate the marketing process, hundreds of cooperative livestock shipping associations were formed by Wisconsin farmers, the first in Black River Falls and East Ellsworth (Pierce County) in 1908 (Hibbard 1920:2).

Naturally, stock yards were built at shipping centers throughout the state. Although Wisconsin remained an important center of beef production, conveniently situated to midwestern meat-packing plants, by the 1950s only 10 percent of the state's cattle were raised for beef production (Bufton 1954:6). Unlike their dairy brethren, beef cattle have traditionally been housed in inexpensive shelter. The earliest shelter was provided by straw-roofed, open-sided sheds or simple haystacks (Wilcox 1950:2). By the late nineteenth century, beef cattle were housed in long, low rectangular sheds (Apps 1977:120).

HOGS

Driven from Indiana and southern Illinois during the territorial period, the first Wisconsin hogs were tall, lean, bristly "prairie-racers," whose long necks and tusky snouts were well adapted for foraging among wild vegetation (Schafer 1922:126). But the lack of dense forests or "hog commons" in southern Wisconsin required pens, fences, and feed. Confinement brought improvement. Reproducing rapidly, hogs changed character within a few generations, providing a cheap but primary source of meat for the farmsteads of early statehood and a source of cash when butchered, salted, barrelled, and sold in the growing cities or distant lumber camps of the state (Schafer 1922:107).

The ability to feed themselves and mature quickly made hogs attractive (and affordable) to early settlers, and hardly a farm was without a few (Ebling 1948:63). What was not consumed on the farm was sold at local markets. In the spring in the 1850s, for example, farmers drove thousands of hogs to Milwaukee and elsewhere where butchers barrelled them for shipment east (Ficker 1942:344). The supplemental income provided an adjunct to market grains and another way to help pay off the farm mortgage.

But despite the prevalence of hogs, commercial production before 1870 was small scale. From 1850 to 1870 hogs were distributed fairly evenly across the settled regions of the state, but their numbers were less than one-half that of sheep largely because of the lag in corn production during the wheat era (Lampard 1965:55). Not until the rise of urban areas, the development of refrigerated rail cars, and the growth of the packing industry

after 1870 was there substantial incentive for commercial production.

Such production was concentrated, of course, in the "corn belt" counties of the southwest where large fields of corn (and barley and field peas to a lesser extent) served as fodder that hogs quickly transmuted into ham. Between 1860 and 1870 Grant, Green, Lafayette, Iowa, and Dane counties had doubled their stock. The quickness and relative cheapness of hog production saved thousands of former wheat farmers in the region from ruin. Cheaper to raise than dairy cows (because of lower care costs), less expensive to ship than wheat, and transportable by rail, hogs were an attractive component even on farms where it was not the main product. In the southwest, hog farming was an economical companion to corn-beef agriculture, while dairy farmers elsewhere discovered that hogs effectively consumed dairy by-products like skim milk and whey (Schafer 1922:126).

Between 1870 and 1880, hog production increased 120 percent and ranked second only to dairying in value of product among the state's agricultural pursuits. In two southwestern counties - Lafayette and Grant - hogs actually outnumbered cattle. [The improvement of swine breeds accompanied the rise of commercial production. In 1883, the Wisconsin Swine Breeders Association was established, seeking to upgrade quickly-fattened breeds like Poland-China and Chester White (Remey 1921:56)]. By 1900, hog production had reached a high point in Wisconsin constituting 20 percent of farm income, processing two-fifths of the corn grown for grain, and spread across a belt of production which stretched from the Twin Cities southwestward to Milwaukee (Ebling 1948:63; Krause 1949:2-3).

After 1900, however, the state hog population declined (as dairying assumed greater importance) and levelled off at mid-century when it constituted about 10 percent of farm income. A brief surge in production occurred during World War II and by the 1980s, the state was the eighth largest hog producer in the nation.

Marketing hogs was similar to marketing other livestock. In the southwestern hog region, large-scale hog farms raised pigs for fattening, or purchased feeders for fattening and sale to slaughterhouses. But feeder pigs were often raised in the northern, east-central, and southeastern dairy counties, fed on dairy byproducts and sold at local "pig fairs" for resale to the fatteners of the corn belt (Krause 1949:34, Krause 1957:26). Fattened hogs were then shipped to market by buyers who purchased the animal on the farm itself or through a cooperative sales association which assembled hogs at local concentration yards and shipped them collectively to stockyards in Milwaukee, St. Paul, or Chicago (Krause 1949:19-21).

Housing hogs was cheap, one factor in their favor on pioneer farmsteads. The earliest hog "houses" were often old log barns or a framework of poles covered with woven wire and threshed straw. Later nineteenth century hog houses were typically long, low A-frame structures. Smaller houses for one sow and her litter might measure 12' long, 5' wide, and 6' high, raised on skids for movement from one pasture to the next, while large houses could house pens for as many as 100 animals (Apps 1977:120).

By the early twentieth century, the College of Agriculture had developed plans for inexpensive hog colonies. Generally, the large central hog house was a long rectangular building, typically 24' wide, 48' long, and about 6' high, with an A-frame, gable, or shed roof configuration, capable of housing eight 6'x8' hog pens and storage of fodder on an attic level. Small windows and flues provided ventilation. Several smaller portable "colony pens," with room for several hogs, supplemented the central house (Fuller 1914:25-32).

OXEN

Prized for their rugged constitutions, complacent temperament, and simple dietary needs, oxen were the mainstay of pioneer farm life, outnumbering horses and mules until 1855. Oxen excelled at pulling plows through tough grasses and sticky top soil. Six or seven yoked together, with two or three drivers, could rapidly break new fields, and teams were often hired out to neighboring farms. In 1850 each Wisconsin farm had about two oxen, outnumbering horses and mules by a ratio of three to two. By 1860, however, with the introduction of faster farm machinery (better suited to the gait of horses and mules), the hard-working oxen began losing favor. By 1870, horses and mules outnumbered oxen five to one. By then, oxen were limited mostly to northern counties for use in logging operations and to clear cutover areas (Lampard 1965:26; Nesbit 1973:284; Ebling 1948:52).

HORSES

Although horses were virtually unknown in the state before 1850, they were always highly prized both as draft and pleasure animals (Ficker 1942:344). By 1855, horses and mules replaced oxen as work animals, particularly in the wheat district of the southeastern counties where their speed proved more appropriate to the farm machinery of the day (Schafer 1922:107). The work horse was the most valuable piece of farm equipment and farmers often mortgaged their property to buy one. As late as 1865, for example, one horse cost more than three milk cows. Surplus army horses increased Wisconsin's supply significantly during the Civil War decade (Ebling 1935:61), and by 1870 the number of horses doubled, with two and one-half horses and mules per farm. The number continued to climb through the century, reaching 3.1 horses per farm in 1890 (near the historic high point of 3.63 in 1920) (Ebling 1948:52).

Thoroughbreds were relatively rare in the state through most of the century, but breeds were introduced in the southeastern counties before the Civil War. In 1860, two or three breeds were reported in the state; five years later, the State Agricultural Society noted "too many to mention," created largely by importation of thoroughbred stallions from Kentucky and elsewhere (Wisconsin State Agriculture Society 1865:40).

But the thoroughbred blood did not mix quickly with the common farm stock and improvement was generally slow. "Fancy" and "racing" breeds (especially in Racine and adjacent southeastern counties where the rich lime content in the soil was conducive to strong bones) were popular in the 1860s and 1870s, shown at county fairs through the period. Many communities, especially in the southern counties, constructed horse tracks to display and race such animals (Raney 1936:226). But improvement to racing stock did not upgrade the work horses on most of the state's farms.

Tentative improvement of work stock began to appear by 1880. That year, the first draft horse was awarded a prize at the State Fair, precipitating a general interest among breeders and farmers in purebreds (Schafer 1922:120). In the ensuing decades, Wisconsin breeders bred (and exported) Normans, Clydesdales, Percherons, Belgians, and other heavy types to cope with farm equipment. Breeders were particularly numerous in Rock, Columbia, Sauk, Dane, Dodge, Richland, Waukesha, and Milwaukee counties, and by 1900 the general work stock in these areas was decidedly improved. The State Department of Agriculture registered purebred stallions by 1905 and encouraged the use of such animals. Within a decade, most registered stallions in the state were purebred, and breeders sold their stock to buyers at the Chicago stockyards (Ebling 1948:53, Alexander 1905:66-68). The high point for Wisconsin horses was 1915 when 748,000 animals were reported. But with the introduction of the combustion engine to the farm, horse power was in less demand. The number of horses peaked in Milwaukee in 1900; in the southern counties in 1910, and in the northern counties, where horses continued to be used in lumbering operations, after 1920. Statewide, horses declined continually after 1916 (with a brief recovery posted at the height of the Great Depression), until by 1945 Wisconsin farms had fewer horses than in 1870 (Ebling 1948:53). Although sometimes housed in

general barns with other livestock, horses were also housed in special horse barns. Usually, horse barns had square proportions, with a gable roof, double door entrance, small windows and an upper story for storage of hay and oats.

SHEEP

Long before Wisconsin fields were planted to the feed crops that sustained a mature livestock agriculture, flocks of sheep, driven in from southern Illinois and the Ohio Valley, grazed on pasture land not devoted to wheat. The spinning wheel was an essential household item, and sheep supplied the raw material. But the animal also fed itself on available grasses, providing a cheap source of meat. Grazing on pasture and hillsides where wheat was not grown (and requiring little labor, shelter, or feed), sheep complemented the cash-crop economy and spread with settlement throughout the territorial period. Flocks were reported as far north as Lake Winnebago, but early concentrations formed in the southeastern counties of Kenosha, Racine, Walworth, and Waukesha, where pasture land was most plentiful and settlers from the British Isles and Vermont most prominent (Lampard 1965:52). Between 1845 and 1850, Wisconsin's sheep population exploded, climbing from 30,000 to over 125,000. The increase continued through the new decade as wheat farmers supplemented their income with wool and mutton. At the state fairs of the 1850s, purebred sheep (including Merino and Saxons, introduced in the southeastern counties by 1850) dominated the show (Schafer 1922:124). Concentrations remained high in Walworth County (especially around Whitewater), but flocks followed settlement as far north as Dodge and Fond du Lac Counties and westward to Dane and Rock Counties. Yet the increase in number did not improve conditions. Only a few farms had purebred animals and the sheep faced universally poor treatment.

The Civil War was a watershed in Wisconsin sheep production. In response to the shortage of southern cotton and the demand for woolen army blankets and uniforms, the population of Wisconsin sheep jumped dramatically. Happily, the surge in production during the 1860s coincided with the decline of wheat in the southeast, thus providing an important new source of income--as well as a respite for over-cropped fields. Sheep raising, wrote Eric Lampard, "was the first major adjustment toward more balanced farm management by raising the area of land left under grass" (Lampard 1965:54). Because sheep required little capital investment and reproduced at a rapid rate, most farmers found the transition more affordable than dairying or hog farming. Indeed, during the Civil War decade, sheep farming returned a higher profit than any other branch of agriculture (Wisconsin State Agriculture Society 1865:43). And unlike other livestock products, wool was non-perishable and easily shipped to distant markets. By 1864, Wisconsin growers placed four million pounds of wool for sale (Lampard 1965:53).

During the boom, several county sheep associations were formed in the southeast, and in 1864 a statewide organization (the Wisconsin Wool Growers Association) was established at Janesville to provide information for farmers and promote protective tariff legislation (Merk 1926:20). By decade's end, sheep production in the state increased three-fold (to over one million head in 1870) reaching a peak in the traditional southeastern wool district (Ebling 1948:64). Responding to the extensive amounts of wool shipped east, Wisconsin businessmen after 1870 began to erect local woolen mills to process the fiber, particularly in the southeast, south-central, and southwestern counties.

After 1870, sheep, driven in large numbers from eastern counties, gained a foothold in the hillier and rougher lands of counties in the southwest and west-central districts. But after 1880, wool production began a long term decline, pushed aside by the increasing profitability of dairy farms (Nesbit 1973:274; Ebling 1948:64) and the need for feed crops. By 1885, the state recorded an average of one sheep per farm compared with 15 per farm in 1866 (Krause 1980:2). In the late nineteenth century, sheep production was concentrated on hillier, cheaper, and less competitive lands, notably in Fond du Lac, Columbia, Richland, Vernon, and Grant counties. In ensuing years Trempealeau, Pierce,

and other northwestern counties reported gains. But with a decline in wool prices, mutton was more profitable and farmers in the south and west preferred Shropshire, Hampshire, and Oxford breeds rather than the Merinos and Saxon raised earlier for wool (Krause 1980:19). Some farmers fed their sheep on vines and other byproducts of the pea-packing industry, and sheep flocks increased somewhat in regions near canning plants (Ebling 1948:61).

Mutton raised for sale in the late nineteenth century was marketed much like other livestock products, sold to local buyers at auction, shipped through cooperatives, or sold at stockyards in Milwaukee and Chicago, or sold directly to packers. Statewide, the number of sheep dropped precipitously in the early twentieth century (a 41 percent decline between 1900 and 1910 alone) and by 1920 the state could boast only 400,000 sheep (fewer than in 1870). As the century worn on, sheep production continued to diminish in significance and concentration, although three counties - Rock, Columbia, and Grant--raised 25 percent of all sheep for market at mid-century (Krause 1950:19; Ebling 1948:64).

Although sheep were poorly housed through most of the mid-nineteenth century, a distinct "sheep barn" was common in the twentieth century (and plans for several prototypes were available through the University Extension Services) (Lacey 1934:10). The inexpensive, gable-roof, frame barn was built without basement and sided with a single sheathing of vertical boards. Usually, a second floor hay loft was used for storing winter feed. Large doors, opening to the south or east, provided access and ventilation, and windows, hinged at the bottom and opened at the top, helped regulate light and kept temperatures relatively cool. Although such sheds varied in size, a mature breeding flock generally required at least 15 square feet of floor space per ewe (Lacey 1934:10).

POULTRY

Chickens

Although no documents verify the extent of poultry production on pioneer Wisconsin farmsteads, it is well known that chickens and hens were an important source of family food and feathers. By 1850, probably 200,000 birds were kept on the state's farms. The first census of Wisconsin poultry, made in 1880, reported 3.5 million chickens, distributed among 95 percent of the state's farms (Estes 1950:1). Most of the products thus raised were consumed on the farm; some eggs were sold or bartered at local markets. But in the late nineteenth century, with the growth of cities, commercial production boomed. In 1889, the Wisconsin Poultry Association was founded (Remey 1924:56); within 20 years, over nine million chickens (mostly White Leghorns and Hampshires) were raised in Wisconsin, forming the third most important branch of livestock farming in the state. By mid-twentieth century, over 16 million birds were reported (although concentrated on fewer farms) (Estes 1950:1).

Because of the close relationship between poultry products and urban markets, the greatest concentration of chickens historically has been in southeast Wisconsin, particularly in Racine and Milwaukee counties. Other significant early twentieth century concentrations were found in the west-central counties (notably Pierce, Pepin, and Trempealeau) and eastern lakeshore counties (Sheboygan and Ozaukee) (Ebling 1948:74). These areas not only provided accessible markets, they supported the strong agricultural climate essential to poultry production. Chickens thrive on corn, oats, barley, and rye (Estes 1956:2-5); with better feeding comes higher egg and meat production per chick. Given those requirements, it is not surprising that chickens complemented dairy farming. Good foragers and cheap to house, chickens comfortably lived on the by-products of dairy farms. Not surprisingly, then, strong concentrations appear in the state's dairy districts while fewer chickens are reported on farms in the central plains and far northern counties (Estes 1950:2-5).

By the turn of the century, Wisconsin poultry farms produced five basic products: eggs for market, so-called "fancy" poultry for breeding purposes; hatching chicks for sale; eggs for hatching; and springers for meat. In the 1930s and 1940s, demand for poultry increased as consumers sought alternatives to beef and pork during the Depression and war years. Wisconsin farms raised over one million broilers to meet that demand (Brereton 1952:1). Most of these products were sold directly to stores and markets, but some were sold to local buyers, directly to consumers, to wholesalers, or through cooperative associations.

By 1930, as egg and poultry production increased in importance, young birds came increasingly from commercial hatcheries, concentrated in southeast and south-central counties (especially Dane), west-central and eastern lakeshore counties (Estes 1950:3-5). After the depression, most chickens were purchased from hatcheries; by 1951, almost 30,000,000 chicks were hatched in commercial hatcheries in the state (Brereton 1952:12). By 1950, poultry production in Wisconsin was a \$100 million business (accounting for one-eighth of the state's agricultural income) (Estes 1950:1).

Poultry houses on Wisconsin farms in the late nineteenth and early twentieth centuries were long, low rectangular frame structures. The so-called "long house"--housing numerous pens as well as feed--could measure 10' x 40' (about 6' high) and feature a variety of roof shapes, including shed, combination shed, gable, monitor, semi-monitor, or A-frame. The square hen house, used for breeding purposes, usually measured about 20' x 20' and was about 6' high (Halpin 1911:2).

Turkeys

The first census of turkeys raised in Wisconsin, conducted in 1890, reported 206,230 birds, the bulk of these in the southern third of the state. By the 1930s, turkey farms were established in northwestern counties as well (especially Polk, Barron, Rusk, Richland, and Waupaca), but the number remained relatively small (Brereton 1953:1). After World War II, demand increased and today Wisconsin is the nation's ninth largest producer of the bird, with production concentrated in the west-central, south-central and southeastern regions (WDOA 1983:69).

IDENTIFICATION

Resource Types. Resources associated with livestock production include barns, sheds, and pens for sheltering animals (including dairy barns, cattle sheds, hog houses, horse barns, sheep barns, poultry houses), structures for storing feed (including graneries, hay barns, silos, bins, and corncribs); structures and sites for marketing livestock (including concentration yards, terminal public markets, auction barns, stockyards, and holding pens); houses of significant stockmen, breeders, and farmers; offices and barns associated with breeding associations; offices and barns associated with cooperative shipping associations and livestock exchanges; barns and laboratories of the University of Wisconsin College of Agriculture and the various Experiment Stations.

Locational Patterns of Resource Types. Resources associated with the production of livestock, including barns, sheds, and farmhouses, were located on the farmstead itself. Markets and structures associated with marketing (including concentration yards, stockyards, holding pens, and the offices of cooperative shipping associations) are located in villages and cities close to rail lines and slaughter facilities; structures associated with the display of livestock are found at the county fairgrounds, usually located on the outskirts of the county seat, and at the various state fairgrounds; structures associated with breed associations are generally located in communities near the region of greatest production.

Previous Surveys. No previous survey has systematically identified actual structures or types of structures associated with livestock production, although the Green County Intensive Survey and Larry Jost's publication, The Round-And-Five-or-More-Equal Sided Barns of Wisconsin survey by Larry Jost (1979) have identified numerous dairy barns.

Survey and Research Needs. Because of the lack of adequate survey information, initial efforts must be directed toward a systematic perusal of the publications of the University of Wisconsin Agricultural Experiment Station and Extension Service, the Wisconsin Department of Agriculture, the Wisconsin State Agricultural Society, and the popular agricultural press to study both the prototypes of agricultural buildings disseminated by these groups and Wisconsin agricultural conditions over time. After such research, an "inventory" of building types can be compiled. Following that, field surveys should be conducted (focusing on regions of greatest production) to identify extant structures which are associated with the various phases of livestock production.

EVALUATION

National Register Listings and Determinations of Eligibility

Ferdinand C. Hartwig House (1864), 908 Country Lane, Watertown, Dodge County (NRHP

1982)

Stonefield, Town of Cassville, Grant County (NRHP 1970)

Pilgrim Family Farmstead (1850s), Town of West Kewaunee, Kewaunee County (NRHP 1979)

Lutze Housebarn (c.1850), Town of Centerville, Manitowoc County (NRHP 1984)

Klein Dairy Farmhouse (1892), 1018 Sullivan Ave., Kaukauna, Outagamie County (NRHP

1984, MRA)

Alexander A. Arnold Farm (1874), Town of Galesville, Trempealeau County (NRHP 1978)

Jones Dairy Farm (1907), Jones Ave., Fort Atkinson, Jefferson County (NRHP 1978)

Hoard's Dairyman Farm (1889), Town of Jefferson, Jefferson County, (NRHP 1978)

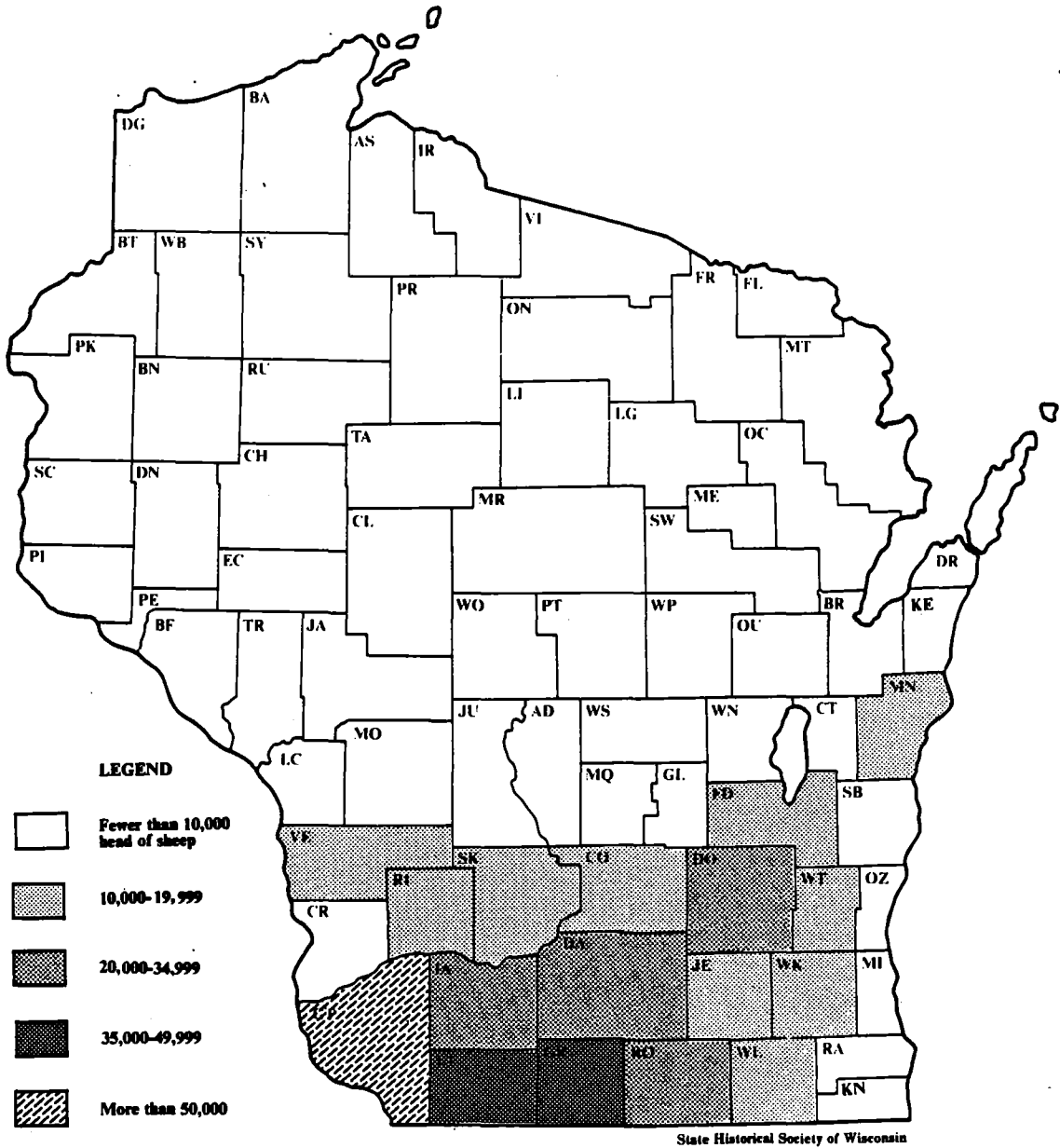
The Donald Farm, Town of Springdale, Dane County (NRHP 1984)
Wyman-Rye Farm (1857,1872) Town of Bradford, Rock County (NRHP 1977)
Annala Round Barn (1917-1921 and c.1928), Town of Oma, Iron County (NRHP 1979)
Centric Barns in Rock County Thematic Group

Context Considerations. Livestock production is associated with several types of specialty structures, including dairy barns, cattle sheds, hog houses, horse barns, sheep barns, and poultry houses. While some of these structures may be so architecturally or historically significant as to merit an individual National Register nomination, most should be evaluated in the context of the entire farmstead.

Many extant farm complexes associated with livestock production have undergone various alterations and modernizations in an attempt to stay abreast of contemporary agricultural practices. While some modern intrusions may not detract from National Register eligibility, integrity of the structures as they relate to a specific time period or method of livestock production is an important contextual consideration.

Most eligible farmsteads associated with livestock production will merit local significance. However, some farms or individual structures may be so historically important as to merit statewide or national significance.

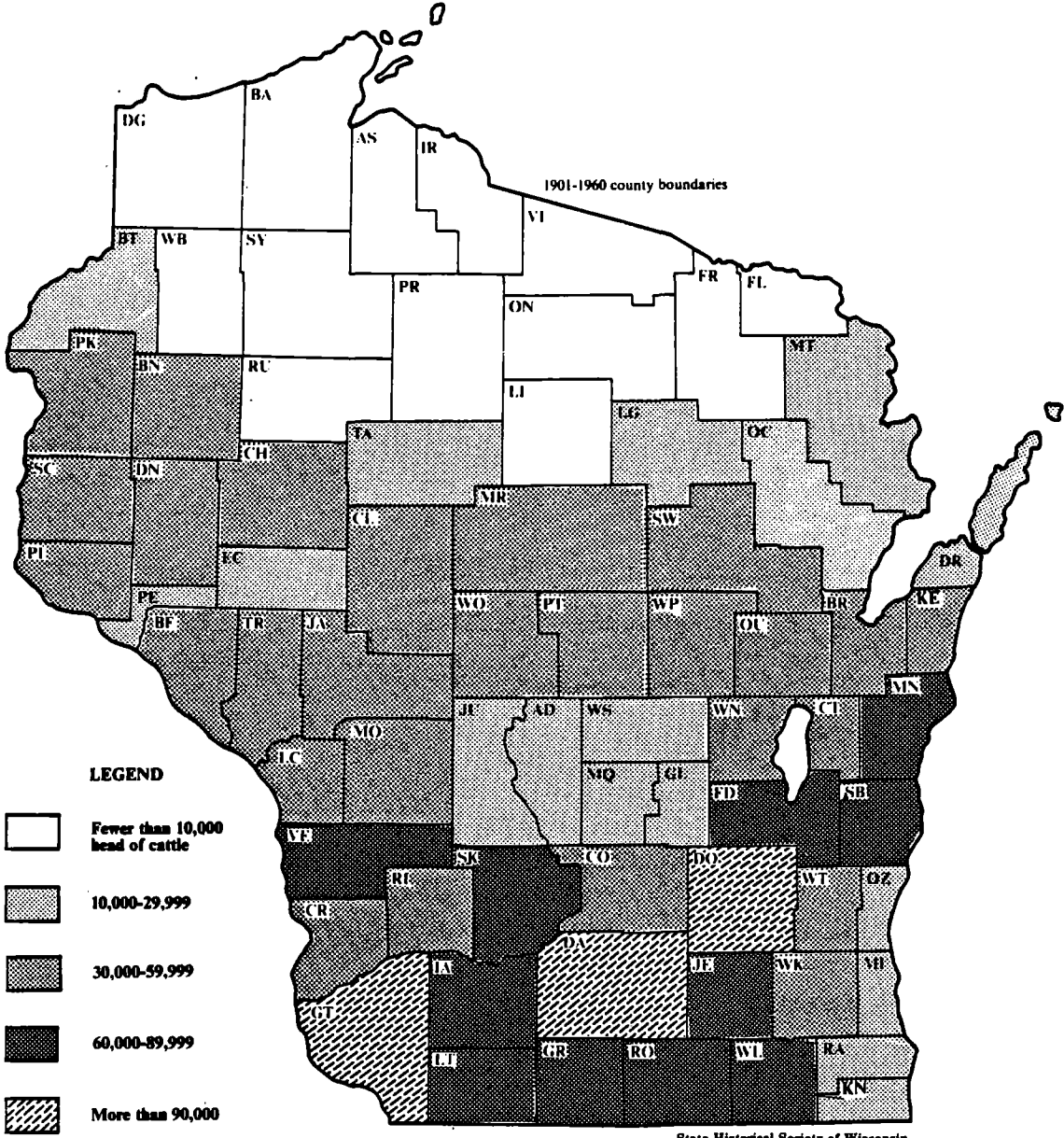
LIVESTOCK PRODUCTION



Head of Sheep by County, 1870

Source: Walter Ebling, *A Century of Wisconsin Agriculture*, Wisconsin Crop and Livestock Reporting Service Bulletin #290 (Madison, 1948), p. 105.

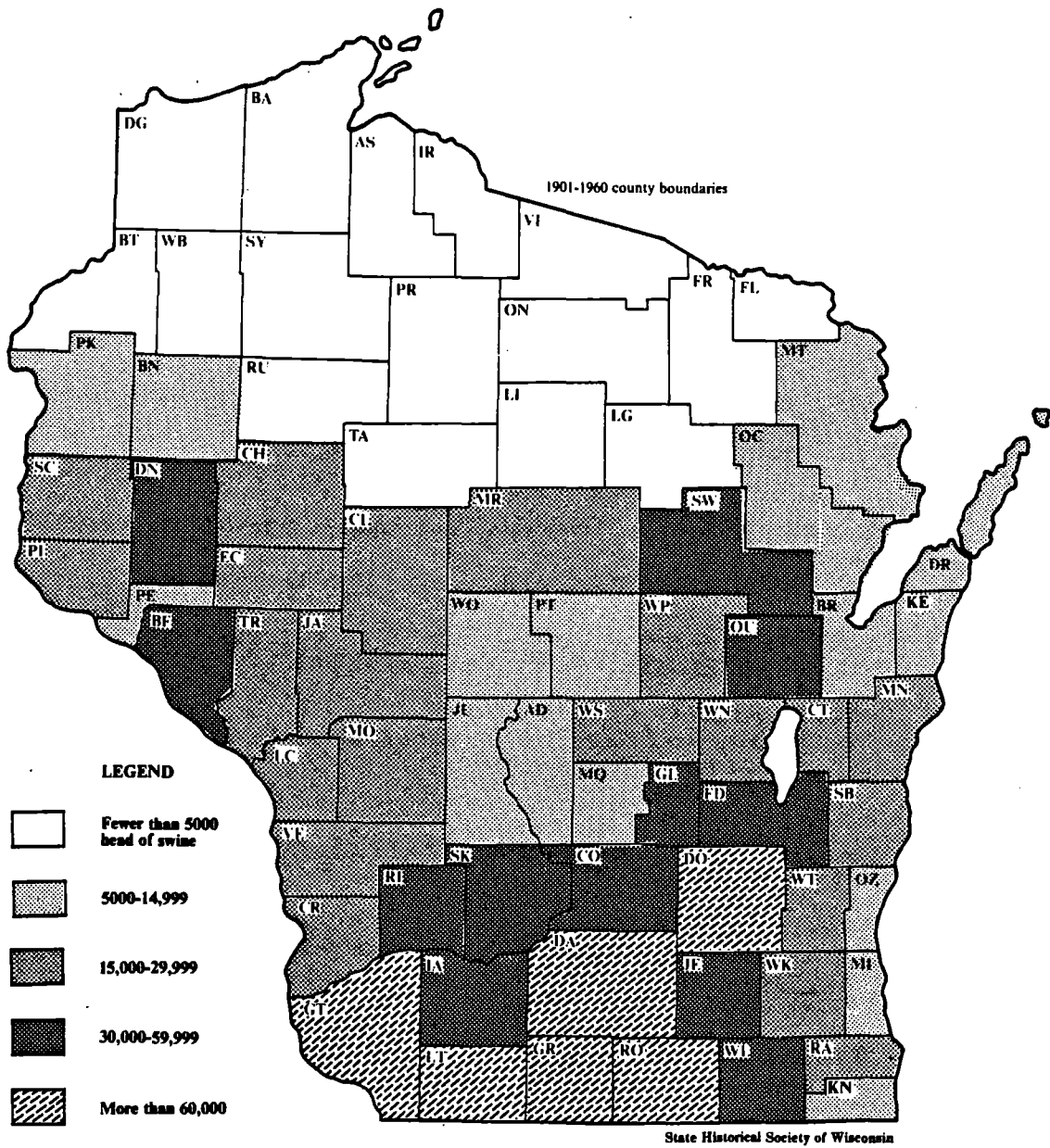
LIVESTOCK PRODUCTION



Head of Cattle by County, 1910

Source: *Thirteenth Census of the United States, 1910: Vol. VII, Agriculture*, pp. 914-919.

LIVESTOCK PRODUCTION



Head of Swine by County, 1910

Source: *Thirteenth Census of the United States, 1910: Vol. VII, Agriculture*, pp. 914-919.

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EARLY DAIRY PRODUCTION

Temporal Boundaries: 1830-1860.

Spatial Boundaries: Primarily southeastern Wisconsin, though found as far north as present day Winnebago County. Thinly spread, very site specific.

Related Study Units: Industrialized Dairy Production, Dairy Expansion, Livestock Production.

HISTORICAL BACKGROUND

"The modern dairy industry of Wisconsin is in direct line of descent from a few skillful and enterprising men . . . who began to make dairying a specialized concern and thereby surmounted many of the obstacles which had hindered its previous advance under the regimen 'balanced husbandry'" (Lampard 1963:86). These enterprising men were not native sons of Wisconsin, but were primarily New Yorkers who moved here during the late 1840s and 1850s. Many of them, such as Chester Hazen, Stephen Favill, Samuel Thurston, and others, had been raised on dairy farms and hoped to practice their occupation in the new West. They brought with them the techniques of skilled dairymen, but they would struggle for years before dairying became accepted as more than just another part of the general farming operations. Many of these early advocates and practitioners of dairy specialization eventually became leaders of the Wisconsin Dairymen's Association that was formed in 1872, but the acceptance of commercial dairying required a great change in the farmers' attitudes and economic circumstances that prevailed before the Civil War.

When some of these early dairymen first settled in Wisconsin, wheat was the major commercial crop--the dairy consisted of one or a few cows of unknown heritage who were milked during the spring and summer months, then allowed to dry off in preparation for winter. Drying off, it was believed, would result in higher milk production in the spring when the cow "freshened." It also allowed the farmer to feed the animals less of the precious winter feed. Many farmers, being hard-pressed to feed cattle through the winter months, slaughtered the majority of them, holding over only the best for the next year. The dairy was viewed strictly as an adjunct to the other farming operations and was a job performed by the women, just as was the gardening and other chores around the farmstead. The man's job was in the fields, plowing, planting, and harvesting. As a result of the lack of concentrated effort, little dairy product was sold commercially; that which was sold, whether butter or cheese, usually was of inferior quality. Butter often was stored for weeks before being brought to market and poor quality salt and production techniques resulted in a rancid product, often good only for greasing wheel bearings. Cheese also was of inferior quality for many of the same reasons - poor preparation and storage, as well as the quality of milk used. The shopkeeper who accepted butter and cheese for goods often sold it at a loss or for very low profit to city vendors.

Although it was more difficult to produce, most of the earliest commercial dairy operations made cheese rather than butter because it kept longer. Among the earliest of cheesemakers in Wisconsin was Charles Rockwell, who began production at Koshkonong a few miles south of Fort Atkinson in 1837. Within a year or so, Armine Pickett began operations at Rock Lake in the town of Lake Mills. "According to his sons, Pickett had driven 10 cows across country from Ohio with the intention of starting a regular cheese business in his new home. He agreed to milk another 10 cows belonging to some of his neighbors and brought his herd up to 30 by hiring a further 10 from wheat growers in Aztalan in 1841. By 1842 two more newcomers had lent an additional five animals to the

joint enterprise, and the whole herd grazed together at Lake Mills, being driven into one yard at night and milked separately by their owners" (Lampard, 1963:71). However, by 1846, the Lake Mills herd was dissolved and Pickett had moved his family to Utica township in Winnebago County to start a second cheesemaking operation. Although Pickett survived quite well as a cheesemaker, other experienced practitioners did not fare as handsomely. Stephen Favill set up operations at Milford in about 1851, but soon closed down in favor of wheat growing. It was not until after the decline in wheat prices at the end of the Civil War that Favill could operate successfully.

These large commercial operators did not exemplify the true pioneer phase of dairy production. If pioneers were interested in dairying at all they more typically owned a few inferior cattle that were poorly tended and gave milk of expected low quality. Though they might be interested in dairying, the real money was to be made in wheat growing. For example, soon after his arrival, Edwin Bottomley, an English immigrant who settled in western Racine County in 1842, invested 31 dollars in some butter-making equipment and a few animals of insignificant heritage. Although his herd increased over the next nine years, many of them were dry or gave little milk and often were sold at the end of the summer season. By the time he died in 1851, Bottomley's eight cows, five two-year old heifers, and four calves were worth the paltry sum of \$221, while his two horses, each 16 to 18 years old, were appraised at 95 dollars. The example of Bottomley points out the two problems in casual dairying that prevented the production of high quality and quantity of liquid milk--the careless attention given to the feeding and housing of the herd and the mongrelized nature of early dairy cattle. It was only at the time of Bottomley's death in 1851 that Wisconsin farmers were beginning to be exhorted to improve their herd quality if they hoped to manufacture dairy products that would provide them an income. Farm newspapers and journals pointed to the successes that eastern dairies achieved by carefully tending and housing their herds, and by the development of cattle that were proven milk producers. Still skeptical of the ability to build a successful specialized dairying operation, they promoted the "dual-purpose" Devons, Ayshires, Herefords, Shorthorns, and so-called "Aldernays" that gave both milk and meat. The success of single purpose herds that required more specialized operations was in the future.

At the same time that greater attention was being given to the development of improved breeds and their care, there also was increased attention being given to improvements in the manufacture of cheese and butter, and to the problems of marketing. In the 1840s and 1850s, it was recognized that there were almost as many ways to make cheese and butter as there were producers. The result was inconsistent taste and quality. By the 1850s experts were beginning to educate farmers to the importance of such variables as temperature and the quality of salt in the manufacturing stages and in the value of proper storage. However, the whole problem of markets made many farmers skeptical of the potential for specialized dairying. Only a small local demand existed for their product and this didn't promise much growth. To counter this, boosters argued that many of the available customers were being sold cheese and butter imported from the East partly because of the unsure quality of the home product. They argued that small local dairies could undercut these imports because of the large freight costs involved in shipping the heavy dairy products. Thus, a better local product would result in a larger market for the producers.

The vicissitudes of interest in dairying during this period were inversely related to the rise and decline of the wheat market. As the wheat market increased or remained high, interest in commercial dairying remained low; as the wheat market declined, more and more dairy farmers appeared. However, as we have seen in the topic on Diversified Agriculture, dairying competed with a variety of other cash crops and animal husbandry for the former wheat farmers' interest. The economic circumstances in Wisconsin were changing; King Wheat was dying, its successor unchosen. Because dairying required the farmer to work everyday, it required a serious change in attitude on his part. But even for those who had made the change during this time period, there were few efforts at

organized dairy manufacturing. Most of the production of cheese and butter still occurred on individual farms, even with large operations such as the Picketts and the Rockwells. One of the earliest exceptions was the effort of J. I. Smith of Sheboygan County. In 1858, he "procured that county's first cheese vat for his specially constructed cheese house. The building was boarded and battened outside with groats filled in between the studs; the inside was carefully lathed and plastered to assist in the control of atmosphere and temperature. Smith gathered unsalted curd from neighboring farmers which he then cooked, salted, pressed, and cured into the finest cheese yet seen in Sheboygan. He rounded out the season's activities by shipping 58 barrels to Chicago at eight cents a pound, the first cheese shipped to that destination from Sheboygan County. Smith's co-operative curd venture was shortly abandoned owing to the fact that his farmers left too much whey in the curd causing its rapid deterioration. Nevertheless, it was a significant innovation which clearly foreshadows the emergence of the cheese factory in Wisconsin a few years later" (Lampard 1963:84-85).

IDENTIFICATION

Resource Types. Dairy farms, dairy barns, cattle sheds, hay barns, corncribs, grain bins, milk houses, cheese houses, and homes of prominent dairymen.

Locational Patterns of Resource Types. Early dairy farms were located in the southeastern section of the state. Specific structures associated with early dairy production, including dairy barns, milkhouses, and hay barns, were located within the farm complex.

Previous Surveys. No systematic survey of dairy associated properties has been undertaken. The Geneva Lake and Trempealeau, Galesville, Blair, and Whitehall intensive surveys do, however, address the development of early dairying very briefly.

Survey and Research Needs. Because of the lack of adequate survey information, initial research efforts must be directed toward a systematic perusal of the publications of the Wisconsin State Agricultural Society, Hoard's Dairyman, and other popular agricultural publications to determine prototypes of dairy related buildings disseminated by these groups and Wisconsin agricultural conditions over given periods of time. Field surveys, focusing on the southeastern counties (the historic heartland of Wisconsin dairying) should be conducted to identify extant structures associated with early dairy production.

EVALUATION

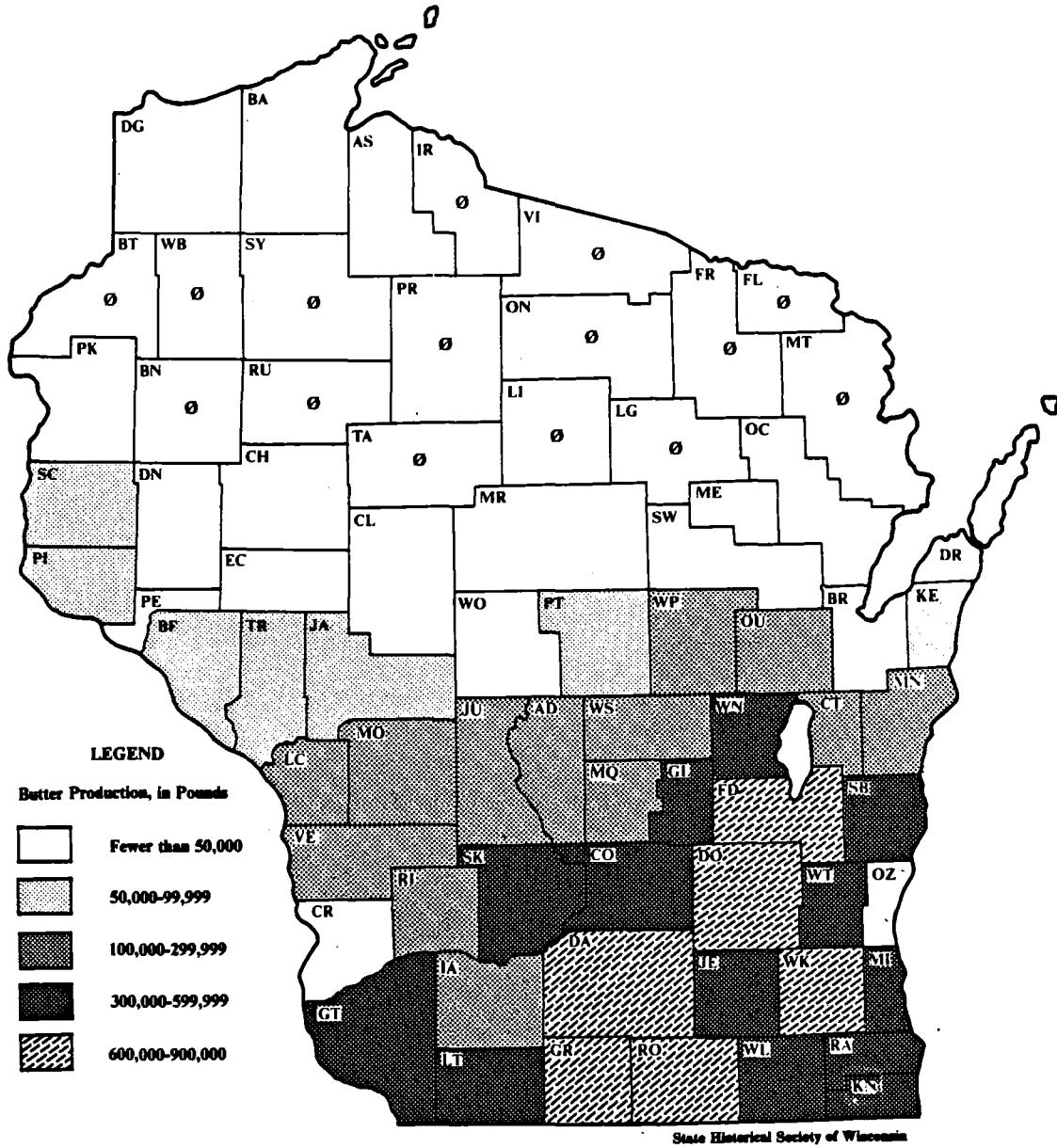
National Register Listings and Determinations of Eligibility

Jones Dairy Farm (1839-1922), Jones Ave., Fort Atkinson, Jefferson County (NRHP 1978)

Context Considerations. It will be difficult to evaluate structures specifically associated with early dairying since they were often multi-use structures associated with diversified agricultural pursuits of the first half of the nineteenth century. Most of these early structures should be evaluated within the context of the entire farmstead, although some individual buildings may be significant for architectural reasons, such as half-timbered buildings.

Many extant farm complexes associated with early dairy production have undergone various alterations and modernizations in an attempt to stay abreast of the industry. While some modern intrusions will not detract from National Register eligibility, the architectural integrity of these early structures is an important context consideration. Most of the eligible structures associated with early dairy production will merit local significance; however, some structures or farmsteads may be of great enough historical importance to merit statewide or national significance.

EARLY DAIRY PRODUCTION



Wisconsin Farm Butter Production, 1859

Source: Walter Ebling, *A Century of Wisconsin Agriculture 1848-1948*, Wisconsin Department of Agriculture Bulletin no. 290 (Madison, 1948), p. 109.

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INDUSTRIALIZED DAIRY PRODUCTION

Temporal Boundaries: 1860-1890.

Spatial Boundaries: Throughout the southern half of the state with concentrations in the southeast and in the Green and Richland counties area.

Related Study Units: Early Dairy Production, Dairy Expansion, Livestock and Poultry Production.

HISTORICAL BACKGROUND

Wisconsin dairying experienced a revolution of industrial development between 1860 and 1890. The price of cheese and butter rose sharply due to the increased demand for dairy products during the Civil War. The boost in demand and price gave added incentive to the already convinced core of innovative dairymen that a more efficient means of dairy product manufacturing was necessary. One result was increased specialization within agriculture as farmers became dairymen or crop farmers. Specialization also occurred within the dairying community; by the 1890s dairying could be divided into milk producers, dairy product manufacturers, and various types of middlemen. Dairying, especially cheese and butter manufacturing, moved out of the farmstead and into the factory between the Civil War and the 1890s.

The cheese factory did not spring wholesale upon the Wisconsin landscape during this time period. It had numerous antecedents before the Civil War in the efforts of Milo Jones, Armine Pickett, Stephen Favill, and others. Most of these early efforts were made by individual farmers developing cheese from the milk of their own herds--Pickett was one of the first to employ what was later known as associated dairying (the combining of milk from several individually-owned herds by a single manufacturer) at his cheesemaking operation in the Lake Mills, Jefferson County area. However, these unsystematic individual ventures were not always successful. Another antecedent is the associated curd factories of the 1850s and 1860s. Curd was brought together from various farms to a central location to be made into cheese. While this was a large step toward the specialization of labor in making cheese and other dairy products, the curd factories did not result in a better quality product than could be made on the farm. The factories could not exercise sufficient control over the quality of the curd being received. One lot of unsweet curd could ruin an entire cheese. In addition, the virtues of proper control over quality of salt and care in manufacturing were not fully understood. Finally, with the recognition that skilled labor was necessary to create a quality product, it was an easy step from the association of curds to the association of milk.

"Factory organization grew out of the conscious effort by dairymen to increase and improve the production of American cheese" (Lampard 1963:94). These dairymen were often the specialists that Wisconsin cheesemaking required to make Wisconsin cheese competitive with New York cheese in local and export markets. These early factory men were almost all New Yorkers who brought their talents with them when they immigrated to Wisconsin. Chester Hazen of Ladoga (Fond du Lac County) opened what was probably the first true cheese factory in 1864, though A. Knapp may have preceded him by a year with his factory at Omro in Winnebago County. By the end of the Civil War, there were 30 cheese factories in Wisconsin and 17 in northern Illinois. The Wisconsin number grew to 54 by 1870; creameries appeared during the mid-1870s. By the 1880s, cheese manufacturing was concentrated in three counties: Sheboygan (87 factories), Green (47), and Jefferson (36), with Walworth, Manitowoc, and Dodge counties next in descending order. Five years later, Green replaced Jefferson as the second largest cheese producer

while Sheboygan produced twice as much as its nearest rival. Much of Sheboygan County's cheese was exported to Great Britain and New York, an indication of the growing importance of distant markets to the growth of the cheese manufacturing industry. The rise of boards of trade in Sheboygan and Jefferson counties by 1880 attests to the necessity and the extent of this export trade.

Factory-made cheese brought a higher price because of its higher and more uniform quality. Consequently, farmers received higher prices for their milk. However, many dairymen strenuously resisted the rise of the dairy factory system. Their objections can be grouped into two broad categories: those related to disagreements about the milk itself and those having to do with the farmers' relationship to the factory system. The problems associated with the milk focused on the amount of butterfat in the milk and the ownership of the whey. Before Stephen Babcock invented a simple and inexpensive butterfat test in 1890, farmers were paid on the basis of the weight of the milk alone. Because good cheese requires a high butterfat content, the higher the amount of butterfat in a farmer's milk, the more it should be worth theoretically. The lack of an accurate butterfat measure made this amount difficult to determine and less than honest farmers took advantage of it by watering or skimming their milk before hauling it to the factory. Despite exhortations against this practice, enough farmers continued it to jeopardize the quality of the final product. Efforts to replace low butterfat with substitutes eventually ruined the cheese export trade. Ownership of the whey was also a problem between farmers and manufacturer. Because they had used it to feed livestock after making butter or cheese at home, many farmers continued to view whey as their property even after they began to bring their milk to the factories. Factory owners did not always agree. An additional disincentive to farmers was the necessity of hauling the whey back to the farm even if the factory owner was willing to return it. Babcock's butterfat test ended most of the problems with watered milk, but farmers did not give up the fight for their whey until the rise of scientific feedings.

The transportation difficulties apparent in the struggle over whey ownership appear in several areas of the farmers' relationship to the factory. The latter days of the nineteenth century were in many ways the dark age of road transportation in Wisconsin. As a result of the rapid rise of the railroads, road repairs and constructions were put off to the point where many roads were deeply rutted and difficult if not impossible to traverse. The three to five mile haul became an ordeal for the farmer, especially because it was necessary for him to keep regular delivery hours that complied with the factory's manufacturing schedule. Milk not delivered on time was rejected, regardless of its condition. Placed in this subservient position, many farmers rebelled against the factory system. The transition from wheat husbandman to herdsman had been difficult enough, but the adjustment to the even more regulated and confining routine of the factory supplier was too much. The task-oriented work of the farm was giving way to the time orientation of the factory. It was not until this conceptual problem was fully overcome that factory dairying could be successful on a large scale. Neither did the factory completely free the dairyman from the manufacturing process. Because cows were not milked year round, they had periods of low production in the fall as they began to dry off. The factories closed during these times of decreased milk production, but the farmer still had to do something with his milk. The lack of a large fluid milk market forced the dairyman to make his own butter and cheese using his own equipment. Many farmers felt that if they had to do this part of the year, there was no reason not to do it the rest of the year. This added to a reluctance to participate in the factory system at all.

In the 1870s, the leaders of the burgeoning Wisconsin cheese industry organized several professional organizations to promote their product and overcome farmer opposition to the cheese industry. Among the most famous was the Wisconsin Dairyman's Association, founded in Watertown, Dodge County, in 1872 by Chester Hazen, William Dempster Hoard, Stephen Favill, J. G. Hull, D. E. Smith, H. F. Dousman, W. S. Greene, H. C. Drake, and M. S. Barrett. This was primarily a marketing association though it

also provided education in new dairying methods through its publications and meetings. From the idea of associated marketing, boards of trade developed where sellers and buyers could come together to trade. The Watertown Board of Trade was founded the same year as the Wisconsin Dairyman's Association; two years later, in 1874, the Sheboygan Falls Board of Trade was established. By eliminating exorbitant middleman prices, these boards helped establish a fairer marketing system. They also contributed to the dairymen's education through lively discussions on technical dairying subjects at their weekly meetings. Probably the board's most successful activity was their support of county fairs and other exhibits of dairy products. The competition for awards at these fairs so greatly improved the quality of Wisconsin dairy products that the Wisconsin Dairy Association and the Sheboygan Falls Board of Trade ranked first and second in the number of awards won at the New Orleans Exposition in 1884.

Industry promotional efforts and a product that now surpassed the finest quality New York cheeses dramatically increased the sales and exports of Wisconsin cheese. The trade to Great Britain and New York was especially large and profitable. But this trade began to fall off in the late 1880s due largely to the tarnished reputation that resulted from adulterated cheeses. The most common technique was to add enough oleomargarine to the cheese mixture to replace butterfat that had been removed. Many people claimed that neither taste nor consistency was affected by "filling" cheese with oleo. Although apparently true in the short run, the filled cheeses exported to Britain and the South were often inedible. Canadian competitors began to take a greater proportion of the export trade lost through this practice. The decline of the profitable cheese export trade forced many factorymen to shift to butter or fluid milk production.

Until the late 1880s, buttermaking had remained a non-industrial farm operation. "The largest producers were Dane, Dodge, Rock, and Fond du Lac counties in that order; the creameries--fewer than 40--were confined to Jefferson, Kenosha, and Walworth counties in the more urbanized parts of the state, and perhaps Green and Juneau counties, the latter close to the pineries" (Lampard 1963:114-115). The tremendous growth in creameries that occurred between 1880 and 1891 took place between the two major cheese producing areas centered at Muscoda in the west and Sheboygan on the east--generally where there were no cheese factories. Among the leading counties were Kenosha, Walworth, Sauk, and Rock, with the dominance of the cheese factory threatened in Washington, Racine, Jefferson, and Dodge counties.

The spread of dairying changed the face of the Wisconsin landscape. Cattle and forage crops replaced the acres of wheat that recently had grown so poorly. As dairying grew important to Wisconsin's economic well-being, increased attention was given to the variables that influenced milk production: breed, feed, and shelter. The University of Wisconsin's new Agricultural Experiment Station and publications like Hoard's Dairyman, played an important role in educating farmers to the proper forms of shelter, the most recent feeding formulas, and the advantage of certain specialized breeds of cattle.

The short milking season was the most difficult problem to overcome. Because most farmers milked only seven or eight months out of the year, cheese factories accepted milk for only six months to prevent fluctuations in the milk supply which reduced the cheesemaker's profits. Some were open as little as three months of the year. Farmers were forced to dispose of the surplus milk supply on their own, usually through their own cheese or butter making operations. Consequently, farmers often were reluctant to participate in the factory system. They felt that it was not worth the effort to participate in associated dairying if they still had to maintain butter and cheesemaking equipment at home. In the latter part of the nineteenth century, it was realized that a lengthened milking season would benefit cheesemaker and farmer alike by allowing the factories to stay open year-round and by reducing the farmer's fixed costs. The solution to this problem changed the nature of dairying as well as the appearance of the Wisconsin landscape.

Farmer's attitudes complicated this problem of a short milking season. "There were men who boasted that they had brought their herd through the winter on a minimum of feed; others were convinced that the longer a cow was dry the more she would yield after freshening in the spring" (Lampard 1963:154). By the late 1870s, it was known that extra feeding extended the milking season and increased the milk flow throughout the year. However, the successes of winter feeding demonstrated by dairyman Hiram Smith of Sheboygan County and George Lawrence, Jr. of Waukesha and the admonitions of W. D. Hoard and others were met with farmers' remonstrances about the scarcity of farm labor. In turn, the dairy leaders argued that hiring permanent help would alleviate the shortage caused by the current practice of hiring seasonal labor--it would also rid the countryside of tramps. In essence, the dairy leaders were arguing that all phases of dairying could be more profitable if it were a year-round occupation.

The 1870s also marked the end of the search for the solution to the winter feed problem. Several techniques for providing abundant, inexpensive, and nutritious winter feed were promoted before the "truly revolutionary method of winter feeding was introduced in the late seventies with the practice of 'ensilage'" (Lampard 1963:155). This was an ancient method of grain preservation that had been under close study in Europe since the 1850s. When Wisconsin dairymen first began to experiment with the new technique, silage was stored in pits covered with earth. After numerous studies by William A. Henry and others of the University of Wisconsin Agricultural Experiment Station, the virtues of silage were promoted throughout the state via the WAES bulletins. As the increased use of silage changed the management of the farm, it also changed the face of Wisconsin's rural landscape. Pit silos gave way to square above ground silos which, in turn, evolved into the varieties of round silos evident today. Many of these forms were designed by Franklin H. King and other members of the Experiment Station. Their efforts contributed significantly to the move toward agricultural specialization, as husbandman became farmer, and farmer became dairyman.

By the 1890s, the foundation of the Wisconsin dairy industry was firmly in place. The professional and educational organizations--from the Wisconsin Dairyman's Association to the Agricultural Experiment Station at the University of Wisconsin--were established and respected institutions. The first generation of farmers, slow to change their ways, was giving way to the second generation bent on making farming a business. And the idea of association--whether through the cheese factory, the cooperative store, the local Board of Trade, or the Grange--was becoming the new touchstone. So-called rugged individualism, often marked by outmoded practices and physical isolation, was being transformed into the new, scientific business of associated dairying. But the bricks and blocks that made up the building were not as solid as once thought. The reputation of Wisconsin cheese had been badly damaged by adulteration caused by the desire for quick profit. The 1890s marked another turning point in the state's major agricultural industry.

IDENTIFICATION

Resource Types. Dairy barns, silos, grain bins, corncribs, hay barns, milk houses, cheese houses, homes and farms of prominent dairymen, breeders, agricultural educators and inventors, creameries, cheese factories, sites associated with early Boards of Trade, agricultural associations, cooperative associations, and the University of Wisconsin Agricultural Experiment Station.

Locational Patterns of Resource Types. The majority of late nineteenth century dairy farms were located in the southern half of the state, particularly in the southeastern and south-central sectors, including Green and Richland counties. Many resources associated with industrialized dairy production, e.g., barns and silos, were located within the farm complex itself. Structures associated with the production and marketing of dairy products, e.g., creameries, cheese factories, and cooperative shipping associations, were generally located in villages, towns, and cities close to principal transportation routes. Structures associated with breed associations were generally located in communities near to the region of greatest production.

Previous Surveys. No previous survey has systematically identified structures or types of structures associated with Wisconsin's industrialized dairy production. The "Agriculture" chapters of some intensive surveys, e.g., Geneva Lake, and Green County, do provide some information on industrialized dairy production for particular localities. The Round-And-Five-Or-More-Equal-Sided-Barns-Of-Wisconsin survey by Larry Jost also provides important information about dairy barns.

Survey and Research Needs. Because of the lack of adequate survey information, initial research efforts must be directed toward a systematic perusal of the publication of the University of Wisconsin Agricultural Experiment Station and Extension Service, the Wisconsin Department of Agriculture, the Wisconsin State Agricultural Society, and the popular agricultural press to determine prototypes of dairy related buildings disseminated by these groups and Wisconsin agricultural conditions over given periods of time. Field surveys, focusing on the southeastern and south-central counties, should be conducted to identify extant structures associated with industrialized dairy production.

Further research on the following persons might shed further light on the subject as well: Levi P. Gilbert, Fort Atkinson (first pit silo in the state); Bryon Snyder, Clinton (first above ground silo in the state); John Steele, Aderly (early promoter of silos); Dean Henry L. Russell (silage experimentation and promoter); F.H. King, Hebron (promoter of round barns and silos and the inventor of King's ventilation system for barns).

EVALUATION

National Register Listings and Determinations of Eligibility

Arthur R. Hoard House, 323 Merchants Ave., Town of Jefferson, Jefferson County (NRHP

1982)

Hoard's Dairyman Farm, Town of Jefferson, Jefferson County (NRHP 1979)

Jones Dairy Farm (1839-1922), Jones Ave., Fort Atkinson, Jefferson County (NRHP

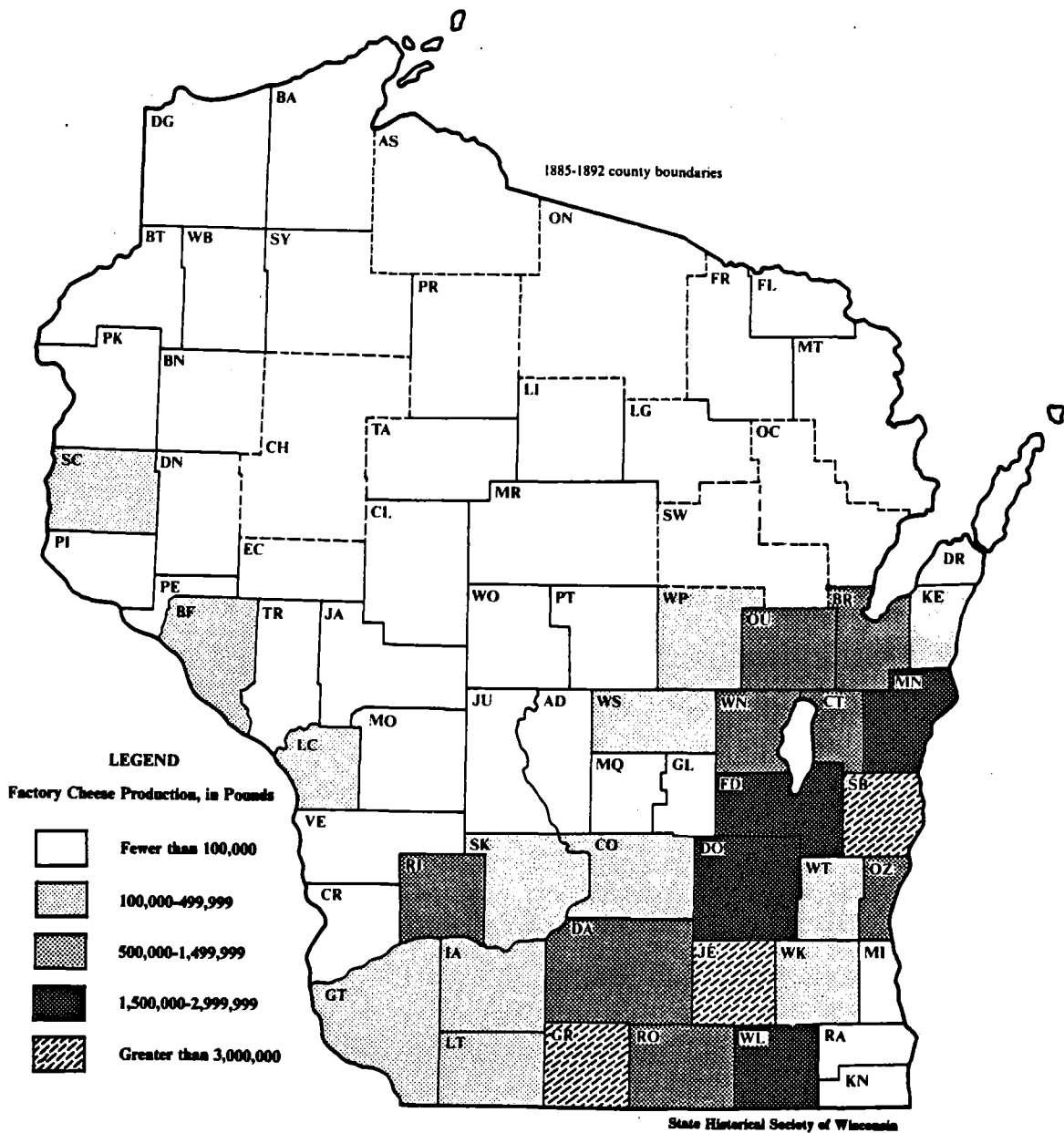
1978)

Cooksville Cheese Factory (1875), Town of Porter, Rock County (NRHP 1980;
Cooksville MRA)

Context Considerations. While some farm structures associated with dairy

production, e.g., dairy barns, may be so architecturally or historically significant to merit an individual National Register nomination, most should be evaluated in the context of the entire farmstead. Many structures within extant farmsteads have undergone various alterations and modernization in an attempt to stay abreast of contemporary dairying practices. Some modern intrusions may not detract from National Register eligibility, but the overall architectural integrity of these structures should be an important contextual consideration. Similarly, a majority of extant dairies, creameries, and cheese factories have been extensively modernized and altered in order to keep abreast of contemporary production practices. Original machinery, where still in place, may be of substantial interest and can enhance a nomination. When evaluating dairy associated complexes, e.g., creameries and condensaries, careful attention should be given to the integrity of the entire complex.

INDUSTRIALIZED DAIRY PRODUCTION



Wisconsin Factory Cheese Production, 1885

Source: Walter Ebling, *A Century of Wisconsin Agriculture, 1848-1948*, Wisconsin Department of Agriculture Bulletin no. 290 (Madison, 1948), p. 111.

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DAIRY EXPANSION

Temporal Boundaries: 1890-present.

Spatial Boundaries: Entire state.

Related Study Units: Early Dairy Production, Industrialized Dairy Production, Livestock Production and Poultry Production.

HISTORICAL BACKGROUND

By 1890, dairying was well on its way toward becoming a leading industry in the state. "The difficult period of experiment and adjustment now lay behind and after 1897, the industry went on to enjoy almost three decades of prosperity and expansion. Not before the second quarter of the present century did the dairy farmer find himself engulfed by the deepening economic crisis of American agriculture. Though other systems of farming, such as the combinations of corn and hogs, grain and cattle, or specialty crops, might flourish here and there in the state, the dairy and its related livestock activities were henceforth the chief concern of a majority of farmers. Their task was to produce the raw material for a highly specialized branch of manufactures. Dairying, in short, had become Wisconsin's specialty" (Lampard 1963:244).

By 1915, Wisconsin has become the leading dairying state in the nation. It produced more butter and cheese than any other state in the Union and surpassed even New York in fluid milk production. This massive increase in production fostered a great many technical advances that aided even greater production. Among these were the Cooley-Fairlamb cream can, the centrifugal cream separator and the Babcock butterfat test (1890). Other innovations included David Curtis' box butter churn and the University of Wisconsin Agricultural Experiment Station's numerous and varied technical and chemical advances in dairy product development, especially the cold-curing method of cheesemaking.

However, success did not occur without first overcoming tremendous problems of image and quality control. Short-sighted factory producers had destroyed the cheese export trade - the major profit of the industry - with the introduction and proliferation of filled cheese. In this manufacturing process, the butterfat necessary for making quality cheese was removed from the milk to be used in buttermaking. The butterfat was then replaced with lard, oil, or oleomargarine and the cheesemaking process completed. The final product tasted no different to the consumer if eaten fairly soon after production. By using this process, factory producers could dramatically increase their profits by substituting a cheap filling for the butterfat and then using the butterfat to make butter.

Severe problems arose with the export trade because the filled cheese became rancid if not eaten soon enough. Those areas furthest from Wisconsin - Great Britain and the American South - complained the most because almost none of the cheese received from Wisconsin was edible. By the late 1880s, the Wisconsin export trade was virtually non-existent. Wisconsin's cheese reputation was so poor that quality Wisconsin cheese was shipped to Canada for re-packaging as Canadian cheese to be exported overseas or to the United States.

After years of cajoling by dairy leaders like William Dempster Hoard and as falling prices and product demands caused factory after factory to close or reduce operations, producers finally realized their mistake. With the establishment of the Wisconsin Dairy Commission in 1889, Wisconsin began the long haul back to prominence. The dairy commissioner began policing factories to ensure sanitary production facilities and an educational

campaign by the University of Wisconsin College of Agriculture was stepped up. "By 1893 several prominent cheese makers had realized that their special stake in the manufacture and marketing of a prime product required a business association apart from the old Dairymen's Association, and in that year a Wisconsin Cheese Maker's Association was formed to foster the special interests of cheese dairying" (Lampard 1963:253). In addition to educating farmers in better methods of milk handling and compelling the adoption of the Babcock test as the basis for milk payments, the Cheese Makers' and the Dairymen's Associations joined forces to lobby the state legislature to "root out the filled cheese heresy. Finally in 1895 the Wisconsin legislature outlawed the manufacture and sale of cheese from skimmed milk. This prohibition was reinforced in the following year by a federal statute which taxed and branded all filled cheese. The two legal measures, together with the upswing in the business cycle in 1897, marked the beginning of the end for filled cheese. By 1912 the dairy commission could report that 'the department has not found a pound of filled cheese manufactured or sold in Wisconsin during the past ten years'" (Lampard 1963:253).

At the time of this report, cheese production once again was well established in Wisconsin. Factory cheese production had doubled between 1895 and 1905. In 1899, Wisconsin produced 26.6 percent of all United States cheese; this rose to 46.4 percent in 1909, and to 63.1 percent, or 298,705,911 pounds in 1919. Although the overseas' trade was never regained, the expansion of the domestic market more than offset its loss.

Oleomargarine caused greater problems for the dairy industry. Invented in 1867 by Parisian chemist Mege-Mouries, his process was patented in the United States in 1873; that year the Oleo-Margarine Manufacturing Company of New York began production. The burgeoning factory butter manufacturers in Wisconsin greeted oleo with open arms. Most of them saw it as a way of forcing cheaper, inferior butter off the market. But as a substitute for butter it proved too successful. Not only was inferior butter forced out, but butter sales fell in general. Despite the successful efforts of the Dairymen's Association and, later, the Wisconsin Buttermakers' Association (founded in 1902) to limit oleomargarine production and consumption, the substitute found its way into millions of homes. "By 1911 the Internal Revenue Commissioner reported that even retailers were violating the [1902 Oleomargarine Act]" due to the potentially massive profits to be made (Lampard 1963:257-266). Eventually, widespread importation and coloring violations were brought under control, but factory butter making never reached its full potential because of oleomargarine. "By July, 1950, when the oleo interests finally effected the repeal of the federal law of 1902, the butter industry had long since become the least buoyant sector of Wisconsin's dairy economy" (Lampard 1963:266).

Most, if not all of the loss of potential buttermaking profits was made up with the rise in sales of fluid milk. The high per capita consumption of fluid milk is a twentieth century phenomena. Much of this consumption resulted from the increased technical and sanitation procedures which eliminated animal odors and the threat of disease, especially tuberculosis, from milk, and eased the process of distribution.

The years 1890-1910 were critical to the development of milk sanitation, as the two major practices of marketing pure milk were instituted. The first of these practices was the certified milk program begun in New Jersey in 1892. "During the early years of this century a few farmers in southeastern Wisconsin took advantage of the scheme and enjoyed a lucrative, if limited, market in both Milwaukee and Chicago" (Lampard 1963:234). Unfortunately, the high price prohibited those people most in need of wholesome milk from obtaining it. "Pasteurization" solved this problem. In 1886 an Austrian chemist had successfully experimented with variations of Louis Pasteur's method of curing "wine sickness" in preparing milk for infant feeding. Before long, chemists and physicians in the United States were practicing a variety of "pasteurization" techniques. Despite the obvious success of the process in lowering infant mortality, it took thirty to forty years for pasteurization to become a nearly universal requirement in American

cities. For example, in Wisconsin, 91.5 percent of all milk sold in Milwaukee in 1916 was pasteurized, but only 8.6 percent of Oshkosh's milk was so treated.

The rise of preserved milk in the late nineteenth century is the other half of the fluid milk story. A desired product since the early nineteenth century, it was not until 1856 that the first satisfactory method of producing "condensed milk" was developed by Gail Borden of Texas and New York. At first, the number of condenseries and the desire for condensed milk grew slowly. No condensary appeared in Wisconsin before Borden's New York company built a plant at Monroe in 1889. The next plant appeared in Racine in 1905, but in the next five years 17 more plants were built in the state: by 1910 there were six in Walworth County, three in Jefferson County, two each in Green, Kenosha, Racine, and Waupaca counties, and one in Washington and Sheboygan counties (Lampard 1963:240-241). By 1920, there were 67 plants in the state handling about one-fourth of the national condensary product.

DAIRY REGIONS IN WISCONSIN

"By 1915 the state had developed a number of roughly concentric belts of production which, if merging at their edges, could nevertheless be distinguished on maps of Wisconsin dairy plants published by the dairy commissioner" (Lampard 1963:268). The following descriptions of those regions are from Lampard's book, pages 268-272:

The Southeast

The earliest and most complete transformation occurred in the historic dairy counties of the southeast which comprised the heartland of Wisconsin dairying. Between 1885 and 1905 creamery butter production literally displaced the cheese factory in this part of the state and, by 1900 a growing proportion of the creamery milk supply was being diverted into more profitable channels of market milk. Production figures reported in the state census returns reveal the magnitude of the change:

Factory and Creamery Production in Southeastern Counties of Wisconsin, 1855-1905 (Reported in pounds)

| | Cheese | | |
|-----------|-----------|-----------|---------|
| | 1885 | 1895 | 1905 |
| Racine | 9,700 | ---- | ---- |
| Kenosha | 149,572 | 17,900 | ---- |
| Milwaukee | 75,760 | 40,000 | ---- |
| Walworth | 2,217,999 | 875,000 | ---- |
| Waukesha | 315,770 | 194,561 | 309,265 |
| Jefferson | 3,014,196 | 1,060,101 | 875,188 |

Butter

| | 1885 | 1895 | 1905 |
|-----------|-----------|-----------|-----------|
| Racine | 716,292 | 1,422,916 | 1,430,602 |
| Kenosha | 726,096 | 1,460,850 | 1,414,878 |
| Milwaukee | 761,892 | 724,212 | 222,584 |
| Walworth | 1,432,572 | 5,089,419 | 4,985,222 |
| Waukesha | 1,232,307 | 2,292,871 | 2,356,823 |
| Jefferson | 1,105,679 | 3,683,373 | 6,345,851 |

SOURCE:

CRS Bulletin 290, table 45, based upon "State Census Reports."

No doubt, some of this butter increment was simply the result of the enlarged milk supply, and some of the decrease in cheese production was a consequence of the filled cheese episode; after 1895 both butter and cheese production suffered from the growing demand for market milk. In Milwaukee County, for example, the decline in both butter and cheese output after 1900 can be attributed to the effect of urbanization. The slight decline in the creamery product of Walworth County by 1905 reflects the growth of the condensery industry as well as the encroachment of the Chicago milk shed. Kenosha County, which in the early seventies had been a banner county for cheese, did not support a single cheese factory at the end of the century, while in Racine County the only cheese made after 1895 was a by-product of one combined factory-creamery. Waukesha County appears to be an exception but, in fact, represents a microcosm of what was taking place across the state. After 1895 production of cheese increased in the area already devoted to cheese, adjacent to the brick cheese industry in Dodge County. The eastern part of Waukesha County was absorbed into market milk production and the western townships especially north of Pewaukee and west of Wales, became the locus of creamery production.

By the early years of this century, therefore, the extreme southeastern part of the state was distinctively a region of creameries and the factories had been pushed toward the north and west. Indeed, some creamery competition had been felt as far north as the established cheese-producing region embracing parts of Dodge, Fond du Lac, and Winnebago counties. Not only had all three registered increases in butter output by 1900, but the last two had witnessed a decline in the number of factories, albeit no corresponding reduction in the output of cheese. In no case, however, did creamery development set in so fast or go so far as in the counties to the south of this eastern cheese belt. The increase of butter production in Dodge County, for example, was greatly overshadowed by the expansion of brick cheese output and by 1900 Dodge County ranked third in the state both for the number of its factories and the size of their product. Likewise, Sheboygan and Manitowoc counties continued their intensive cheese dairying and, as a consequence, made only small advances in butter.

Southwest

In the specialized cheddar and foreign-type cheese districts of the southwest there had also been a sharp upsurge in butter production, especially in the depression days of the early nineties. The expansion went furthest in Lafayette County which produced over two million pounds of butter in 1895. Lafayette County, however, had always been less committed to cheese dairying than either Green or Richland counties and large areas in the county had only recently converted to dairy farming of any description. Statistics for the first decade of this century confirm the fact that the southwest generally withstood the challenge of the creamery and, despite a sizeable output of butter, remained essentially a cheese producing region.

South-Central

If the continuing specialization in the southwest and the new turn in the southeast represented the varying responses of dairymen to changing economic conditions, then the intermediate counties, such as Dane and Rock, understandably contained elements of both factory and creamery expansion. From the standpoint of the dairy, Dane County can be regarded both as an extension of Jefferson County from the east and of Green and Iowa counties from the west; the clear division of cheese and butter activities in this part of the state, however, points to the fact that economic advantage is always closely related to natural conditions. Thus the census returns from Dane County reveal increases in both cheese and butter production, with the latter more marked. But, whereas butter increases are general throughout the county, the smaller cheese increment originates in areas bordering Green and Iowa counties. Dane County, in fact, appears to be the "typical" case of both intensive and extensive dairy development: intensive cheese production and extensive butter production. By 1905 it had not only become the banner county for creamery butter, but had also achieved a fivefold increase in cheese output over the two previous decades. Rock County also witnessed simultaneous advances in cheese and butter but, on the whole it tended toward the pattern established in the southeast.

The West

Another development during the "creamery decade" deserves special mention: by 1900 a new butter region had developed along the Mississippi river in the far western portion of the state. Vernon, La Crosse, Monroe, and Trempealeau counties each produced over a million pounds of creamery butter in 1895. Trempealeau had already exceeded two million pounds, much of which compared in quality and price with the best southeastern product. Like the adjacent counties of Minnesota, however, this western butter development differed from its older counterpart in the southeast in that it represented a new conquest for dairying and did not involve the displacement of any well established cheese industry. No significant factory growth had appeared in this area before the nineties, hence the proliferation of small creameries marked the first substantial gain for industrial dairying. The western creameries followed very closely on the decline of wheat growing, and it may well be for this reason that leadership in dairy enterprise fell to farmer-co-operative organizations established by relatively recent converts to livestock husbandry.

North Central and Northwest

The other remarkable development of the nineties was the spread of dairying into hitherto neglected sections of north central and northwestern Wisconsin. In several northern counties butter output had risen where, before 1895, all dairy production had been insignificant. By 1901 Polk County had 16 creameries and four combined factory-creameries; Barron county had eight creameries, Pierce 15, Chippewa 10, Portage 15, and Marathon 11. Of these only Marathon and Clark counties, which at this time had only four factories, were shortly to experience a very rapid growth of cheese dairying and smaller cheese gains were also to be registered in Barron, Chippewa, Polk, and St. Croix counties. Thus the long tradition of agricultural prophecy in regard to this region, reaching from Increase Lapham in pioneer days through Abbot Ellis, John Wesley Hoyt, and others, to Dean William A. Henry at the close of the century, now seemed on the verge of fulfillment.

IDENTIFICATION

Resource Types. Farms and houses of prominent dairymen, breeders, agricultural inventors and educators; dairy barns, including centric barns; silos; creameries; cheese factories; condenseries; skimming stations; shipping facilities; sites associated with dairy associations, cooperative associations, and the University of Wisconsin Agricultural Experimental Station; typical "dairying" landscapes.

Locational Patterns of Resource Types. Rural areas throughout state supported twentieth century dairy farms. Creameries, cheese factories, and condenseries were commonly located adjacent to major transportation routes as were structures associated with the marketing of dairy products. Structures associated with breeders associations were generally located in communities near the regions of greatest production.

Previous Surveys. No previous survey has systematically identified structures or types of structures associated with the period of dairy expansion (1890-present). The "Agriculture" chapters of several intensive surveys, e.g., Green County, Geneva Lake, and Trempealeau, do provide some information on structures related to the later period of dairy production in specific localities. The Round-And-Five-Or-More-Equal-Sided-Barns-Of-Wisconsin survey by Larry Jost also provides pertinent information.

Survey and Research Needs. Identify any new types of structures associated with twentieth century dairy production by examining the publications of the University of Wisconsin Agriculture Experiment Station and Extension Service, the Wisconsin Department of Agriculture, the Wisconsin State Agricultural Society, and the popular agricultural press. Field surveys should be undertaken throughout the state, but particularly concentrated in those northern counties where dairying is a relatively new industry, to identify extant structures associated with later dairy production.

EVALUATION

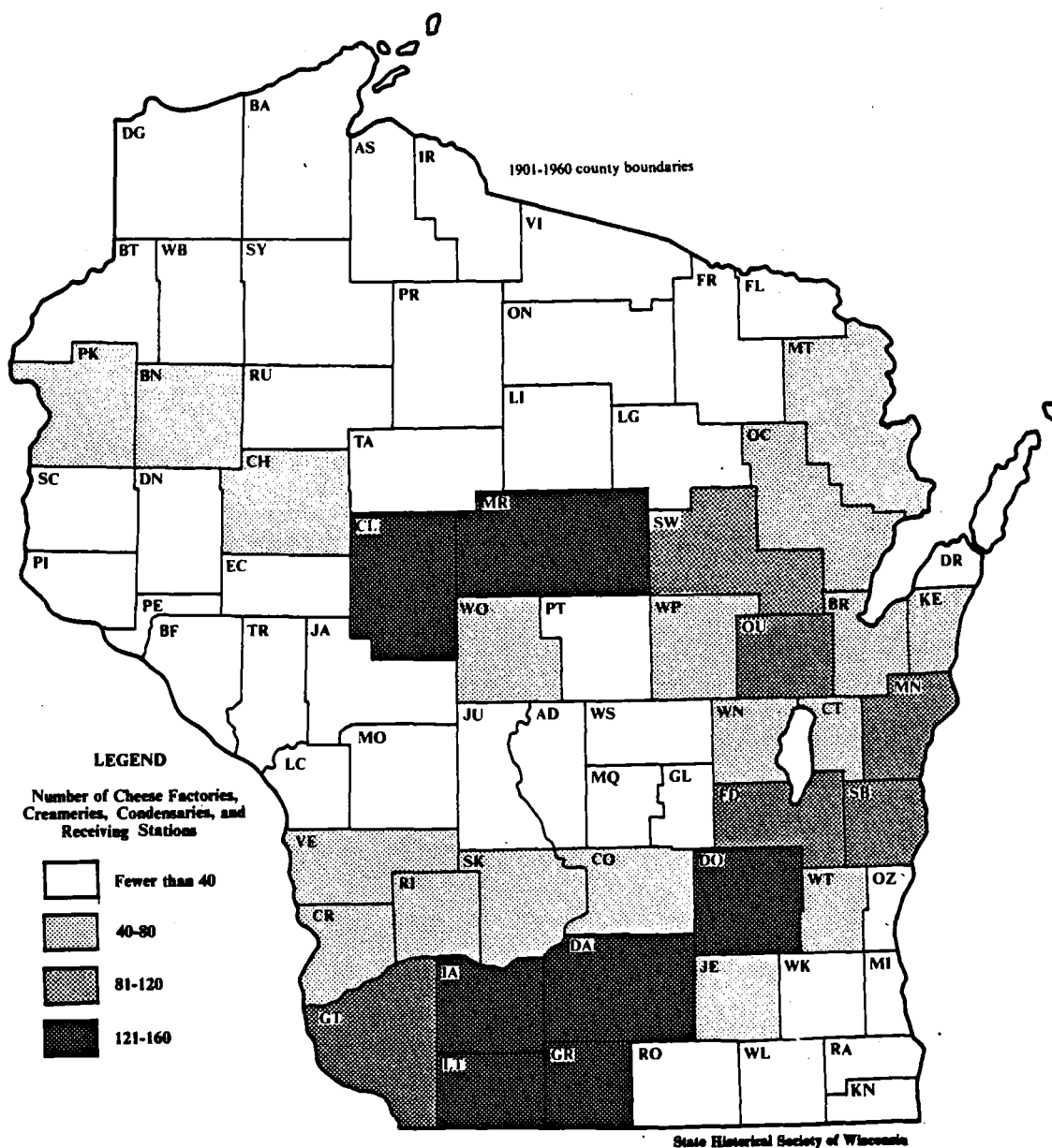
National Register Listings and Determinations of Eligibility

Jacob Regez House (1901), 2121 Seventh St., Monroe, Green County (NRHP 1980)
Annala Round Barn (1917-1921 and c.1928), Town of Oma, Iron County (NRHP 1979)
Hoard's Dairyman Farm (1889), Town of Jefferson, Jefferson County (NRHP 1978)
Jones Dairy Farm (1839-1922), Jones Ave., Fort Atkinson, Jefferson County (NRHP 1978)
Klein Dairy Farmhouse (1892), 1018 Sullivan Ave., Kaukauna, Outagamie County (NRHP 1984; Kaukauna MRA)
North Hall, River Falls State Normal School (University of Wisconsin-River Falls) (1914, 1927), Third St., River Falls, Pierce County (NRHP 1986)
Prentice Co-operative Creamery Co. (1915), 700 Main St., Prentice, Price County (NRHP 1985)
Dougan Round Barn (1911), 444 W. Colley Rd., Beloit, Rock County (NRHP 1979, Centric Barns in Rock County Thematic Group))
Footville Condensery (1912), Beloit St., Footville, Rock County (NRHP 1982; Footville MRA)
Gilley-Tofslund Octagonal Barn (c.1913), Town of Porter, Rock County (NRHP 1979; Centric Barns in Rock County Thematic Group)
Gempeler Round Barn (c.1912), Town of Spring Valley, Rock County (NRHP 1979; Centric Barns in Rock County Thematic Group)

Central Wisconsin Creamery (1910), 312 S. Park St., Reedsburg, Sauk County (DOE
1984; Reedsburg MRA)

Context Considerations. While some farm structures associated with dairy production, e.g., dairy barns, may be so architecturally or historically significant to merit and individual National Register nomination, most should be evaluated in the context of the entire farmstead. Many structures within extant farmsteads have undergone various alterations and modernizations in an attempt to stay abreast of contemporary dairying practices. Some modern intrusions may not detract from National Register eligibility, but the overall architectural integrity of these structures should be an important contextual consideration. Similarly, many extant dairies, creameries, cheese factories, and condenseries have been extensively modernized and altered in order to keep abreast of contemporary production practices. Original machinery, where still in place, may be of substantial interest and can enhance a nomination. When evaluating dairy associated complexes, e.g., creameries and condenseries, careful attention should be given to the integrity of the entire complex.

DAIRY EXPANSION



Dairy Plants in Wisconsin, 1932

Source: Walter Ebling, *A Century of Wisconsin Agriculture 1848-1948*, Wisconsin Department of Agriculture Bulletin no. 290 (Madison, 1948), p. 108.

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