National Register of Historic Places Multiple Property Documentation Form

This form is used for documenting property groups relating to one or several historic contexts. See instructions in National Register Bulletin *How to Complete the Multiple Property Documentation Form* (formerly 16B). Complete each item by entering the requested information.

X New Submission Amended Submission

A. Name of Multiple Property Listing

Minnesota's German Immigrant Timber Frame Barns, 1865-1925

B. Associated Historic Contexts

(Name each associated historic context, identifying theme, geographical area, and chronological period for each.)

"Early Agriculture and River Settlement, 1840-1870," "Railroads and Agricultural Development, 1870-1940," "Euro-American Farms in Minnesota, 1820-1960"

C. Form Prepared by:

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D. Certification

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this documentation form meets the National Register documentation standards and sets forth requirements for the listing of related properties consistent with the National Register criteria. This submission meets the procedural and professional requirements set forth in 36 CFR 60 and the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation.

Signature of certifying official

Title

Date

State or Federal Agency or Tribal government

I hereby certify that this multiple property documentation form has been approved by the National Register as a basis for evaluating related properties for listing in the National Register.

Signature of the Keeper

Date of Action

NPS Form 10-900-b United States Department of the Interior National Park Service

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Create a Table of Contents and list the page numbers for each of these sections in the space below. Provide narrative explanations for each of these sections on continuation sheets. In the header of each section, cite the letter, page number, and name of the multiple property listing. Refer to *How to Complete the Multiple Property Documentation Form* for additional guidance.

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Paperwork Reduction Act Statement: This information is being collected for applications to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C.460 et seq.). Estimated Burden Statement: Public reporting burden for this form is estimated to average 250 hours per response including time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding this burden estimate or any aspect of this form to the Chief, Administrative Services Division, National Park Service, PO Box 37127, Washington, DC 20013-7127; and the Office of Management and Budget, Paperwork Reductions Project (1024-0018), Washington, DC 20503.

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E. Statement of Historic Contexts

Minnesota's German Immigrant Timber Frame Barns, 1865-1925

Introduction

This Multiple Property Documentation Form (MPDF) encompasses timber frame barns built by German immigrants to Minnesota. It establishes an historic context entitled "Minnesota's German Immigrant Timber Frame Barns, 1865-1925."

The barns covered by this MPDF have timber frame structural systems – that is, interior bents and exterior wall framing – comprised of heavy timbers. The skeleton or structural framework of the barn is exposed, or visible, on the interior. Architectural historian John Fitchen notes in a study of Dutch immigrant barns in New York, that one of the interesting things about a barn is that the entire structural framework remains open for viewing. He writes, "Such an opportunity for unlimited inspection is presented only by barns; almost all other building types hide their structural members beneath plaster or paneling, behind wainscoting or ceiling finishes, except perhaps in cellars and attics."¹

The timber frame barns were built with mortise and tenon joinery. Such joints were traditionally used to assemble timber frames and are generally much stronger than nailed connections. Barns whose structural framework is nailed, rather than joined with mortise and tenon, are not included within this context. Barns with braced rafter, plank, laminated rafter, balloon, or stud framing are also not included.

On some Minnesota farms, timber framing is also found in granaries, which, like barns, needed to be very strong. Timber frame granaries and similar farm outbuildings do not fall within the purview of this MPDF.

Barns within this context were built by or for persons of German immigrant background. They will usually be first- or second-generation German immigrants. People from German-speaking parts of Europe became Minnesota's largest immigrant group. Most came to Minnesota in a process of "chain migration" whereby new immigrants joined family or friends who had previously immigrated to the area. Most became farmers. In some rural townships in central and southeastern Minnesota, 90% of the population was of German immigrant stock. These German-Americans not only brought European-influenced cultural traditions with them, but retained some cultural practices for many decades.

Barns located anywhere in the state may fit within this historic context. It is believed most German-built timber frame barns are located in southeastern Minnesota, with fewer numbers in central Minnesota. Southeast and central Minnesota contained the state's greatest concentration of German immigrants (Fig. 2), and were most densely forested with deciduous trees at the time of Euro-American settlement (Fig. 3). Because long, straight hardwood timbers were needed to build the barns, they are generally found only in areas with hardwood forests.

¹ John Fitchen, *The New World Dutch Barn: A Study of its Characteristics, its Structural System, and its Probable Erection Procedures* (Syracuse, NY: Syracuse University Press, 1968), 65.

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Minnesota's German immigrant timber frame barns were built over a nearly 60-year period from circa 1865 to 1925. Most were probably built between 1875 and 1910.

Most German immigrant barns will have been built on family-operated farms. The barns were typically the second barn built, constructed after the farm moved out of a subsistence phase and had begun to produce excess crops for sale. These barns were built as general-purpose or "combination" barns, used for storing crops as well as housing dairy cows and draft horses. The barns are associated with the growth of dairying in southeast and central Minnesota, and were typically built as the farm was gradually building a herd of specialized dairy cows.

As described in this document's Property Types section (Section F), most of the barns take one of four major forms, but they vary considerably in details. More research is needed to understand the range of variation among timber frame barns built by Germans in Minnesota, and to identify patterns and influences.

The barns are examples of so-called vernacular architecture. While few specifics are known, it is believed most were designed and built by trained carpenters or barn-builders – some of whom may also have been local farmers – who worked with the farmers themselves to plan and build the structure. No standardized plans were followed and the buildings exhibit great individuality. Their designs overwhelmingly emphasize function and utility over aesthetics and decoration.

Many of the barns were very well built, involving time-consuming hand-craftsmanship. Many exhibit construction details that are European in influence, yet not commonly found in barns of comparable age built by other cultural groups in the state. These details and techniques include possible scribe rule joinery, the use of curved and irregular timbers, the use of long diagonal braces, and the use of square panel wall framing, among others. Many of the techniques may have been passed from one generation to the next and/or from community to community. They were brought to Minnesota either directly from German-speaking Europe or from earlier-established German-American communities in states east of Minnesota.

Much of the information in this MPDF is based on cultural resources surveys of about 44 German immigrant-built timber frame barns in southeastern Minnesota. The surveys were conducted in 2005-2008 for the Minnesota Department of Transportation (MnDOT) along highway corridors in four counties: Carver, Dodge, Nicollet, and Steele. Information on one additional barn, located northeast of Rochester in Olmsted County, was also included; information on this barn was gathered during preparation of a 2011 National Register nomination. (For more information, see the summary of identification methods in Section H.)

Associated Historic Contexts

In addition to being associated with the historic context "Minnesota's German Immigrant Timber Frame Barns, 1865-1925," the barns are also associated with three previously established statewide historic contexts.

The first, "Early Agriculture and River Settlement, 1840-1870," encompasses the initial settlement of southeast and central Minnesota by Euro-Americans. During this period, the state's population remained low. Agricultural and economic development were hampered by a transportation system that

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was comparatively inefficient and limited to primitive roads and walking paths; use of small boats such as canoes and ferries; and larger craft such as steamboats, which could only travel seasonally and only on navigable parts of the largest rivers. German timber frame barns constructed between 1865 and the early 1870s (before railroads were built) should be understood within the parameters of this historic context.

The second statewide historic context, "Railroads and Agricultural Development, 1870-1940," focuses on Minnesota's Euro-American settlement and agricultural development during and after construction of the state's railroad system. Railroads brought reliable, efficient, year-around transportation to the state. With a railroad network, agricultural markets and processing centers could be created, farmers could transport more crops to market, and people, equipment, building supplies, and manufactured goods could efficiently move from population centers to the small towns and villages that served as agricultural service centers. This railroad-based agricultural infrastructure, combined with factors such as farm mechanization, population increase, rising demand for food nationwide, and the rise of the dairy industry, enabled the so-called "Golden Age" of agriculture in Minnesota from 1900-1919. German timber frame barns constructed after railroads arrived in a particular area, often around the early 1870s, should be understood within the parameters of this historic context.

The third statewide historic context, "Euro-American Farms in Minnesota, 1860-1960," focuses on the development of small family farms.² Most of the state's German immigrant-built timber frame barns are likely associated with two of the eight developmental periods described in the historic context. The first is "Diversification and the Rise of Dairying, 1875-1900," which encompasses the state's shift from a frontier-based wheat monoculture to a model of diversified farming in which livestock and feed crops were grown for farm use and for sale. Farms kept dairy cows, hogs (which were fed skim milk separated from the saleable cream), and chickens, and practiced crop rotation and other sustainable production methods. The shift was gradual, in part because dairying required new skills and investment in expensive buildings and livestock. The second developmental period relevant to the barns is "Industrialization and Prosperity, 1900-1920." During this period, overall production, land values, and commodity prices rose, bringing an increase in farm income and a decrease in indebtedness. Agricultural colleges and other interests developed and disseminated science-based improvements in mechanical technology, crops, animal husbandry, and building design and materials. With strong prices and increased worldwide demand for food, farmers expanded their operations, tilled more land, bought more machinery, and constructed new buildings. This so-called Golden Age ended in 1920 when food exports and commodity prices crashed and Minnesota agriculture entered a period of economic depression that lasted until World War II.³

Factors in Agricultural Development in Southeast and Central Minnesota

Southeast and central Minnesota were the first parts of the state settled by Euro-Americans. The Mississippi River, which flows through most of the state from north to south, forms the eastern boundary of much of this region. The area is drained by a number of major tributaries including the

² See Susan Granger and Scott Kelly, *Historic Context Study of Minnesota Farms, 1820-1960*, prepared for the Minnesota Department of Transportation by Gemini Research, June 2005. This multi-volume resource contains background information useful to understanding the material culture of family farms in Minnesota in the late 19th and early-to-mid 20th centuries and is referenced frequently in this MPDF.

³ See Granger and Kelly 2005, 3.43-3.60, for more information.

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Minnesota River – whose farmland-rich valley traverses the state from west to east – and smaller rivers such as the Cannon, Zumbro, Root, Crow, and Sauk. Fort Snelling, the nucleus around which the Twin Cities grew, was established in 1819 at the confluence of the Mississippi and Minnesota rivers. Most of Minnesota's first farms and villages were established on the rolling hills and flat prairies adjacent to rivers and streams. At the time of early Euro-American settlement, much of southeast and central Minnesota were covered with deciduous hardwood forests, part of the state's 5,000-square-mile "Big Woods" (Fig. 3).

Euro-Americans first legally settled in southeast and central Minnesota in the early 1850s after land cession treaties were signed between the U.S. Government and Native American groups who, along with their predecessors, had been living in the area for centuries. Subsistence-level farming was underway in the region by the mid-1850s. Individual family farms eventually occupied most of the land and the economy was largely based on agriculture.

Pioneers were drawn to the area by low-cost federal land, good soil, and river transport. Developing a farm on wooded land was challenging, however, and development proceeded slowly. While some immigrants bought farms that had already been established, many worked for years to painstakingly cut oak, elm, maple, and basswood trees and clear away the stumps to create fields. With simple tools, a family could clear little more than two or three acres of land per year.

In many areas, farms remained at a subsistence level for nearly a generation. Fields were small and farms produced limited amounts of corn, potatoes, oats, wheat, rye, and barley, all for home use. Livestock was generally limited to a pair of oxen, a cow and calf, and a few pigs and chickens. Most housing for people, animals, crops, and tools consisted of small, simple buildings constructed from logs cut on the farm.

When sufficient land was cleared, most farmers began growing wheat to sell as their first surplus crop. Much of the grain was ground at small local mills. Development of a rigorous farm economy was delayed until markets were established and railroads built. In the meantime, farm products were moved on sparse and poorly built roads or by river barge. Wheat remained the principal cash crop through about 1880.⁴

Farm development during the early settlement period was hampered by the vagaries of weather, by the U.S. Civil War of 1861-1865, and by the U.S.-Dakota War of 1862. The latter conflict centered on the Minnesota River Valley, which at the time was home to about 7,000 Dakota and a growing number of Euro-Americans. Hundreds of people died during several months of violence, and much of the river valley and adjacent upland areas were essentially depopulated until the early 1870s. Southeast and central Minnesota also saw severe locust attacks in 1865 and 1871-1875.⁵

⁴ William G. Gresham, ed., *History of Nicollet and LeSueur Counties, Minnesota* (Indianapolis: B. F. Bowen and Co., 1916), v1; Bryce O. Stenzel, *German Immigration to the Minnesota River Valley Frontier 1852-1865* (Mankato, MN: Mankato Heritage Pub., 2002); Granger and Kelly 2005, 3.15-3.26.

⁵ Daniel J. Hoisington, *A German Town: A History of New Ulm, Minnesota* (New Ulm, MN: City of New Ulm, 2004), 53; LaVern J. Rippley with Robert J. Paulson, *German-Bohemians, The Quiet Immigrants* (Northfield, MN: St. Olaf College Press, 1995), 91; Stenzel 2002; Gresham 1916, v1; William B. Mitchell, *History of Stearns County, Minnesota* (Chicago: H. C. Cooper and Co., 1915), v1.

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Railroad Construction (1870-1885)

A network of rail lines through southeast and central Minnesota was built over a 15-year period beginning around 1870. North-south lines connected St. Cloud and Minneapolis-St. Paul with cities such as Chicago and Cedar Rapids, Iowa, and with the Great Lakes port at Duluth. East-west lines connected Winona, Hastings, the Twin Cities, and St. Cloud with western farming regions.⁶

Railroads brought new people, supplies, and manufactured goods to Minnesota and facilitated the export of farm products. The population rose and new farms were established. Towns and villages were founded along railroad lines to serve as agricultural service centers where general stores, grain elevators, implement dealers, and lumberyards catered to the developing economy.

The Rise of Dairying and Scientific Agriculture (1880-1920)

During the 1880s farming in southeast and central Minnesota was shifting from an economy based on wheat to a more diversified mix of feed crops and livestock. After decades of planting solely wheat, farmers in the southeast were experiencing falling yields as soil fertility dropped and pests and diseases increased. Land prices were rising as population increased, preventing farmers from buying more land to mitigate low yields. Around 1880 farmers began a gradual process of diversification that included slowly building a specialized dairy herd. The shift was slow because dairying required special skills, expensive cows, and a good barn. Technological improvements such as the upright silo and a winter-hardy strain of alfalfa were among the factors that encouraged dairying, and by the turn of the 20th century, many average-sized farms in Minnesota had a herd of 15 milk cows. Dairying was at the center of a diversified and interrelated strategy that also included raising pigs that were fed the skim milk and ultimately butchered for meat, raising chickens for meat and the sale of eggs, and creating a patchwork of fields and pastures in which corn (for feed and silage), oats (for draft horses), wheat (sold for cash), and alfalfa hay (for winter feed and soil rejuvenation) were raised in rotation.⁷

By the early 20th century, only Wisconsin exceeded Minnesota in dairy production nationwide, and southeast and central Minnesota were the state's leading dairy regions. Between 1915 and the 1930s, income from milk and butterfat accounted for nearly 30% of total farm income. By the 1930s "fully 90%" of Minnesota farms kept milk cows.⁸

Milk was marketed primarily through a network of small creameries, also known as butter factories, located on rail lines. In 1928, for example, 73% of Minnesota milk was destined for creamery buttermaking. Each creamery or cream collecting station typically served farms in a 10- to 15-mile radius. By 1930 Minnesota had 845 creameries, about 79% of which were owned as farmers' cooperatives. Much of the state's butter, which was renowned for its quality, was shipped to the East Coast. In the 1920s and 1930s, New York City was the largest market for Minnesota butter, and in 1938, 17% of the nation's butter was made in Minnesota.⁹

⁶ For the development of the state's railroads see Andrew J. Schmidt et al., "Railroads in Minnesota, 1862–1956," National Register of Historic Places Multiple Property Documentation Form, 2013.

⁷ See Granger and Kelly 2005, 3.27-3.42.

⁸ E. Fred Koller and O. B. Jesness, "Trends in the Minnesota Dairy Industry," *University of Minnesota Agricultural Experiment Station Bulletin* 346 (1940), 3-4; Granger and Kelly 2005, 3.27-3.42.

⁹ Koller and Jesness 1940, 9, 12, 19.

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Statewide, farm diversification and the rise of dairying were part of a steady transformation from traditional methods and small-scale farming to a more productive, science- and engineering-based model of agriculture. The shift began in the late 19th and early 20th centuries and accelerated after World War II. At the heart of the transformation were technological changes in machinery, equipment, power sources, building materials, plant genetics, and animal husbandry – to name a few – developed by scientists and engineers from academia, government, and industry and disseminated to farmers via extension service bulletins, commercial advertising, the agricultural press, farm radio broadcasts, and other methods.¹⁰

Farm infrastructure, machinery, and equipment improved as windmills, gasoline generators, electric power, piped water, gravel roads, automobiles, tractors, new implements, and milking machines were installed. Pre-cut dimensional lumber and standard millwork became more affordable, and new materials such as poured concrete, concrete block, hollow clay tile, and sheet metal, as well as cement stave silos, steel corn cribs, and prefabricated grain bins were introduced. Farm outbuildings became more specialized. Dairy barns, for example, were planned with optimal layout, standard sized stalls and alleys, factory-made stanchions, running water, improved ventilation, cleanable concrete floors, and labor-saving manure gutters – all designed to reduce labor and cash outlay and to improve efficiency and production.¹¹

Farm diversification, technological improvements, construction of railroads and highways, and population increase as European immigrants moved to the state helped the state's agricultural economy flourish. Farm incomes continued to rise until the summer of 1920 when the economic bubble burst and Minnesota agriculture entered a 20-year depression that did not resolve until the 1940s and the outbreak of World War II.¹²

German Immigration

While many of Minnesota's 19th century farmers were Anglo- or "Old Stock"-Americans, the majority were immigrants from Sweden, Norway, Finland, Ireland, Canada, and elsewhere. Minnesota's largest immigrant population came from German-speaking parts of Europe. Germans were also the largest immigrant group nationwide. Minnesota attracted the second-largest number of German immigrants in the U.S., a total exceeded only by Wisconsin.¹³

The first Germans to come to America settled in eastern Pennsylvania in 1683. German immigration to Pennsylvania was particular strong between 1710 and 1776 when it slowed during the American Revolution. More Germans immigrated to Pennsylvania in subsequent decades, and Pennsylvania Germans migrated out of the older settlement area, moving into the Appalachians and westward along the Great Lakes (Fig. 1). Substantial numbers moved, for example, to Ohio in the late 18th and early 19th centuries, and to the Upper Mississippi River Valley around 1830.¹⁴

¹⁰ See Granger and Kelly 2005.

¹¹ Ibid., pp. 3.105-3.116 and 5.1-5.6.

¹² Ibid.

¹³ This MPDF provides only a brief overview of German immigration. For more information see the resources listed in the bibliography. Many of the most useful sources are identified in the footnotes.

¹⁴ K. Edward Lay, "European Antecedents of Seventeenth and Eighteenth Century Germanic and Scots-Irish Architecture in America," *Pennsylvania Folklife*, 32 (Autumn 1982), 3-4.

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In an overview history of Germans in Wisconsin, historian Richard H. Zeitlin provides a useful summary of the waves of German immigration to the United States, which peaked in 1845-1890. He explains:

German immigration to the United States in the 1800s occurred in three major waves. The first came primarily from southwestern Germany in the years 1845-1855 and consisted of some 939,000 men, women, and children, 97% of whom came from the states or areas of Nassau, Hesse, the Rhineland, Pfalz, Baden, Wurttemberg, and Bavaria. Small, inefficient, overpopulated, and often mortgaged farms dominated these areas. Repeated crop failures and the potato blight made calamity all but certain. In addition, a significant number of German emigrants counted themselves 'free thinkers': intellectuals, radicals, religious dissenters . . . in effect, political refugees. . .

The second great wave of German immigrants did not break for another decade, when 1,066,333 newcomers reached the United States in the decade between 1865 and 1875. Most of these came from northwestern Germany, specifically from the states of Schleswig-Holstein, Ostfriesland, Hanover, Oldenburg, and Westphalia. This region contained prosperous middle-sized grain farms. In the 1850s an influx of cheap American wheat began to depress the world market for grain and to affect German farmers' decisions. By 1865 . . . many owners of Germany's moderately-sized farms feared foreclosure, so they decided to sell out while they could. Some departed for America with enough cash to begin anew. In addition, northwestern Germany's industrial centers were filled with unemployed farmers and farm workers anxious to build new lives abroad. The bulk of these emigrants came from the lower-middle economic strata; as one historian observed, they were 'people who had a little and had an appetite for more.'

The third and largest wave of German immigrants began in 1880, coinciding with the beginning of a great influx of newcomers from southern and southeastern Europe. Records show that 1,849,056 persons of Germanic extraction came to America in this migration, which lasted until 1893.... The vast majority of this third wave originated from northeastern German, an area dominated by Prussia but including the states of Pomerania, Upper Silesia, and Mecklenburg.... The unification and industrialization of the region eliminated or consolidated thousands of peasant holdings between 1816 and 1859 – thus creating a landless agricultural class whose best opportunity for improvement lay in emigration.¹⁵

In addition to living in Pennsylvania and along the Great Lakes, large numbers of Germans moved to Iowa, Missouri, Minnesota, and Texas (Fig. 1). Eastern European Germans also emigrated to North and South Dakota. German immigration to the U.S. ended soon after World War II.

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Many Germans arrived in Minnesota after stopping first at an older German-American community in, for example, Ohio, Illinois, or Wisconsin. These communities had been established by migrating Pennsylvania Germans who transferred their cultural practices to them, and thereby influenced Minnesota's immigrants who may have stayed for a season or two. Germans were drawn to Minnesota by the chance to buy low-cost land, but also to work as loggers, in sawmills, and as craftsmen and merchants.

The 1860 federal census reported about 9% of Minnesota's population as German-born. About 15.8% were of German stock – that is, either German-born or the children of German-born. In both 1870 and 1880, about 20% of the population was either German-born or the children of German-born. Germans remained the largest foreign-born group in Minnesota until 1905, when they fell behind Swedes. Even so, persons of German stock remained the largest immigrant cultural group in the state into the mid-20th century.¹⁶ German immigrants to Minnesota were both Protestant and Catholic.

Identifying a "German" immigrant – that is, determining place of birth – is not easy from available records. Many scholars define a German immigrant as one who emigrated from a German-speaking part of Europe, which would include present-day Germany as well as parts of Luxembourg, France, Switzerland, Poland, Austria, Bohemia, Hungary, Yugoslavia, and the Black Sea and Volga areas of Russia.¹⁷ In *They Chose Minnesota,* geographer Hildegard Binder Johnson describes her effort to establish place of origin for the residents of one township in Carver County using 1860 and 1870 federal census data. According to the 1860 census, 83% of the residents of Benton Township had been born in 13 German-speaking regions: Prussia, Hanover, Bavaria, Baden, Hesse-Darmstadt, Switzerland, "France" (likely Alsace), Saxony, Mecklenburg, Luxembourg, Hesse, Brunswick (*Braunschweig*), and Austria. The 1870 census, which counted even more German immigrants, also recorded 13 places of birth, but both recording techniques and the political landscape in Europe had shifted so that four of the birthplaces listed in the 1860 census were not listed in 1870 (including Hanover which in 1860 was named second most often), and four birthplaces – Wurttenberg, Saxe-Weimer, Lippe-Detmold, and Tyrol – were now listed.¹⁸

Place names in southeast and central Minnesota are a testament to the origin of many settlers. Cologne and Hamburg in Carver County were named for places in northwestern and north central Germany; Kasson in Dodge County, Potsdam in Olmsted County, and Heidelberg in LeSueur County were named for towns in northeastern Germany; New Munich in Stearns County was named for the city in southern Germany; and Veseli in Rice County, Litomysl in Steele County, and New Prague on the Scott/LeSueur border were named for places in the present-day Czech Republic.

German immigrants settled throughout Minnesota but were especially concentrated in southeastern and central counties (Fig. 2). According to Johnson, the south central Minnesota settlement region – beginning in Carver County southwest of the Twin Cities, extending along the Minnesota River past the towns of Mankato and New Ulm (through Nicollet, Sibley, Brown, and Renville counties), and extending northwest through McLeod, Meeker, Wright, and Stearns counties – is "the largest area in the state

 ¹⁶ Hildegard Binder Johnson, "The Distribution of the German Pioneer Population in Minnesota," *Rural Sociology* 6 (March 1941), 31; Kathleen Neils Conzen, *Germans in Minnesota* (St. Paul: Minnesota Historical Society, 2003), 5.
¹⁷ Conzen 2003, 4.

¹⁸ Hildegard Binder Johnson, "The Germans," in *They Chose Minnesota: A Survey of the State's Ethnic Groups*, ed. June Drenning Holmquist (St. Paul: Minnesota Historical Society, 1981), 158.

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occupied 'predominantly' by a single ethnic group."¹⁹ New Ulm, established in the 1850s in Brown County and located directly across the Minnesota River from Nicollet County, is commonly considered Minnesota's most Germanic city. In 1905, the Minnesota towns with the greatest proportion of Germanborn residents were New Ulm, Mankato, Faribault, Winona, Hastings, St. Paul, South St. Paul, and West St. Paul – all in southeastern Minnesota – and St. Cloud in central Minnesota.²⁰ As late as 1970, 41% of New Ulm residents still claimed German as their principal language, compared to 8% statewide. The situation was similar in Stearns County.²¹

In some parts of the state, settlement by German immigrants was so dense that rural communities were almost homogeneous. Examples include Lafayette, Courtland, and Nicollet townships in southwestern Nicollet County – all near New Ulm – where several timber frame barns discussed in this MPDF are located. In 1860, 88% of the population of Lafayette Township was either German-born or had German-born parents; in 1870 the number was 79%. In neighboring Courtland Township, 60% of the population was of German stock in 1860, and 96% in 1870.²²

Chain Migration. Most German immigrants to Minnesota settled in a pattern of "chain migration" whereby newcomers joined family and friends already established in a given area. Zeitlin writes that in Wisconsin, "By far the most effective stimulus to German immigration was the unsolicited and unvarnished testimony of recently arrived settlers. Virtually all immigrants wrote back to their friends, relatives, and neighbors in the Old Country, describing their new lives in America."²³

Chain migrants to the United States tended to settle in already-established cultural groups, rather than in "frontier" areas. Historians LaVern J. Rippley and Robert J. Paulson explain that non-chain migrants tended to be unmarried young adults, and up to 75% male. Chain migrants, on the other hand, "tended to arrive with families, therefore were married, as a group showed much broader age distribution, revealed a more closely balanced sex ratio, had lower wealth status, less education, and poorer occupational levels. Not genuine pioneers, chain migrants took less risks."²⁴

Chain migrants tended to create, and remain living within, tightly knit communities that often retained Old World cultural characteristics longer than other places. Rippley and Paulson write, "Chain migrants were less apt to seek acculturation. They were less likely to marry outside their 'cocoon' and were less inclined toward assimilation with American society." To illustrate their point, Ripley and Paulson compare German-Bohemian immigrants in the New Ulm area with Danish immigrants in Minnesota, who the authors explain did not follow chain migration patterns. The Danes tended to "disperse" more readily than the Germans and to assimilate sooner, being relatively quick, for example, to abandon Danish as their primary language.²⁵

¹⁹ Ibid., 164.

²⁰ Conzen 2003, 25.

²¹ Rippley with Paulson 1995, 148; Johnson, "The Germans" 1981, 156-173; Hildegard Binder Johnson, "Factors Influencing the Distribution of the German Pioneer Population in Minnesota," *Agricultural History* 19 (Jan. 1945).

²² Johnson 1945, 46.

²³ Zeitlin 2000, 10; Conzen 2003, 18.

²⁴ Rippley with Paulson 1995, 2-4, 103; Don Heinrich Tolzmann, *The German-American Experience* (New York: Prometheus Books, 2000), 197.

²⁵ Rippley with Paulson 1995, 2-4.

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The European cultural character of chain migration communities was particularly durable if the communities "enjoyed the size necessary to maintain a cross section of daily life that in at least some respects replicated the Old World format," write Rippley and Paulson.²⁶ Some scholars explain that ethnically-influenced traditions did not remain pure, however, but were usually mixed with, and influenced by, local conditions in a process that created entirely new cultural practices and ways of life.²⁷

Tolzmann writes of German immigrants in general: "German-American families [nationwide] tended to be larger than non-German families. Often families in rural areas would have four or more children, all of whom would work together as they grew up. . . . It was common for several generations of a family to live together, or in close proximity." Tolzmann also explains that German-Americans tended to see economic support *for the family* as principal motivation for work, as opposed to seeing work "as a means to obtain individual financial wealth." The immigrants tended to take pride in workmanship, to be frugal, to have high rates of savings and of home ownership, and to pay in cash rather than buying on credit.²⁸

German Farmers. Most German immigrants to Minnesota became farmers. The 1880 federal census reports that 60% of Minnesota's German-born residents were employed worked as farmers, and 18.5% of all Minnesotans employed as farmers were German-born. Kathleen Neils Conzen notes that the number of Germans who *lived* on farms was greater since housewives and children were not typically counted in the census as "employed." According to Conzen, most German-Americans in Minnesota who were not farmers worked as tradesmen or in manufacturing, "thanks to the high proportion of skilled craftsmen" among the immigrant population.²⁹

Many Germans came to the U.S. with strong farming backgrounds and brought agricultural preferences and practices with them. German In the 18th and 19th centuries, farmers in Germany practiced more integrated crop and livestock farming than did their predecessors in, for example, the British Isles where farmers grazed more livestock and grew fewer crops. In Germany, farmers practiced crop rotation and spread manure on their fields, both practices that became fundamentals of the diversified farming that changed Midwestern agriculture in the late 19th and early 20th centuries. Whether they housed their livestock in house-barns (common in Germany but rare in the U.S.) or in timber frame barns (in either Europe or the U.S.), German farmers tended to commit more resources to sheltering livestock than did farmers of groups such as the English or Swedish who generally built less substantial shelters and left stock outdoors more often.³⁰

²⁶ Ibid., 2.

²⁷ Allen G. Noble, "The Immigrant Experience in the Nineteenth Century and Afterwards," in *To Build in a New Land: Ethnic Landscapes in North America*, ed. Allen G. Noble (Baltimore: Johns Hopkins University Press, 1992); Allen G. Noble, "Migration to North America: Before, During, and After the Nineteenth Century," in *To Build in a New Land: Ethnic Landscapes in North America*, ed. Allen G. Noble (Baltimore: Johns Hopkins University Press, 1992); Tolzmann 2000: 235-237; Kathleen Neils Conzen, *Making Their Own America. Assimilation Theory and the German Peasant Pioneer* (New York: Berg Publishers, 1990).

²⁸ Tolzmann 2000, 232-233.

²⁹ Conzen 2003, 25, 29.

³⁰ Hubert G. H. Wilhelm, "Midwestern Barns and Their Germanic Connections," in *Barns of the Midwest*, ed. Allen G. Noble and Hubert G. H. Wilhelm (Athens, OH: Ohio University, 1995), 64-67.

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Architectural historian K. Edward Lay describes the character and values of German immigrant farmers in Pennsylvania, a group that influenced cultural practice in communities across the Great Lakes, in the Upper Mississippi River Valley, and as far south as Texas. Lay writes:

Virtually all American Germans were farmers; they exceeded all other ethnic groups in that occupation. Often they were wise enough to purchase land which had already been cultivated, but upon which the owner could not survive. They, in turn, made it into a profitable farm. On uncultivated land, they cut down each tree and used its wood for fire or building. This practice, rather than the [Pennsylvania] English and Scots-Irish method of girdling trees, made the field ready for cultivation in its second year. They often built their barns before their houses, kept their cattle indoors in the winter, and fenced their pastures. They were the first to store and recycle manure, rotate crops, and irrigate. The Germans had 30 generations of farming knowledge to bring to America. Many had come [to Pennsylvania] from the German Pfalz or Palatinate [in southwestern Germany], which during the Middle Ages had been among the most influential of German states and was known as the garden of Germany.³¹

Conzen writes that most German immigrant farmers in the U.S. adapted to American agricultural products and practices. However, she writes,

[Traditional] attitudes toward farming as a vocation proved more functional and tenacious. German American farmers had a reputation for being conservative and unspeculative, more ready to rely on family rather than hired labor, and to invest in fine barns rather than grand houses, more oriented toward long-term persistence of the family on the farm than to short-term profits, and Minnesota's German farmers often lent credibility to the stereotype. The labor of all family members, female as well as male, children and adults, on and off the farm, ensured its survival, while the farm provided the family with a living and children with an inheritance. . . . Such caution [in adopting new methods], along with religious stress on the virtues of rural life, larger than average families, lower than average educational levels, and distinctive inheritance practices aimed at keeping farms in the family, helped ensure that today Minnesota's dwindling number of family farms are even more likely to be in German-descended hands than a century ago.³²

³¹ Lay 1982, 3.

³² Conzen 2003, 28-29.

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Conzen has also written:

The stereotypical 19th century German farmer [in the U.S.] was regarded by his contemporaries as stable, hard-working, dependable, and thrifty – some even said penurious. His land was a permanent home for his family and not a speculative investment; choosing it well, he endowed it with his own and his family's hard labor, methodically cultivating it with careful Old World techniques, and persisting and prospering while more restless neighbors moved on. Where Germans settled among non-Germans, such stereotypical behavior proved short-lived, as local norms prevailed. But where fellow countrymen reinforced familiar patterns of life and work, the traditional mind-set of the German peasant endured far longer, lending some truth to the stereotype and creating the only German-American ethnic cultures to persist into the middle of the 20th century.

German clustering of sufficient size to influence cultural persistence occurred in most Midwestern states and in Texas. The logic of clustered settlement was persuasive. A nucleus established in an area not yet fully settled could support German churches, schools, local governments, and familiar social patterns and lured other Germans to fill in the remaining land. When other settlers moved on, their land was taken up by German newcomers or children of the pioneers; community norms discouraged sales to outsiders. Intra-family assistance and transfer of land to children during the parents' lifetime adapted German goals to American circumstances and fostered an unusual degree of persistence and expansion in many rural ethnic communities. Once established, such clusters usually endured, intensified, and expanded over time in Wisconsin, Minnesota, Missouri, and Texas.

Farmers relied upon family labor, avoided mortgage debts whenever possible, and exhibited relatively low rates of tenancy.... Their perception of the farm as property held in trust for succeeding generations encouraged intensive investment in buildings and soil conservation practices. Even in clustered settlements, Germans planted the locally prevailing crops, and almost everywhere they abandoned Old World village settlement patterns for the dispersed farmsteads of America. Differences in degree, not in kind, distinguished these from other rural communities.

Nevertheless, the persistence of distinctive attitudes and social patterns revealed the strength of the ethnic culture, which was encouraged by isolation and frequently centered around the local church. In many rural areas the German language has persisted to the fourth and even fifth generations, although improved roads, mass communication, consolidated school systems and longer attendance, and modern farming practices have all tended to break down the isolation of such communities. Yet family orientation, religiousity, and social and political conservatism, nurtured in rural self-containment and widely diffused by the migrations of numerous offspring, remained traits attributable to German ethnicity in the 1970s.³³

³³ Kathleen Neils Conzen, "Germans," in *Harvard Encyclopedia of American Ethnic Groups*, ed. Stephen Thernstrom (Cambridge, MA: Belknap Press of Harvard University Press, 1980), 415.

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Architecture of Minnesota's German Immigrants

While Minnesota had the nation's second-largest number of German immigrants, the state has relatively few buildings or structures that directly express Germanic influence in design or construction. Because of this, well preserved timber frame barns that provide direct links to cultural preferences originating in Europe or in older German immigrant communities east of Minnesota are historically and architecturally significant.

The state's lack of overt German influence in its built environment is not uncommon, and is explained in part by the fact that most German immigrants arrived in Minnesota just before, or more typically during, the construction of the state's railroad network. Railroads were highly efficient in moving people, ideas, and goods throughout the state (particularly from urban to rural areas) and helped spread both material resources and cultural ideas. Building technologies were also changing by the time most immigrants arrived, with standardized building materials and balloon-frame construction techniques becoming common.³⁴

Johnson writes that while Minnesota's German immigrants maintained some ethnic traditions "more tenaciously than most," they generally adopted architectural forms already in use.³⁵ Jeffrey Hess and Paul Larson note that early in its history the city of St. Paul had a few houses credited to a "Teutonic fondness for stone construction," but they were atypical and the "vast majority of first-generation immigrant housing was indistinguishable from dwellings occupied by native-born residents of similar economic status."³⁶

Geographer Hubert G. H. Wilhelm, an expert on German immigrants to Ohio, points out that place names and land inheritance patterns are often more clearly indicative of German influence than structure design, and that Germanic cultural traits in Ohio appear more strongly in areas where Germans were the first Euro-American settlers.³⁷

Minnesota has some examples of buildings that clearly arose from the architectural traditions of German-speaking Europe, as listed below. Some are architect-designed "high style" buildings while others are modest vernacular structures. In some, the Germanic influence is subtle. In general, they are a tiny fraction of the buildings and structures built in Minnesota during the period of greatest immigration.

 Minnesota has a number of churches displaying Germanic design influences including Church of the Assumption in St. Paul (1874), Laketown Moravian Brethren's Church in Carver County (1878), Church of St. Boniface in Melrose (1899), and Church of St. Mary in New Trier (1909). (All four are listed on the National Register.)

³⁴ Hubert G. H. Wilhelm, "Germans in Ohio," in *To Build in a New Land: Ethnic Landscapes in North America*, ed. Allen G. Noble (Baltimore: Johns Hopkins University Press, 1992), 65-66 referring to German-built structures in Ohio.

³⁵ Hildegard Binder Johnson, "The Most Diverse Ethnic Group," in *A Heritage Deferred: The German-Americans in Minnesota*, ed. Clarence A. Glasrud (Moorhead: Concordia College, 1981), 32-33.

³⁶ Jeffrey A. Hess and Paul Clifford Larson, *St. Paul's Architecture: A History* (Minneapolis: University of Minnesota Press, 2006), 20-23; see also Thomas Harvey, "A Rejection of Traditional German Forms," in *A Heritage Deferred: The German-Americans in Minnesota*, ed. Clarence A. Glasrud (Moorhead: Concordia College, 1981), 72-73.

³⁷ Wilhelm 1992, 65-66; see Zeitlin 2000 for the imprint of German culture on Wisconsin.

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- Minnesota has a handful of high-style breweries designed with German influence including the Schell Brewery and Residence in New Ulm (1880s, National Register), Minneapolis Brewing Company (1890s, National Register), and the Schmidt and Hamm's breweries in St. Paul (both ca. 1900).
- Notable concentrations of brick houses built by German immigrants are located in Wabasha, Chaska, Carver, New Ulm, Mankato, and St. Cloud. Large clusters of brick farmhouses are located in Carver and Stearns counties. (Some of the in-town houses are the focal points of historic districts listed on the National Register.)³⁸
- Some modest brick commercial and industrial structures in towns like Carver and Chaska feature stepped, corbel-like Germanic detailing in gable ends. Some brick houses in New Ulm feature what historian Roger Kennedy terms "German Gothic Revival" detailing including brick quoins and ornamentation that resembles rows of dentils.³⁹
- In 1988 Steven Martens, then an architecture graduate student, photographed the ruins of a circa 1865 German-built brick farmhouse in Carver County that had exterior walls built of square panel framing that were filled ("nogged") with brick.⁴⁰ The ruins have been removed.
- In 2003 a German immigrant farmhouse was documented in Carver County that had stud or balloon frame walls that were filled with wattle and daub (also known as mud and stick) infill, perhaps for insulation.⁴¹ The farmhouse has been demolished.
- In 2008 Gemini Research photographed a granary on a German farmstead in Carver County that had exterior walls nogged with brick.⁴² The granary is believed extant.

³⁸ For German brick farmhouses in Carver County, see Susan Granger and Scott Kelly, "Chaska Brick Resources in the Vicinity of Carver County, 1857-1961," National Register of Historic Places Multiple Property Documentation Form, March 2013.

³⁹ Roger G Kennedy, *Historic Homes of Minnesota* (St. Paul: Minnesota Historical Society Press, 2006), 49-62.

⁴⁰ Steven Cleo Martens, *Ethnic Tradition and Innovation as Influences on a Rural, Midwestern Building Vernacular: Findings From Investigation of Brick Houses in Carver County, Minnesota*, M.A. Thesis, University of Minnesota, 1988, 69-71.

⁴¹ Susan Granger et al., Phase II (Evaluation) Investigation of the Wenz (Mieseler) Farmstead on TH 41 Near TH 212, Chaska, Carver County, Minnesota, submitted to the Minnesota Department of Transportation by Gemini Research, July 29, 2003.

⁴² Minnesota Historic Properties Inventory Form CR-DHL-042, State Historic Preservation Office, St. Paul.

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Timber Framing

Timber framing is an ancient building technique that was practiced in many forested parts of the world. Northwestern Germany, near Bremerhaven, has one of Europe's most important archaeological sites with evidence of timber frame buildings built in the first and second centuries A.D. with posts and beams, mortises and tenons, and pegs and wedges. (See a brief glossary in this MPDF's Additional Documentation section.) From the 13th to the 18th centuries timber framing was particularly common in England, Denmark, Germany, and parts of France, Switzerland, Finland, Norway, and Sweden. America's first timber frame buildings were constructed by English colonists in the 17th century. In Germany timber framing is often called *fachwerk* (*fachwerk* meaning "framework" in German, and *fach* meaning "panel" or "compartment").

In both Europe and the United States, the timber frame may have been hidden beneath exterior siding or exposed on the outside of the building. A common framing pattern called box framing or square panel framing has a lattice or grid of squarish shapes (Fig. 8). In Europe, and more rarely in the U.S., the voids between the timber members were nogged with brick, woven sticks, or with a mixture of mud and straw. Sometimes the infill panels were coated on the outside with plaster.

Timber framing is sometimes called "half-timbering." While explanations for the term vary, some sources note that the term originated in Europe and references a building style in which the timbers are spaced far enough apart that more than half of each wall is comprised of a non-timber material. The term distinguishes this framing style from an earlier style where timbers were set much more closely together (for example, 7"-wide posts might be spaced 7" apart), or from styles where a timber framework was infilled with short lengths of wood. As European forests were depleted and timbers became more scarce and expensive, the wider spacing helped reduce the amount of wood needed in a building. The use of weather-resistant nogging materials such as brick and plaster also meant the building did not need to be covered with wood siding. Timber framing patterns became highly decorative in many European buildings.⁴³

Nogged timber framing flourished in Germany in the 15th century. According to K. Edward Lay, German use of the technique is believed to have influenced its extensive use in England during the Tudor era. He writes, "In York, Tewkesbury, Stratford-Upon-Avon, Ledbury, Chester, and elsewhere in England, medieval *fachwerk* buildings abound that are virtually identical with those in Germany."⁴⁴

Germany continues to have the world's largest collection of timber framed buildings. The structures display wide variation in styles and techniques. According to German-trained timber framer John Wingender, "there is an almost unlimited supply of joinery in Germany, [each type of joint] dealing with one specific situation and changing from region to region."⁴⁵

Timber framed barns and houses with square panel framing *and* nogging are very rare in the United States. Tishler indicates that an eight-county region in east central Wisconsin (whose residents came

⁴³ Richard Harris, *Discovering Timber-Framed Buildings* (Aylesbury, UK: Shire Publications, 1978), 23-24; Jorn Wingender, "German Frame Typology II," *Timber Framing* 51 (March 1999); Dell Upton, "Traditional Timber Framing," in *Material Culture of the Wooden Age*, ed. Brooke Hindle (Tarrytown, NY: Sleepy Hollow Press, 1981).

⁴⁴ Lay 1982, 9.

⁴⁵ Jorn Wingender, "German Frame Typology," *Timber Framing* 49 (Sept. 1998), 4.

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from Pomerania, Brandenburg, Saxony, and nearby parts of Prussia) contains the country's largest collection. Examples are also found in states such as Pennsylvania, Missouri, and Texas.⁴⁶ Today in Minnesota there are no known examples of nogged timber frame buildings.

Minnesota's German Immigrant Timber Frame Barns

Minnesota's German immigrant barns are likely the state's best examples of Germanic timber framing.

Such a barn was generally built after a farm was well established and served as a replacement for a much smaller settlement-era barn. The first barn typically built by a pioneer farmer in Minnesota and Wisconsin was a structure built of logs or poles. If well-built of logs, the first barn might serve 20 years through a farm's subsistence period. After it was no longer needed as the primary barn, the structure might then house hogs, chickens, horses, or sheep. In forested areas of central Minnesota, Brinkman and Morgan found that German immigrants were building log barns through at least 1900.⁴⁷

In a study of historic barns in southern Ontario, geographer Peter Ennals describes the typical succession of barn construction on farms in that region. He explains that Ontario farmers first built a log barn, often with three bays. After roughly 30 years, a second barn – this one timber frame – would be built to replace it. The second barn's form depended on the region and era in which it was constructed. In earlier-settled areas, the second building was a threshing barn suited to wheat storage, with the farm's few animals usually kept in other shelters. In later-settled areas (comparable to Minnesota), the farm's second building was a general-purpose barn because by the time the log barn deteriorated the farm had usually diversified and had a herd of dairy cows. These second-generation barns were modified or enlarged as dairy herds grew. Ennals found that, when the second-phase barns began to deteriorate, some farms built a specialized dairy barn as a third-generation barn. In cases where the second-phase barn was in good condition and continued to suit its purpose, a third phase of barn-building might be delayed until after World War II when a metal-sided pole barn was built.⁴⁸

⁴⁶ William H. Tishler, "Fachwerk Construction in the German Settlements of Wisconsin," *Winterthur Portfolio* 21 (Winter 1986); Charles F. Calkins and Martin C. Perkins, "The Three-Bay Threshing Barn," in *Barns of the Midwest*, ed. Allen G. Noble and Hubert G. H. Wilhelm (Athens, OH: Ohio University, 1995), 53-54; Richard W. E. Perrin, *Historic Wisconsin Buildings: A Survey in Pioneer Architecture, 1835-1870* (Milwaukee: Milwaukee Public Museum, 1981); Christopher S. Witmer, *The German Timber-Framed Threshing Barns of Lebanon Township, Dodge County, Wisconsin*, M. A. Thesis, University of Wisconsin, 1983; Charles Van Ravenswaay, *The Arts and Architecture of German Settlements in Missouri: A Survey of a Vanishing Culture* (Columbia, MO: University of Missouri Press, 1977); Hubert G. H. Wilhelm and Michael Miller, "Half-Timber Construction: A Relic Building Method in Ohio," *Pioneer America* 6 (1974); Gerlinde Leiding, "Germans in Texas," in *To Build in a New Land: Ethnic Landscapes in North America*, ed. Allen G. Noble (Baltimore: Johns Hopkins University Press, 1992), 375; Lauren B. Sickels-Taves and Philip D. Allsopp, "Marking a Mark in America: The Architectural Ingenuity of Germanic Settlers," *Material Culture* 37 (Spring 2005), 95.

⁴⁷ Marilyn Salzl Brinkman and William Towner Morgan, *Light from the Hearth: Central Minnesota Pioneers and Early Architecture* (St. Cloud: North Star Press, 1982); see also the following: William Towner Morgan, Telephone interview with Susan Granger, Feb. 2006; Allen G. Noble and Richard K. Cleek, *The Old Barn Book: A Field Guide to North American Barns and Other Farm Structures* (New Brunswick, NJ: Rutgers University, 1995), 2; Perrin 1981: 57; Martin Perkins, Telephone interview with Susan Granger, Feb. 2006; William H. Tishler, Telephone interview with Susan Granger, Feb. 2006; Tishler "Fachwerk" 1986, 277.

⁴⁸ Peter M. Ennals, "Nineteenth Century Barns in Southern Ontario." *Canadian Geographer* 16 (1972), 267-268.

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Materials

The superstructure of a timber frame barn is comprised of a series of bents that were typically preassembled on the ground and tipped up into place on a stone foundation. Large timbers ranging from 8" x 8" to 12" x 12" in cross-section were used as principal elements, and smaller timbers were used for braces, girts, and other components. The timber frame was generally assembled with mortise and tenon joints fastened with wooden pegs. Joints were either custom-cut into unique mortise and tenon pairs, or cut with standardized mortise and tenon units that were more interchangeable.

Barns were a significant investment, and it was common for cash-strapped Minnesota farmers of all backgrounds to defray costs by contributing their own labor and using on-farm materials such as felled trees and field rock. (Because they relied on the use of long, straight timbers, few timber frame barns were built in parts of Minnesota that were not naturally forested.) Window sash and other components were often purchased, and as were shingles, paint, nails, and hardware. Older barns generally have more hand-built components.⁴⁹

Structural timbers were usually shaped from tall tree trunks – often oak – that were hewn square with a broadaxe or, more often among Minnesota's German barns, squared off with a mechanical saw. Sawmills were common in Minnesota by the early 1870s when all but the earliest of Minnesota's German immigrant barns were built. It is presumed most of the barns were built with logs felled on the farm and then hauled to a local mill to be cut into timbers. It was also possible that timbers were shaped from logs with a portable sawmill brought to the farm. Minnesota farmers often hauled logs to a sawmill in town during the winter when farm work was light and the roads were frozen hard rather than being muddy or rutted. Horse-drawn sleds were typically used.⁵⁰

Efficient circular saws were introduced in the U.S. around 1813 and by the 1870s had replaced older technology in most areas, including in Minnesota. Allen G. Noble and Rudy R. Christian describe the evolution of sawmills in Ohio:

The early water-powered mills were an asset to barn builders, but they were slow and limited to relatively short logs. Thus, the barns built in these times exhibit hand-converted [hewn] timbers for most of the principal members. The early mills were built on a principle called 'up and down' sawing, also known as frame or sash sawing, since the saw blade was a straight piece of heavy steel mounted in a wooden frame. This frame would move up and down, while the carriage mechanism slowly moved the log through the frame. This method of milling left easily identifiable 'saw tracks' that run straight, but slanted, across the face of the timbers as coarse parallel lines. Discovering barns [in Ohio] that have both hewn and sash sawn timbers usually means they were built after the first sawyers arrived, but probably before the Civil War when a major change in sawmilling technology [use of the circular saw] occurred.

Developing enough horsepower to run a circular saw large enough to mill logs was difficult using water wheels or water-driven turbines, but steam engines developed in the mid-19th

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⁴⁹ Granger and Kelly 2005, 5.1-5.2.

⁵⁰ Martens 1988; Granger and Kelly 2013; Perkins 2006; Tishler 2006; Jack A. Sobon, Telephone interview with Susan Granger, Feb. 2006; Allen G. Noble and Rudy R. Christian, "Historic Barns: The Barn, a Symbol of Ohio," *Heartland Science*, Ohio Academy of Science, 2005, 12-14.

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century were capable of running large blades at high speeds. These new mills could cut large diameter logs at higher feed rates and often were built to handle logs of greater length, although usually limited to 18' to 30' or so. Circular saw mills quickly replaced vertical mills [in Ohio] in the mid-19th century. A major change in barn construction resulted, since improved mills and improved roads meant timber framers could build barns more quickly and completely with sawn materials. This was done by making longer timbers from shorter sawn pieces 'scarfed' together end to end. Some timber framers still chose to hew the longest pieces from logs 30' long and greater. The saw tracks from circular mills imprint large arcs across the faces of the timber. These are easily distinguished from those left by the up and down mills.⁵¹

Builders

Despite their large size and the weight of the timbers, the Minnesota barns were built largely by hand with very little equipment. Typical timber framers' tools in 1900 resembled those used for centuries. They included axes, chisels, knives, mallets, hand saws, and rulers, and – for raising the frame – ropes, harnesses, counterweights, pulleys, rollers, and pike poles. In some parts of Europe, a timber frame barn might be laid out, and its mortise and tenon joints cut, in a village carpenter's yard. For most barns in the U.S., however, cutting the joinery usually occurred on the farm.⁵²

Very few of the carpenters or barn builders responsible for the Minnesota barns have been positively identified. Most farmers in the late 19th and early 20th centuries were experienced carpenters and built their own buildings. However, it is unlikely that many would have had the expertise necessary to design and build a barn with massive timbers and custom-fit joinery. Even after plank and balloon frames superseded timber frames (see below), most farmers regardless of ethnicity hired a skilled carpenter or barn builder to help plan and build such a large and important structure. Farmers often solicited help from relatives and neighbors for part of the construction process.⁵³

John Fitchen, in a study of 18th century Dutch immigrant barns in New York, notes that a typical farmer could have felled the trees, cured the logs, and hauled them to the building site. "But unless the farmer also happened to be a skilled carpenter, the shaping of the timbers and the cutting of mortises in accordance with a carefully laid out plan would have been the work of a professional and experienced carpenter."⁵⁴ Van Ravenswaay believes some German immigrant barns in Missouri were built by farmers who also served as part-time barn builders for the community. He believes they may have learned the skill through apprenticeship, perhaps working with their fathers.⁵⁵

Some of the Minnesota barns are known to have been built by the farmers themselves – men who also had formal carpentry experience. A good example is the Benike Barn, a beautifully crafted structure built circa 1875 in Olmsted County (OL-FRM-020). The barn was built by Carl Ludwig Benike, then age 71, and his son Herman E. Benike, 26, with likely help from Herman's brothers Frederich, 46, and Gustav, 41, who farmed nearby. Carl Ludwig had worked as a carpenter and cabinetmaker in northeastern Germany before the family immigrated in 1843. The Benikes first lived in Marquette

⁵¹ Noble and Christian 2005, 12-14.

⁵² Perkins 2006; Harris 1978, 15; Witmer 1983, 36.

⁵³ See Granger and Kelly 2005, 5.1-5.34.

⁵⁴ Fitchen 1968, 59-60.

⁵⁵ Van Ravenswaay 1977, 266.

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County, Wisconsin, and in 1865 moved to Olmsted County.56

In Nicollet County, three barns built circa 1875 on farms owned by brothers Karl, Heinrich, and Wilhelm Bode may have been built under the direction of Karl Bode, who had worked as a carpenter just before coming to Nicollet County. The Bode brothers were born in Hanover and immigrated to the U.S. in 1852 (at ages 14, 16, and 10) with their parents. The large extended family lived in Illinois for a few years before resettling in Nicollet County. Karl Bode worked as a carpenter in Illinois from 1852-1854.⁵⁷

Most barns were "raised" in a group effort with relatives and neighbors pitching in to help. Many historians describe such events in various parts of the country.⁵⁸

Assembly usually happened in one long day, which Fitchen says was different from the European tradition in which farmers, who lived quite close to one another, could call on neighbors several times as needed. Fitchen writes, "there was a stringent limitation on the amount of time he could ask of his neighbors to give [because they were as busy as he]. So he had to have all in readiness before they arrived to help him."⁵⁹ Babcock and Stevens write about similar limitations noting, "If the [barn] raising was on schedule, by the end of the day the frame was in place, including the rafters. Occasionally the raising included part of a second day, but all parties knew the volunteers were anxious to return to the work of their own farms. Thus the master builder was judged not only on the barn itself but by the speed and efficiency with which the parts he had laid out went together."⁶⁰

Design Influences

More research is needed to understand the origins of the barn designs and construction methods, and how ideas and techniques were learned or spread. Minnesota's German-built timber frame barns appear to share characteristics with barns in Pennsylvania, Missouri, Illinois, Indiana, Montana, New York, North Carolina, Ohio, and Texas, but comparative study is needed to provide details about similarities and differences.⁶¹

Design could be influenced in several ways. Researchers believe that several barn types originated in Germany and evolved in form and detail as immigrant groups moved across the country, adapting farm buildings to local conditions and resources.⁶² Barn design might differ according to the region of

 ⁵⁶ Susan Granger and Scott Kelly, "Benike Family Barn," National Register of Historic Places Registration Form, March 2011.
⁵⁷ Gresham 1916, v2; The Bode brothers' barns are NL-NCT-008, NL-NCT-011, and NL-NCT-015.

⁵⁸ See, for example, Victor C. Dieffenbach, "Barn Raisings," in *The Pennsylvania Barn*, ed. Alfred L. Shoemaker (Lancaster, PA: Pennsylvania Dutch Folklore Center, Franklin and Marshall College, 1955), 40-45, and Robert F. Ensminger, *The Pennsylvania Barn: Its Origin, Evolution, and Distribution in North America* (Baltimore: Johns Hopkins University Press, 1992) for German barns in Pennsylvania; Fitchen 1968 for Dutch Barns in New York; and Witmer 1983 and Jerry Apps, *Barns of Wisconsin*, rev. ed. (Madison, WI: Wisconsin State Historical Society Press, 2010) for Wisconsin.

⁶⁰ Richard W. Babcock and Lauren R. Stevens, *Old Barns in the New World: Reconstructing History* (Lee, MA: Berkshire House Pub., 1996), 30-31.

⁶¹ See Witmer 1983 and other sources listed in Section I of this MPDF.

⁶² Robert W. Bastian, "Southeastern Pennsylvania and Central Wisconsin Barns: Examples of Independent Parallel Development?" *Professional Geographer* 27 (May 1975); Ensminger 1992; Van Ravenswaay 1977; Zeitlin 2000.

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Europe the farmers or builders emigrated from.⁶³ Barn design might be affected by the barns already standing in the immigrants' new home, and the specific experience and skills of the local barn builders and craftsmen.⁶⁴ Earlier Minnesota barns (built before circa 1895) are likely to display more direct Old World influence in design and construction than later barns, which might reflect greater influence from American-trained barn builders, agricultural engineers, and dairy scientists.⁶⁵ Minnesota's Germanic barns may be the product of any or all of these influences.

Charles Van Ravenswaay writes of German barns in Missouri, "In building their great barns, the Missouri-German farmers adapted traditional northern European designs that had evolved through centuries of trial and error. What the Missourians created were as varied in size, materials, and design as were the national and regional backgrounds of the owners and builders, each of whom found different solutions to similar agricultural needs." He explains that the barns "show a development in design, from earlier examples that seem very European to late 19th century forms common throughout the Middle West." He notes, "Some of the framing techniques were light and simplified; others were exceedingly heavy and complex."⁶⁶

Robert F. Ensminger has studied in detail the dissemination of the Pennsylvania forebay barn through Great Lakes states and the Midwest by migrating Pennsylvania Germans. He writes that in many parts of the Midwest, ethnic Germans emigrating directly from Europe settled among the already-established Pennsylvania Germans, "obviously attracted by the similarity of culture and language." The newcomers built the same type of Pennsylvania forebay barns already being built in the area, in some cases influenced by local barn builders.⁶⁷

While studying forebay barns in north central Wisconsin, Ensminger encountered a group of barns built circa 1905-1920 by local professional barn builders. Ensminger notes that the builders read and spoke both English and German, were familiar with agricultural journals, and used paper plans and sketches in their work. The builders "frequently promoted a [particular] barn style," including the Pennsylvania forebay barn.⁶⁸

Evolution Away From Timber Framing

Dell Upton describes a gradual process by which Old World barn technologies evolved, and writes, "the history of timber framing in America is not represented as the sudden displacement in the mid-19th century of folk carpentry by an alien system. In many ways it represented rather a continuous search for structural systems that were flexible and labor-efficient." He notes, "Traditional carpenters had sought this on their own, and for many the new forms were understood as modifications of the old."⁶⁹

⁶³ Van Ravenswaay 1977.

⁶⁴ Robert F. Ensminger, "A Comparative Study of Pennsylvania and Wisconsin Forebay Barns," *Pennsylvania Folklife* 32 (1983); Ensminger 1992; Zeitlin 2000.

⁶⁵ See Granger and Kelly 2005 for the development of agricultural engineering and so-called scientific agriculture.

⁶⁶ Van Ravenswaay 1977, 263-268.

⁶⁷ Ensminger 1992, 151.

⁶⁸ Ensminger 1983, 106; Ensminger 1992, 175.

⁶⁹ Upton 1981, 92-93.

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Although they were large and very strong, timber frame barns had some disadvantages, including the fact that long straight timbers were not always readily available. The timbers were also heavy and difficult to move, and skilled joinery was needed for their assembly. One of the first changes that occurred was the substitution of large nails or spikes for the complex mortise and tenon joinery.

Many timber frame barns also had limited mow capacity. As dairy herds grew in the early 20th century, it became important for farms to maximize storage capacity for winter feed, as well as have a loft large enough to accommodate a modern hay carrier. Larger mows could be created with plank or balloon frames, and these new styles increasingly replaced timber frames for new barn construction.

Plank frames became especially popular in Minnesota in the 1910s. In this framing style, the members forming the bents were built-up of long, thin planks nailed together (Fig. 65). Only one worker was needed to carry several planks, and mortise and tenon joinery was not used. The balloon frame depended not on a series of heavy bents, but on a distributed system of many closely-spaced wall studs and rafters that worked together to share structural support and create large, strong shapes. A further development was the laminated rafter, in which small pieces of wood were nailed or glued together to create built-up, self-supporting, rafter pairs, usually Gothic-arched. Like balloon frames, laminated rafter barns had stud walls and very open mows. All three systems were predicated on lumberyard-distribution of modestly-priced standard-sized sawn boards and inexpensive machine-made nails.⁷⁰

In all three systems – plank frames, balloon frames, and laminated rafters – much of the weight of the mow roof and floor was supported by rafter trusses and the first-story side walls. It was less important to support the mow floor from below. Thus the heavy posts common to the stables in timber frame barns were superceded by lighter supports, freeing the stable to be arranged more efficiently. Modern stanchions, feed alleys, manure gutters, and other features were installed to reduce labor and handle more cows.⁷¹

New framing styles were adopted gradually, with timber frames continuing to support buildings which, like barns, needed to be very strong and have a large open interior. In the 1920s, even though balloon framing had become standard in the construction industry, some Minnesota barns were still being built with mortise and tenon timber frames. Some farmers did not trust balloon framing, given the great weight of hay the barn needed to support. Others preferred to save money by cutting their own timbers rather than buying so much precut lumber.⁷²

In his discussion of evolving building technology, Upton concludes that the new industrial-based construction methods changed carpentry "from the realm of craft to that of industry" and in many ways reduced the carpenter's role from skilled planner and craftsman to that of laborer.⁷³ Barns with new framing styles required less craftsmanship, were faster to build, and used less wood than timber frame

⁷⁰ Granger and Kelly 2005, 5.63-5.66.

⁷¹ Glenn A. Harper and Steve Gordon, "The Modern Midwestern Barn, 1900-Present," in *Barns of the Midwest*, ed. Allen G. Noble and Hubert G. H. Wilhelm (Athens, OH: Ohio University, 1995), 222; Granger and Kelly 2005, 5.65-5.66.

⁷² Richard W. E. Perrin, *Wisconsin Architecture* (Washington, DC: National Park Service, 1965), 18, 61; Perrin 1981, 42; Thomas Durant Visser, *Field Guide to New England Barns and Farm Buildings* (Hanover, NH: University Press of New England, 1997, 21-22.

⁷³ Upton 1981, 92-93.

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barns. The new framing styles represented the influence of agricultural engineers and recommendations of farm experts who disseminated barn plans through the agricultural press, lumberyards, and land-grant college extension services.⁷⁴

⁷⁴ Granger and Kelly 2005.

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F. Associated Property Types

Property Type: German Immigrant Timber Frame Barns

Description

German immigrant-built timber frame barns within this historic context have heavy timber frame structural systems, including interior bents, exterior walls, and purlin plate roof systems. (See the brief glossary under Additional Documentation.) The frames are connected with mortise and tenon joinery. (Barns with nailed timber frames, plank frames, and balloon frame walls are not included within this context.) Barns within the purview of this historic context must have been originally owned or built by persons of German heritage. The barn will likely date from 1865 to 1925.

A Minnesota Germanic timber frame barn is usually the largest and arguably the most important structure on a farm. They are practical, utilitarian buildings with little ornamentation. The barns tend to display considerable individuality in design; no two barns seem to be identical. Many of the barns embody distinctive characteristics of German immigrant construction, some of which is rare in Minnesota. These elements include particular barn forms, square panel framing, long diagonal braces, scribe carpentry, and the use of curved and irregular timbers.

In most cases, the interior of the building needs to be viewed to confirm whether the barn has a timber frame structural system, whether it is assembled with pegged mortise and tenon joints, and whether the barn displays Germanic design and construction details. Typically, these characteristics are not apparent from the exterior.

Location, Age, and Setting

A statewide cultural resources survey of barns in Minnesota has never been conducted. It is not known how many German immigrant-built timber frame barns stand in the state, but because so many early farmers were of German stock, the barns are believed to be fairly numerous. It is not known how many barns contain Old World or Germanic design and construction details.

Southeastern Minnesota has the most dense concentration of German-built timber frame barns. Central Minnesota counties such as Stearns and Wright contain fewer examples. Further research is needed to explain this distribution, since both areas had high German immigrant populations and abundant natural stands of hardwood trees (Figs. 2 and 3). German-built timber frame barns are far less common in other parts of the state. While northern Minnesota was also forested, farms in that region were generally not developed until after World War I and tended to be small-scale, marginally profitable operations. Barns there tend to be smaller and most were built of balloon frames with dimensional lumber. Barns in treeless western Minnesota were built almost exclusively with precut lumber shipped in by rail car and sold at local lumberyards.⁷⁵

Determining the age of a German immigrant timber frame barn can be difficult because records are scarce. Construction dates for barns cited in this MPDF were estimated by examining design details, building materials, and, in some cases, farm ownership history. Most of the barns were built circa

⁷⁵ Granger and Kelly 2005.

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1865-1925, with the majority built circa 1875-1910. Before circa 1865, most farms were not yet profitable enough to require a large barn nor had they yet added a dairy herd (relevant because the barns offered adequate space for both crops and livestock). After 1925 most Minnesota barns were built with plank and balloon frames rather than with large timbers.

Minnesota's German immigrant timber frame barns were built on individual family farms. They were often the largest building on the farmstead, and were often a focal point of activity. The space on two or three sides of the barn was usually occupied by fenced livestock yards and unfenced work areas.⁷⁶ Some of the barns still have adjacent fenced areas.

Today, many of the barns stand on farmsteads that retain a farmhouse and a collection of outbuildings of various types and ages. Farmsteads with a well-preserved set of pre-1960 buildings are becoming increasingly rare.⁷⁷

Many farmsteads with German timber frame barns are no longer the headquarters of a working farm operation, but are instead simply rural residences. Some of the barns stand on farmsteads that are unoccupied.

Because of changes in Minnesota's dairy farming industry – principally the consolidation of dairy cows into many fewer, very large herds – most of the barns are no longer used for their intended purpose. Many stand empty or are used for storage.

<u>Size</u>

Minnesota's German immigrant timber frame barns range in size from about 28' x 42' to about 40' x 76', providing about 1,170 to 3,000 square feet (sq. ft.) on one level. The smallest barns generally comprise about 1,170 to 1,440 sq. ft. with dimensions such as 28' x 42' or 30' x 48'. The largest barns are more than double the size of the smallest with, for example, dimensions of 40' x 70' (2,760 sq. ft.) and 40' x 76' (3,040 sq. ft.). Many of the barns are about 1,800 to 2,508 sq. ft., with typical dimensions of 35' x 54', 30' x 70', and 40' x 60'. A 2,500 sq. ft. barn could house about 20 dairy cows.

The barns were generally larger than barns built in Germany, but comparable to those built in Germanimmigrant communities in states east of Minnesota.

Many of the barns were large compared to other pre-1960 dairy barns in the state. In the 1920s, for example, a new moderately large Minnesota dairy barn (of any structural type – timber frame, plank, balloon) might have a footprint of 32' x 80', 34' x 64', or 36' x 80' and house 20 to 28 cows. Many experts at the time felt a barn should not be wider than 32' or 36' because of Minnesota's cold climate, and, for that reason, felt that a barn of 36' x 76' was excessive for most farms.⁷⁸

⁷⁶ Ibid.

⁷⁷ For a description of the layout and content of typical Minnesota family farmsteads, see Granger and Kelly 2005, pp. 6.175-6.186.

⁷⁸ Ibid., 6.84.

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Barn Form or Type

Close examination of at least 44 German immigrant-built timber frame barns in southeastern Minnesota reveals great individuality in design. The designers and builders of each barn seem to have solved the problems of structure and function in a slightly different way. Few, if any, of the barns are identical.

The barns do, however, share basic similarities beyond their mortise and tenon timber framework. Each was built with a rectangular plan. (If a barn is L-shaped today, one of the wings has undoubtedly been added (Fig. 30).) All have either a gabled or gambrel roof. In its original form, the roof was always symmetrical (i.e., one plane was not longer than the other).

All of the barns perform two main functions: housing for cows and a few horses, and storage for a large amount of crops – particularly the hay essential for successful dairying.

In all of the barns, the hay mows are large open spaces. The stable had stalls for milk cows, as well as wooden box stalls for calving, isolation of sick animals, and/or housing draft horses. Rarely were pigs or other animals kept in the stable, and eventually state dairy laws prohibited this practice.⁷⁹

For the purposes of this MPDF, Minnesota's German immigrant timber frame barns have been divided into four basic forms or types. (More research and fieldwork are needed to develop and refine the scheme introduced.) The four basic forms differ based on functional and structural elements such as number of stories, position of entrance and mow drive, location of stable, and access to stores. The basic forms are:

- Type 1: Basement Barn (possibly derived from Pennsylvania forebay barns)
- Type 2: Two-Level Ground Barn (possibly derived from German one-story ground barns)
- Type 3: Stable Barn (generally associated with the rise of "scientific" dairying)
- Type 4: Saxon Barn (possibly related to house-barns of northern Germany)

Not all of Minnesota's German-built barns will fall neatly into one of the four types. Some may be determined to be hybrids or anomalies or an entirely different type, but these encounters are expected to be rare.

Geographers and historians use various terms to categorize and describe barns depending on what part of the country is being discussed, or whether the typological scheme is based on barn shape, function, evolution, ethnicity, or other factors. The scheme of this MPDF was informed by the work of scholars such as Hubert G. H. Wilhelm and Allen G. Noble, and by a typology developed recently in Pennsylvania – the first state to be settled by German immigrants – in an historic context study and field guide prepared circa 2010-2014 by the Pennsylvania Historical and Museum Commission.⁸⁰

⁷⁹ Granger and Kelly 2005.

⁸⁰ Architecture and Landscapes of Pennsylvania's Agriculture: A Field Guide, Pennsylvania Agricultural History Project. 2014.

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Type 1: Basement Barn

At least two-thirds of the 44 barns that form the basis of this MPDF fall into the first barn type, the Basement Barn. This barn is also called the Banked Barn, Raised Barn, Raised Basement Barn, Northern Basement barn, or Raised Three-bay Barn.⁸¹

Most of Minnesota's German immigrant timber frame barns are expected to be Basement Barns. They were likely built throughout the period 1865-1925.

Basement Barns are two-level structures with a mow on top and a basement below. In Minnesota the upper level of the barn is wood, while the basement is typically built of mortared stone. In other states, the entire barn might be brick or stone. Most Minnesota Basement Barns have either a gabled or gambrel roof.

The main wagon door in this barn type is invariably positioned near the center of one of the long walls. The barn's main level, which contains this door, has a wagon drive and crop storage mows. The basement is used as a stable.

The long side of the barn may be built against a low hillside so the mow is accessed from the top of the slope (Figs. 11-12). If the barn was built on a level site, a manmade earthen ramp provides access to the main door (Fig. 15). A typical ramp might be 15' wide (slightly exceeding the width of the wagon door opening) and about 20' long. For stability, the edges of a ramp might originally have been retained by mortared stone rubble or poured concrete. In many cases the sides of the ramp were simply sloped and not retained.

The main or mow level is divided laterally into bays – typically three to five – by timber frame bents (Fig. 13). One of the central bays is the wagon drive. The wagon drive is open to the roof, but might have a simple platform (or another type of storage compartment) over one or both ends to provide extra crop storage.

The principal means of filling the barn was by driving a wagon into the wagon bay, forking or hoisting hay out of the wagon bed, and distributing the hay throughout the storage mows by hand-pitching or with the help of ropes and pulleys or other hay-moving equipment. This type of barn has only one door into the mow, requiring that wagons be backed out of the barn and down the ramp. Hay was dropped though chutes in the floor to the stable below.

A moderate-sized barn might have a 12'- or 14'-wide wagon floor flanked by two 18'-wide storage bays. In addition to barn-loading, the wagon bay was also used for husking corn and other chores, and as a place to store equipment in the winter (Fig. 14). If a Minnesota German-built Basement Barn has a hay door high in a gable or gambrel end, the door was typically cut in later. The wagon drive in these barns was usually not used to thresh grain, because by the time most of Minnesota's timber frame barns were

⁸¹ Allen G. Noble, *Wood, Brick, and Stone: The North American Settlement Landscape, Volume 2: Barns and Farm Structures* (Amherst, MA: University of Massachusetts, 1984), 39-41; Allen G. Noble and Gayle A. Seymour, "The Distribution of Barn Types in Northeastern United States," *Geographical Review* 72 (April 1982), 160; Noble and Christian 2005, 6-7; Noble and Cleek 1995, 81-82; Cynthia G. Falk, *Barns of New York* (Ithaca: Cornell University Press, 2012), 36-43.

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built after 1880, mechanical threshers were in use and threshing usually took place in the yard outside the barn.

The mow's wagon door is unsheltered in perhaps all Minnesota examples of this barn type. In other states, there might be a pent roof over the wagon door, or an enclosure completely sheltering it. Some German-built Basement Barns in other states have a root cellar under the ramp that is accessed either externally or from the basement stable. It is not known whether this feature exists in Minnesota; it does not appear in the Basement Barns used as a basis for this MPDF and is presumed rare.

The basement generally extends under all parts of the mow. The side of the basement built against the slope has no windows or doors, while the non-slope side has a full-height exposed wall with window and door openings (Fig. 12). The basement is usually built of mortared field-rock or rough-cut pieces of local limestone or granite. The stone walls are often 18" to 24" thick. Late examples, built in the early 20th century, might have basements built of poured concrete or rockfaced concrete block (Figs. 16-18).

The stable aisles or alleys in a Basement Barn might be arranged either longitudinally or laterally. The stable typically had a few windows, two or three narrow doors for farmers and animals, and one door wide enough for a cart or wagon. Some Basement Barns in Minnesota have a pent roof across the top of the stable or above a stable entrance (Fig. 17). This element is characteristically German.⁸² Earlier barns generally have fewer windows than later barns.

Architectural Antecedents. Minnesota's German-built Basement Barns are likely derived from the socalled Pennsylvania Barn, but built without a forebay or overshoot which is the Pennsylvania Barn's defining feature. In his study of German immigrant buildings in Missouri, Van Ravenswaay describes barns that may be similar to Minnesota's Basement Barns. He calls the Missouri barns "Alpine or 'bank barns' of two levels and a hayloft, utilizing the slope of a hillside" and writes that the barn "while similar to the Pennsylvania barn, lacks the forebay."⁸³

The so-called Pennsylvania Barn (also known as a German Bank Barn or Pennsylvania-German Barn) is a Basement Barn whose first U.S. appearance was in the early 18th century in Pennsylvania among the country's first German immigrants. The Pennsylvania Barn has numerous variants, but its distinguishing features are that it is a Two-level Bank or Basement Barn with mow crop storage above and a stable below, and that it has a mow-level forebay that extends out over the stable level. The forebay provides extra storage, allows feed to be dropped to the yard below, and offers some shelter to livestock in the yard (Fig. 9).⁸⁴ The forebay can be located on the long side of the barn or on a gable end. The barns have either gabled or gambrel roofs.

On the interior, both the mow and stable levels of the Pennsylvania Barn are generally divided laterally (perpendicular to the roof ridge). The mow level usually contains a threshing floor and storage bays.

⁸² Apps 2010, 36; Alan G. Keyser and William P. Stein, "The Pennsylvania German Tri-Level Ground Barn," *Der Reggeboge (The Rainbow): Quarterly of the Pennsylvania German Society* 9 (Dec. 1975); and others.

⁸³ Van Ravenswaay 1977, 268.

⁸⁴ Ensminger 1992; Wilhelm 1995, 67-72.

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Ensminger and other experts on the Pennsylvania Barn have identified numerous subtypes (including one called the Swisser Barn), but all have at least two levels and the definitive forebay.⁸⁵

Ensminger provides a functional overview of Pennsylvania Barn:

[The upper] level is used to process and store feed grains, hay, and straw. It contains several sections or bays. Bays entered directly from the bank have large doors and function as threshing or machinery floors; those adjacent to the threshing floors serve as mows for storage of hay and straw.

The upper-level space to the fore of the barn, extending over the stable wall below, is the forebay. Windows in the front wall of the forebay provide light for this area. An opening in this wall, at the front end of the threshing floor, formerly provided draft for hand threshing and winnowing. Through this opening straw can be tossed to the barnyard below. The overhang of the forebay prevents blockage of the stable doors by straw or snow and avoids splash erosion of foundation mortar near ground level during heavy rains. The forebay area may be continuous from the mows, providing additional storage space. Usually, however, it is partitioned from the mows, and houses a granary with bins for various feed grains. . . .

The lower level of the Pennsylvania barn has always been used to house livestock, including cows, beef cattle, and horses. . . . In many barns, pens for calves and even pigs, sheep, and chickens, can be found. . . . Access between the stable and the barnyard is through double split [sometimes called "Dutch"] doors in the front wall, below the forebay. Gable end doors in Pennsylvania barns, when they occur, provide access to the feeding alley, or *fudergang*, which is usually at the rear of the barn and runs between the rows of pens. The most frequent orientation of the barnyard, stable doors, and forebay, is to the south or southeast, which is especially advantageous during cold weather. Locating the granary in the forebay on the warmest and driest side of the barn with fresh air circulation below also makes sense.⁸⁶

Scholars indicate this barn type was brought to Great Lakes and Midwestern states by Germans migrating from the Pennsylvania cultural core. Ensminger believes, for example, that the Pennsylvania Barn was brought to southern Wisconsin by German settlers transplanted from Pennsylvania and from "secondary centers of Pennsylvania culture in Ohio, Indiana, and Illinois."⁸⁷ Ohio has the largest number of Pennsylvania Barns outside of Pennsylvania.⁸⁸

Despite the hundreds of forebay barns built in Wisconsin, only one barn with a forebay is known to have been built in Minnesota. It was built of logs in central Minnesota's Stearns County where it was documented by Brinkman and Morgan.⁸⁹

⁸⁵ Ensminger 1992, 56-106; see also Charles, H. Dornbusch and John K. Heyl, *Pennsylvania German Barns* (Allentown, PA: Pennsylvania German Folklore Society, 1958).

⁸⁶ Ensminger 1992, 53-55.

⁸⁷ Ibid., 169.

⁸⁸ Ibid., 148, 169-172, 201-206; Wilhelm 1995, 70-71.

⁸⁹ Brinkman and Morgan 1982, 50.

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Scholars have speculated for decades about whether the Pennsylvania Barn was a direct transplant from Europe, or whether it was developed in Pennsylvania by early immigrants. Research by Ensminger and others, summarized in Ensminger's definitive 1992 study, has traced the origins of the barn to log and timber frame structures – both house-barns and barns – built in Switzerland and nearby hilly regions in southern Germany.⁹⁰

Van Ravenswaay writes:

In the Alpine region of southern Germany and Switzerland, the design of the house-barn utilized the slope of a hillside very efficiently. The first or lowest level served as a stable for horses, cattle, sheep, and sometimes even pigs. The rear wall of this floor was insulated from winter cold from the hillside; the exposed wall with the doors and windows was aligned to receive the maximum amount of winter sunshine and was sheltered from the weather by a 'forebay,' the projecting body of the upper level of the barn. This upper level contained the family residence, various work and storage rooms, and a threshing floor inside the great wagon doors, which were entered by way of an inclined driveway or bank.⁹¹

<u>Three-bay Threshing Barn</u>. A barn type similar to Minnesota's German-built Basement Barn – but which has no basement – is the Three-bay Threshing Barn, also known as the English Barn. (This is not to be confused with the New England or English Bank Barn, which is similar to a Basement Barn but has the main door in the gable end.) The Three-bay Threshing Barn was "a type widely known in Europe, [and] brought to the New World by farmers of different nationalities," according to one source.⁹² Wisconsin barn historians Charles Calkins and Martin Perkins write that the Three-bay Threshing Barn was introduced by English settlers to New England, but "introduction of this structure [to the U.S.] also came quite early from other continental sources, especially Germany and France."

Three-bay Threshing Barns are small – rarely exceeding 30' x 40'. They were built in areas east of Minnesota, including Wisconsin, Michigan, and Illinois, during periods when farms grew mostly grain and before they had diversified into dairying. The central bay was a wagon drive and threshing floor. The barns were built on level ground, and there was a door at each end of the drive. During threshing, both doors could be opened to funnel a breeze to help winnow the grain. Both side bays might be used for crop storage, or one of the bays could be used for a few livestock, with crops stored above on a loft or platform, and the other used for crops.⁹⁴

In states east of Minnesota including Wisconsin, some farmers built a Three-bay Threshing Barn during the frontier wheat-growing era and then lifted it onto a basement when they diversified into dairying.⁹⁵ It is believed this practice was rare in Minnesota. Minnesota's German immigrants were generally milking

⁹⁰ Ensminger 1992, 1-50, 107-146.

⁹¹ Van Ravenswaay 1977, 267.

⁹² Eric Arthur and Dudley Witney, *The Barn: A Vanishing Landmark in North America* (Boston: New York Graphic Soc. Limited, 1972), 59.

⁹³ Calkins and Perkins 1995, 44.

⁹⁴ Architecture and Landscapes 2014; Apps 2010, 25; Noble and Christian 2005; Noble and Cleek 1995, 77-78; Falk 2012, 30-33; Calkins and Perkins 1995, 44.

⁹⁵ Calkins and Perkins 1995, 57; Tishler "Fachwerk" 1986, 287.

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cows by the time they built a substantial barn and would have immediately built a Basement Barn so they had an adequate stable.

Type 2: Two-Level Ground Barn

The second typical form taken by Minnesota's German immigrant timber frame barns is termed herein the Two-Level Ground Barn. It has no basement and is not banked but built on level ground.

Minnesota's Two-Level Ground Barns were likely built throughout the period 1865-1925. The type may be rare in the state, but further research and fieldwork are needed. A few examples were found in the sample of 44 barns that inform this MPDF. Brinkman and Morgan may have identified a few similar barns in their study of settlement-era farm buildings in Stearns County.⁹⁶

This type of barn in Minnesota is usually built of wood, with stones only used to form low supports to keep the sill beams up off the ground (Figs. 22, 24, 28). Barns of this type in other states might be built of brick or stone. A late example in Nicollet County, the circa 1905 Studtmann Barn (NL-CTT-047), is largely wood but has lower walls made of several courses of rockfaced concrete block (Fig. 27). Most Minnesota barns of this type have either a gabled or gambrel roof.

The Two-Level Ground Barn is divided laterally into bays by timber frame bents. Like the Basement Barn, the main wagon door is positioned near the center of a long wall. The wagon bay or drive has a door at each end, which allows wagons to drive completely through the barn. The wagon drive is open to the roof, but might have a simple platform or compartment over one or both ends to provide extra crop storage.

The wagon bay is usually flanked on one side by a horse stable (perhaps one bay wide) and on the other side by a cow stable (perhaps two bays wide). There are two large storage mows, one above each stable (Figs. 23, 25-26). Older barns generally have fewer stable windows.

The principal means of filling the hay mows was by driving into the wagon bay, forking or hoisting loose hay out of the wagon bed and into the mows, and distributing the hay by hand or with the help of ropes and pulleys or other hay-moving equipment. Hay was often dropped through chutes in the mow floor to the stables below. A moderately sized barn might have a 15'-wide wagon drive. In addition to giving access to the mow and stables, the drive was used for corn-husking and other chores. If a barn of this type has a hay door high in a gable or gambrel end, the door was typically cut in later.

Architectural Antecedents. The Two-Level Ground Barns found in Minnesota evidently developed from a Germanic form called the One-story Ground Barn (or *grundscheier*). Sometimes the central threshing (or wagon) floor was slightly raised. Ensminger and others note that Pennsylvania's first German immigrants brought the ground barn or *grundscheier* to the region. In its early form the Ground Barn was small – and in the U.S. often built of logs – with a central drive flanked by two "cribs" or crop storage bays.

⁹⁶ Brinkman and Morgan 1982, for example, pp. 110-111.

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Hubert G. H. Wilhelm writes:

The earliest barns erected by German settlers in southeastern Pennsylvania were probably of the ground-level type, also known in the Pennsylvania-Dutch vernacular as *grundscheier* or 'Boddem Scheier.' They were built of log, usually as double cribs, frame or stone, or a combination of these materials. They had a slightly raised threshing floor between the lower-lying animal stalls. Hay and sheaves of grain were stored in the 'overhead' loft areas. In time, these small barns were increased in size by the addition of a second level, which was often cantilevered, thus forming an overhang above the ground level. The ground-level barn, or *grundscheier*, by providing shelter for animals, fodder, and subsistence crops, ideally suited German farming practices. Its major functional handicaps included limited stall areas and inconvenient location of overhead mows. The latter meant that hay, sheaves of grain, and straw had to be pitched overhead, hard work under the best of circumstances.⁹⁷

The Pennsylvania Historical and Museum Commission notes, "The early ground barn in southeastern Pennsylvania is often called a *grundscheier*, it has a tripartite plan with the interior organized crosswise to the roof ridge. A very slight ramp leads to a large central door in the eaves side."⁹⁸ German immigrants are believed to have carried the barn design with them to mountainous areas in Tennessee, the Carolinas, and other states where it is often called the Double-Crib Barn.⁹⁹

Alan G. Keyser and William P. Stein documented a related barn in Pennsylvania which they call the Tri-Level Ground Barn. They describe examples built in Pennsylvania in the 18th and early 19th centuries of logs, stone, and wood-sided timber frame. Older examples were fairly small and had a central threshing-wagon floor flanked by a horse stable on one side and a cow stable on the other. There was a mow above each stable. The barn was sometimes built on a slope so the floor of each of the three units was at a different level. Sometimes the central threshing-wagon floor was at a slightly higher level than the two flanking stables.¹⁰⁰

Keyser and Stein suggest that Ground Barns in Pennsylvania were largely supplanted by Basement Barns in the 19th century. Their 1975 article on the Tri-Level Ground Barn contains a photograph of a barn similar to Minnesota's Homeyer Barn (ST-HAV-032) and F. and M. Lehmann Barn (DO-CLT-031) (Figs. 22 and 24); the authors call the barn in the photograph a "throw back" because it dates from the second half of the 19th century when few barns of that type were being built in Pennsylvania and Basement Barns were much more prevalent.¹⁰¹

According to Ensminger, the Ground Barn was common in the Rhineland-Palatinate region of southwestern Germany, a place from which many Pennsylvania Germans emigrated. Both Ensminger

⁹⁷ Wilhelm 1995, 67.

⁹⁸ Architecture and Landscapes 2014.

⁹⁹ Ensminger 1992, 7, 8, 10, 52; see also the following: "German Influenced Barns" in Douglas McVarish, *A Field Guide to Farm Buildings and Structures of the United States*, website, ca. 2012; Noble and Cleek 1995, 85-89; John Michael Vlach, *Barns* (New York: W. W. Norton and Co., 2003), 240-242.

¹⁰⁰ Keyser and Stein 1975, 1-25.

¹⁰¹ Keyser and Stein 1975, 19 and other photos on pp. 19-20.

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and Keyer and Stein explain that, in Germany, the Ground Barn was often attached perpendicularly to a corner of the farmhouse to form a courtyard-like arrangement.¹⁰²

In a 1976 article, Wilhelm describes a style of barn built by German Amish settlers in central Ohio that appears to be similar to Minnesota's Two-Level Ground Barns except that it has a pent roof on the long side of the barn at the top of the stable. Wilhelm indicates the barns were often expanded with a wing built perpendicular to the main barn. He writes:

Built during the early 1900s, [the barn] consists of a frame of heavy, sawn timbers whose mortise and tenon joints are secured with wooden pegs. Vertical clapboard siding covers the frame. The dimensions of the barn, excluding its addition, are approximately 75-80 by 35-40 feet. There are five structural divisions or bays. One of these forms the drive or threshing floor. The others are partitioned for animal stalls at the lower level, but [the bays] are open, forming a series of inter-connected hay mows, at the upper level.¹⁰³

Type 3: Stable Barn

A third form seen among Minnesota's German immigrant timber frame barns is a type called the Stable Barn or Ground-Level Stable Barn.¹⁰⁴ Noble and Cleek (1975) call it a Foundation Barn. It has no basement and is therefore a type of ground barn.

Minnesota's German immigrant Stable Barns were likely built circa 1900-1925. The design of this type of barn was predicated on the use of modern hay-moving equipment, so there are unlikely to be examples built before the equipment was widely adopted around 1900. The barn is believed to have evolved from a form called the Erie Shore Barn, which emerged in the eastern Midwest around 1875. The form was influenced by early work on dairying conducted in the last quarter of the 19th century at the University of Wisconsin's Agricultural Experiment Station in Madison.¹⁰⁵

Timber frame Stable Barns built by German immigrants are believed to be somewhat uncommon in Minnesota. Instead, most examples will have been built with plank or balloon framing or with laminated rafters.

German timber frame Stable Barns will be built of wood, but may have lower walls built of concrete block or hollow clay tile (Figs. 29-30). Very early examples may have lower walls built of mortared stone. It is suspected most German-built examples have a gambrel roof.

¹⁰² Ensminger 1992, 10-13; Keyser and Stein 1975, 4.

¹⁰³ Hubert G. H. Wilhelm, "Amish-Mennonite Barns in Madison County, Ohio: The Persistence of Traditional Form Elements," *Ohio Geographers: Recent Research Themes* 4 (1976), 6; see also Alice Reed Morrison, "Ethnicity and Acculturation: German Immigrant Homes and Barns of Southern Indiana. Part II: From Log to Timber Frame, German Houses and English Barns, and a German American Subtype – the Broken-roof English Barn," *Material Culture* 34 (Spring 2002) for barns in Indiana that may resemble Minnesota's Two-Level Ground Barns.

¹⁰⁴ Architecture and Landscapes 2014.

¹⁰⁵ Noble and Cleek 1995, 117-119; Ingolf Vogeler, "Dairying and Dairy Barns in the Northern Midwest," in *Barns of the Midwest*, ed. Allen G. Noble and Hubert G. H. Wilhelm (Athens, OH: Ohio University, 1995), 107; Noble 1984, 44-46.

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The essential characteristic of the Stable Barn is a stable that occupies the entire ground level. The second level is a large storage mow. Unlike the three other barn forms described herein, there is no wagon drive on the ground level from which the mows are filled, and the mow is not divided into two units but is a single large space. Most Stable Barns provide more hay storage than the other types because mow space is not lost to a wagon drive.

The mow is reached internally from the stable via a ladder or wooden steps, and is supported by timber frame bents. A large hay door is usually positioned high in a gambrel end, sometimes sheltered by a hay hood. The mow was filled by parking a loaded wagon outside the end wall beneath the hay door, and hoisting hay up and through the door. The hay was then distributed through the mow using hay-moving equipment that typically traveled along a track suspended near the roof ridge. Hay was dropped through chutes in the floor to the stable below. (See Fig. 29 for an unusual chute exterior to the mow floor.)

The stable was usually accessed via a door at one or both gambrel ends wide enough for a small wagon, in addition to more narrow doors used by farmers and animals. The stable was typically arranged with one or more longitudinal alleys. Older barns generally have fewer stable windows.

The so-called Wisconsin Dairy Barn, built in the early to mid-20th century, was the result of applying many of the principals of scientific dairy management to the Stable Barn type. The Wisconsin Dairy Barn has a stable with multiple windows, a concrete floor, concrete manure gutters and feed troughs, washable walls and posts, steel stanchions, and other features recommended by agricultural colleges and eventually required by many states' dairy laws.

The Stable Barn and its Wisconsin dairy barn subtype were popular among Minnesota farmers of all cultural backgrounds. The type is strongly associated with the rise of dairying in the state.¹⁰⁶

Type 4: Saxon Barn

The fourth form seen among Minnesota's German immigrant timber frame barns is tentatively called herein the Saxon Barn. Only one example was identified among the 44 barns forming the basis of this MPDF, the Dunker Barn built circa 1900 in Steele County (ST-HAV-035) (Fig. 31).¹⁰⁷

This barn type evidently evolved from the Lower Saxon house-barn found in northwestern Germany (Fig. 6). It is believed to be rare among Minnesota's German immigrant timber frame barns. The type is not discussed in most sources on the development of barns in the U.S. (see bibliography in Section I). Timber frame examples like Minnesota's Dunker Barn that were built fairly early (circa 1900) by farmers of German immigrant stock may be rare nationwide.

The Saxon Barn in Minnesota is expected to be built entirely of wood. An expansive gabled roof and low side walls are characteristic features.

¹⁰⁶ See Granger and Kelly 2005.

¹⁰⁷ For a detailed description of the Dunker Barn see Susan Granger and Scott Kelly, "Dunker, Herman and Ida, Barn (ST-HAV-035)," Minnesota Historic Property Record, Dec. 31, 2014.

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The barn is typically divided longitudinally into a central wagon drive flanked by side aisles housing the stables. There were often wagon doors at each end of the drive to allow wagons to drive completely through the barn. (The Dunker Barn originally had a wagon entrance at each end of the central drive. One was blocked when an end wall silo was added circa 1940. The other was closed circa 1960. A wagon entrance is now located in each side wall; Fig. 31.)

The wagon drive will probably be open to the roof, but may have a platform over one or both ends to provide extra crop storage. (A related type, the Dutch Barn (see below), often had platforms over much of the wagon drive for crop storage.) Hay storage mows are located above the ceiling of each side aisle stable. The principal means of filling the barn was by driving into the central bay and forking or hoisting hay out of the wagon bed and into the mows. The hay was distributed by hand or with the help of ropes and pulleys or other hay-moving equipment. Chutes in the mow floor could be used to drop hay to the stables below. In addition to loading the barn and accessing the stables, the drive was used for corn-husking and other chores. If a barn of this type has a hay door high in a gable or gambrel end, the door was probably cut in later.

The side aisle stables may have a few narrow doors for farmers and animals. As with most of the barn types, it is suspected that older barns will have fewer stable windows.

Architectural Antecedents. Scholars believe the origins of this barn are Germanic, but little research on this type has been published, and the path of diffusion is unclear. None of the barns described by scholars appear to exactly match Minnesota's Dunker Barn. The Dunker Barn, built circa 1900, may be rare as a late example of the early Germanic barn type described by Van Ravenswaay below and/or may represent a transition from the early Germanic type to a later type of barn called the Transverse Frame Barn, Midwest Three-Portal Barn, Western Barn, Feeder Barn, or Hay Barn. The latter three names are common to western states where the barn was used for feeding grazing cattle or solely for hay storage.

In his study of German immigrant barns in Missouri, Van Ravenswaay encountered a few barns that appear to be similar to Minnesota's Dunker Barn. He writes that antecedents are the "Lower Saxon peasant house-barns" of northern Germany and nearby parts of Holland and Belgium (see Fig. 6). He explains:

The Saxon buildings were as much as 100' long, with a thatched or red-tile roof sweeping upward from low eaves to a high ridge. A third or fourth of the building was occupied by the house, behind which was the barn, entered through large wagon doors in the center of the rear gable end or through the smaller doors for livestock under the eaves. Inside was a wide center aisle for wagons between grain storage bins, stalls for horses and cattle, and various other work and storage areas. Above was the hayloft. . . These house barns of northern Germany and the Low Countries were designed for the level fields of those regions. Consequently the working area of the building was on the ground level with the upper level used only for hay storage.¹⁰⁸

¹⁰⁸ Van Ravenswaay 1977, 266-267.
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Van Ravenswaay describes one example, built in 1842 in Missouri, as having:

... a design based on those used in the flat farmlands along the lower Rhine. Built on one level with a hayloft, it was almost square in proportions, measuring 50' in length, 40' in width, and 45' in height; its heavy frame sat on a low stone foundation and its exterior walls were sheathed in boards placed vertically. It had a gable, instead of the jerkinhead roof its antecedents probably had, suggesting the simplification in forms made by many of the barn builders of the region [in Missouri].... Centered in one gable end were doors leading into the center of three aisles, providing access to two rows of stalls. The threshing floor was surfaced with tamped burnt clay, which made a relatively hard paving.¹⁰⁹

Wilhelm discusses a similar style of barn built by German immigrants in Ohio that he also believes may have European origins. He writes:

It occurs most often in the western prairie states where it became known as a horse barn or feeder barn. Its diagnostic features are gable [end] entrances, huge roof, and large hay door with overhanging hay hood. In recent years, the name 'three-portal barn' has been applied to this structure.

The development of the three-portal barn has been linked with Appalachian folk structures, especially the transverse crib barn. The latter has a central drive, parallel to the roof ridge, and next to the drive are corn cribs and stalls. There is an overhead hay loft underneath a large roof. This barn probably had its origins in the log-building practices of the Upland South. Because log-building techniques diffused from the Swedish-Swiss-German settlement core of southeastern Pennsylvania and the Delaware Valley into the southern Appalachians, the transverse crib barn and its Midwestern offspring, the three-portal barn, may be circuitously related to Germanic settlement influences.

A more direct geographic path to the Midwestern three-portal barn may relate to Dutch settlement in the Hudson Valley and early immigrants in western Ohio and neighboring Indiana from the German province of Lower Saxony (Niedersachsen) [in northwestern Germany]. Whether Dutch, Frisian, or Lower Saxon, these low-country folk lived in a housebarn variously known as the 'Lower Saxon hall house' (*Niedersaechsisches Hallenhaus*) or 'Lower German house' (*Niederdeutsches Haus*). [See Fig. 6.] A central drive extends from the threshing floor (*Tenne*) and lies parallel with the roof ridge. There is a large, steeply pitching roof over the lower part, where hay, sheaves of grain, and straw are stored.

In America, where only the barn portion of the 'hall house' survived, it became known as the 'New World Dutch Barn' (Fitchen 1968). I have located a single example of this kind of barn in Mercer County in western Ohio. This county and adjacent ones in Ohio and in Indiana were settled by immigrant farmers from Lower Saxony in northwestern Germany. The barn has a central drive flanked by animal stalls. It resembles those of the Hudson Valley, even down to the framing details, which included the 'Dutch' tenon or mortise with the mortise cut entirely through the post to allow the tenon to project through to the opposite side of the post, where it was secured with a peg. Noble (1984), who recognizes a similar barn type prevalent in Iowa,

¹⁰⁹ Ibid., 272.

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suggests that it 'may be derived from a north German barn.'

The diffusion path of the Midwestern three-portal barn remains unclear. Nevertheless, whether its origins are among the Appalachian crib barns or with those introduced by the Dutch and Lower Saxon settlers, the linkage to Germanic settlement influences appears likely. Additional study is needed to more clearly establish the antecedents and diffusion of the barn type.¹¹⁰

John Fitchen's extensive 1968 study of timber frame barns built by Dutch immigrants in New York is cited by Wilhelm above. The New York Dutch Barn is a square structure with low sidewalls, a fairly steep roof, and a large wagon door in the center of a gable end. The center aisle was used for threshing and other chores. There were traditionally platforms elevated above the drive for storing crops. Tall purlin posts, joined by heavy anchor beams (i.e., cross beams that spanned the central aisle) supported the barn. The tenons projected entirely through the posts and were pegged or wedged for extra strength. The side aisles were used for stables with hay mows above their ceilings.¹¹¹

In the quote above Wilhelm also cites Allen G. Noble's 1984 survey of barns in the U.S. Noble mentions a barn type occurring "widely" in German-settled prairie areas of the Midwest – "a small, squarish (35' x 42') structure with a steeply pitched roof. The plan is of a central hay mow surrounded by stabling aisles on two or three sides. This barn has not been studied in North America [as of 1984], but may be derived from a north German barn."¹¹²

In a 1995 article Allen Noble and Rudy R. Christian describe – under the heading "Ohio Saxon Barns" – a squarish barn that appears to resemble Minnesota's Dunker Barn, but has the main entrance on a gable side wall rather than the end wall. The authors write:

The barn . . . was derived from the north German plain, where it has been described as the Saxon barn. Germans from Lower Saxony migrated to Mercer and Auglaize counties of western Ohio in the 1830s. In Ohio, the barn which they erected differed considerably from the housebarn they had built in Germany. First, the house and barn parts were separated. Second, the internal arrangements of the barn were changed reflecting the structure of other Ohio barns of Germanic origin. Finally, the door shifted from the gable end to the side, a position common to all the barns thus far discussed. What was retained from the original type was squarish plan, a gentle roof pitch, and a three window configuration on the gable wall. With floor plan dimensions of up to 50' or 100', the roof must be of large size. Its extent is further accented by low side walls. The gable wall is perforated by three small, square or rectangular windows located high up, a feature of the original Saxon housebarn. The interior is usually subdivided into three to five bays, including straw or hay mows, threshing floor, cow stanchions, storage and feed preparation area, and horse stalls. Barns of this type are relatively few in number and restricted to the extreme western fringe of the state.¹¹³

¹¹⁰ Wilhelm 1995, 74-76.

¹¹¹ Fitchen 1968.

¹¹² Noble 1984, 60.

¹¹³ Noble and Christian 1995.

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Timber Framing in Minnesota's German Barns

All of Minnesota's German immigrant-built timber frame barns have, by definition, a timber framework or structural system (also called post and beam) that is connected with hand-cut mortise and tenon joinery affixed with wooden pegs. While the framework was connected with mortise and tenon joints, most other parts of the barn including siding, roofing, flooring, cupolas, doors, animal pens, and other structures were assembled with nails.

It is fairly typical for a few individual timbers to have been removed from the framework since original construction. The most common reason appears to have been to open up the mow to provide more clear space for hay-moving equipment.

Most of the barns are believed to have been built with timbers from deciduous trees cut on the farm or in the local area. Oak was a common species used.

Hewn or Sawn. The oldest barns feature hewn timbers. Hewn timbers are expected to be rare, however, because by the time Minnesota's German immigrants were building their barns, steam-powered sawmills were in widespread use.

At least six of the 44 barns forming the basis of this MPDF – all located in Nicollet County – have some hewn timbers. All built circa 1875-1880, the six barns are the Meyer Barn (NL-CTT-050), Seeman Barn (NL-CTT-052), and Poehler Barn (NL-CTT-061), and three barns built by members of the extended Bode family: the K. and L. Bode Barn (NL-NCT-008), the H. and S. Bode Barn (NL-NCT-011), and the W. and M. Bode Barn (NL-NCT-015).

Most of the Minnesota barns were built with timbers sawn with a circular saw. Three barns, built circa 1875, have timbers that were sawn with earlier pit and/or sash saws. The three barns are the Seeman Barn (NL-CTT-052) and the H. and S. Bode Barn (NL-NCT-011), which have pit-sawn timbers, and the W. and M. Bode Barn (NL-NCT-015), which has sash-sawn timbers.

Straight or Curved. The majority of the timbers in Minnesota's German immigrant timber frame barns are straight and even. Some of the timbers, while straight, are waney, meaning they are not fully square in cross-section but show the original curve of the log from which they were cut. (This occurs when the tree trunk from which the timber was cut was not quite large enough to provide a timber fully square in cross-section, and instead the timber has slightly rounded corners.) Some timbers also have remnants of bark still adhering to the wood. Both waney timbers and timbers with bark are found in Minnesota's timber frame barns regardless of the builders' ethnicity.

Remarkably, approximately five of 44 barns examined include timbers that are not straight, but curved or crooked (Figs. 32, 43-44). All five barns were built circa 1875-1880 in Nicollet County. All five also have hewn timbers (see above). The five are the Meyer Barn (NL-CTT-050), Seeman Barn (NL-CTT-052), Poehler Barn (NL-CTT-061), K. and L. Bode Barn (NL-NCT-008), and H. and S. Bode Barn (NL-NCT-011).

Curved wood was often used in European timber framing because straight timbers were hard to find in forests that were diminishing as population grew. European builders sometimes strategically placed

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the curved pieces for aesthetic interest.¹¹⁴

According to nationally-known historic timber framing expert Jack Sobon (based in Massachusetts), who viewed selected photographs of some of the Nicollet County barns in 2006, as well as experts Paul Martin and Rudy R. Christian (located in New York state and Ohio, respectively), who were also interviewed in 2006, timber frame barns with curved timbers are very rare in the United States. They are not generally encountered except in barns built in 17th century New England and Virginia. According to Sobon, the use of curved timbers strongly suggests the work of European-trained craftsmen. Because curved timbers are more difficult to join and because American forests had nearly unlimited stands of very straight timbers, American-trained barn builders did not use curved timbers.¹¹⁵ It is not clear why curved timbers were used in the five Minnesota barns cited above when presumably enough straight timbers would have been available.

Size of Timbers. It is typical for large timbers in timber frame barns in Minnesota to be 8" x 8" in crosssection, regardless of the ethnicity of the builder. Some of the German-built barns forming the basis of this MPDF have massive timbers that are 10" x 10" and 10" x 12" in cross-section. Some of the timbers are 8" x 10" or 9.5" x 9.5" in cross-section, also considered very large. Timber frame barns in New England were often built with 8" x 8" timbers.¹¹⁶

At least three of the barns with very large timbers are located in Nicollet County. They are the Meyer Barn (NL-CTT-050), the K. and L. Bode Barn (NL-NCT-008), and the H. and S. Bode Barn (NL-NCT-011). Other examples of barns with very large timbers include the Schmidt Barn in Carver County (CR-DHL-049), the F. and M. Lehmann Barn in Dodge County (DO-CLT-031), the Homeyer Barn in Steele County (ST-HAV-032), and the Benike Barn in Olmsted County (OL-FRM-020).

In most of the Minnesota Germanic barns, the longest elements – sill beams, wall plates, and purlins – are made of two (or sometimes three) timbers joined end to end with, for example, a lap joint to create one very long member. In a few of the Minnesota barns, unusually long timbers were observed. For example, the W. and M. Bode Barn, built circa 1875 in Nicollet County (NL-NCT-015), has a 46'-long beam.

<u>Bents</u>

Most of Minnesota's German-built timber frame barns have three, four, or five lateral bays created by the bents. In its simplest form, a bent is comprised of a pair of posts and a cross beam. The posts are tenoned into longitudinal sills and wall plates (Fig. 5). A few of the longer barns have more bents and bays.

Two basic bent configurations, described below, have been observed in the Minnesota barns. In most of the barns, regardless of bent configuration, the wall or end posts of each bent are tenoned into the wall plates that they support (Fig. 32). The Benike Barn (OL-FRM-020), built circa 1875, is unusual. It has an interesting variation in which the plate does not rest on top of the posts, but is let into it (Fig. 47).

¹¹⁶ Visser 1997, 21.

¹¹⁴ Harris 1978; Wingender March 1999.

¹¹⁵ Sobon 2006; Paul Martin, Telephone interview with Susan Granger, Feb. 2006; Rudy R. Christian, Telephone interview with Susan Granger, Feb. 2006.

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Cross-Beam-and-Queen-Post Bent. The first typical bent configuration, seen in more than half of the barns, has principal posts that rise from the mow floor to support cross beams. The posts are tenoned into these beams (Figs. 32-33). The cross beams – often 8" x 8" in cross-section – are tenoned into the bents' wall or end posts in a "dropped" position, meaning the beams meet the posts below the level of the wall plate (Figs. 32, 33, 47, 50). The cross beam often meets the post about 12" to 24" below the level of the wall plate, which generally sits rests on top of the posts. The cross beam meets the post at the same level as the wall plate in only a few of the Minnesota barns examined.

Many Pennsylvania Barns are built with the cross beam *over* the wall plate. (Witmer documented the same configuration of cross beam over the wall plate in central Wisconsin.¹¹⁷) According to Ensminger, using a dropped cross beam "permitted prefabrication of the entire bent" and "while giving up some strength, gained in speed of [bent] assembly and efficiency of raising." He writes that bents with dropped cross beams are found in both English (or "Yankee") barns and Pennsylvania German barns. He believes the efficiency of using a dropped cross beam led to its independent development in more than one part of the eastern U.S.¹¹⁸

In the cross-beam-and-queen-post bent system, the purlin plates – the longitudinal timbers located halfway between the walls and the roof ridge which support the rafters – are supported by queen posts that rise from the cross beam in each bent (Figs. 32-34). (None of the Minnesota barns has a king post.) The queen posts are often 8" x 8" in cross-section. Pairs of short diagonal braces extend from the queen posts to the purlins to stabilize the frame in the longitudinal direction. In most of the barns with this bent configuration, the queen posts are splayed or angled outward (Figs. 33-34) rather than being aligned vertically (Fig. 32). Builders typically chose these so-called inclined queen posts to create a larger central mow space free of timbers that would interfere with hay-moving equipment suspended along the roof ridge. Ensminger reports that bents with inclined queen posts are found in several types of barns in the Midwest and Northeast. Both Tishler and Witmer indicate they are fairly common in Wisconsin.¹¹⁹

Post-to-Purlin Bent. The second typical bent configuration seen in the Minnesota barns was developed more recently than the previous style. It has, in each bent, two very long posts that extend from the mow floor all the way to the purlins (Figs. 36-39). A cross beam, tenoned to the inner side of these principal posts, ties the two posts together (Fig. 37). A shorter beam (or beams) ties each principal post to the bent's wall or end post.

Ensminger indicates, "this post-to-purlin design appeared in the mid-19th century, mainly beyond the [southeastern] Pennsylvania core" where the Pennsylvania Barn originated. He explains:

The popularity of this form of bent in the latter half of the 19th century is related directly to the use of the hay track and fork, a mechanical device that was rigged under the roof ridge and used to transport hay the length of the barn to the mow sections. The post-to-purlin bent eliminated queen posts and struts, which would have interfered with this movement. It retained cross beams, but they were connected to the inner posts far enough below the purlins that they

¹¹⁷ Witmer 1983, 46.

¹¹⁸ Ensminger 1992, 122, 126.

¹¹⁹ Ibid., 122, 124-126; Tishler "Fachwerk" 1986, 279, 286-287; Witmer 1983, 36-37.

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did not impede the movement of the hay fork along the track. In some earlier barns, these various support members were removed, or relocated, to clear the space when hay tracks were eventually installed. The post-to purlin design was endorsed by engineers because it could be modified during planning to accommodate a hay track.¹²⁰

In the quote above, Ensminger indicates the cross beam connecting the inner posts was often fairly low to allow movement of the hay rig. In some Minnesota barns with this bent configuration, the cross beam is quite high (Fig. 39).

Side and End Walls

The side walls of the barns are built with a series of bent end posts and intermediate posts. The posts rest on the sill and, if located on a side wall, are typically tenoned into the wall plate which they support. The walls of the barns also have additional horizontal members known as girts. Many of the barns have two horizontal girts in their side walls between the sill and wall plate (Figs. 43-44). Barns with lighter framing may have only one girt. In some barns the girts are built of large timbers that match or nearly match the posts in cross-section.

The end walls of the barn are usually designed with a denser version of the timber pattern seen in the barn's interior bents with more members added for increased strength.

Square Panel Framing. In several of the barns, the pattern of posts, sills, plates, and girts creates exterior walls with the strong lattice-like framework of square (or squarish) shapes associated with a European style of timber framing termed the box frame or square panel framing (Figs. 10 and 43). (See Timber Framing in Section E above.)

In some of the barns, the grid is quite dense – with, for example, 4' x 4' or 7' x 7' panels or compartments. In some barns the framework of squares also appears in the interior bents (Fig. 45). A less-dense frame required fewer timbers and less time-consuming joinery. In a study of German-built barns in Dodge County, Wisconsin, Witmer speculates that the *fachwerk* frame became less dense as German farmers came into contact with Yankee neighbors and/or American building practices and became convinced that a lighter framework was sufficient to support a barn.¹²¹

At least nine Minnesota barns, built circa 1875-1890 and all located in Nicollet County near New Ulm, exhibit exterior walls with square panel framing that is quite dense. Three of the barns stand in Courtland Township: the Meyer Barn (NL-CTT-050), the Seeman Barn (NL-CTT-052), and the Poehler Barns (NL-CTT-061). Six of the barns are located in Nicollet Township: the K. and L. Bode Barn (NL-NCT-008), the H. and S. Bode Barn (NL-NCT-011), the W. and M. Bode Barn (NL-NCT-015), the Stolt Barn (NL-NCT-020), the Thom Barn (NL-NCT-021), and the Thielbar Barn (NL-NCT-033).

Three of the barns – the Poehler Barn, K. and L. Bode Barn, and H. and S. Bode Barn – have dense square panel framing in interior bents as well as exterior walls.

¹²⁰ Ensminger 1992, 126.

¹²¹ Witmer 1983, 61-67.

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In Europe square panel framing was typically nogged (see Section E). In Minnesota there are no known examples of barns with nogged framing, while Wisconsin has many examples. The phenomenon is rare nationwide. Many sources suggest that an abundance of sawn wood in the U. S. led German farmers to forego nogging in favor of enclosing their barns with vertical board siding.¹²² Vertical siding would also have been much less time consuming.

Diagonal Braces

The timber framework in the Minnesota barns has multiple diagonal braces to prevent movement of the bent or wall. Because a barn has broad exterior surfaces to catch the wind, bracing the frame against strong gales was especially important.

In the Minnesota barns that incorporate rare curved or irregular timbers (see above), the curved wood is often used for braces. The curved braces often come in pairs, because a curved tree trunk would be split lengthwise and to create a matching pair of timbers. Curved braces were generally not as strong as straight braces because of the possibility they might buckle.¹²³

The Minnesota barns generally exhibit two types of bracing. Short diagonal braces (sometimes called sway, wind, arch, or knee braces) usually extend up, but sometimes down, from a post to the next horizontal member (Figs. 33-34, 37-38, 41). These braces are generally used in opposing pairs because each brace resists movement in only one direction.

Many of the barns also have long diagonal braces that extend, for example, from the wall plate to the sill (Figs. 10, 14, 32, 38, 43-44). In some cases the braces extend from a wall post to a sill (Fig. 42). The braces are usually located near the corners of an exterior wall, but in a few cases are also found in an interior bent. Long diagonal braces are characteristically German and, according to scholars such as Dell Upton, distinguish German from English timber framing in the eastern U.S. The long diagonal braces are sometimes called *strebe* braces (*strebe* being German for "brace" or "buttress"). Upton observes that the diagonal brace is usually large (e.g., 6" to 8" square) and that the adjacent girt is usually interrupted by the brace and tenoned into it (Figs. 42, 49).¹²⁴ Long diagonal braces are documented in German immigrant construction in Wisconsin, North Carolina, Missouri, Texas, and many other states.¹²⁵

Roof System

Minnesota's German immigrant-built timber frame barns typically have either a gabled or gambrel roof, with the oldest barns almost all having gabled roofs. While a gabled roof was simpler to frame, a

¹²² For example, Witmer 1983; William H. Tishler, "Built From Tradition: Wisconsin's Rural Ethnic Folk Architecture," *Wisconsin Academy Review* 30 (1984), 14-15; Tishler "Fachwerk" 1986, 288.

¹²³ Jack Sobon and Roger Schroeder, *Timber Frame Construction: All About Post-and-Beam Building* (Pownal, VT: Garden Way Pub., 1984), 12, 25.

¹²⁴ Upton 1981, 75.

¹²⁵ Perrin 1965, 16-17; Perrin 1981; Paul B. Touart, "The Acculturation of German-American Building Practices of Davidson County, North Carolina," in *Perspectives in Vernacular Architecture, II*, ed. Camille Wells (Columbia, MO: University of Missouri Press for the Vernacular Architecture Forum, 1986), 75; Witmer 1983; Tishler 1984; Tishler "Fachwerk" 1986, 286-287; Lyle E. Lidholm, "Early Wisconsin Framing," *Timber Framing* 12 (May 1989), 3; Calkins and Perkins 1995, 53; Van Ravenswaay 1977.

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gambrel created a larger mow with more room for hay. Most of the barns identified in Nicollet County have gabled roofs, while at least three-quarters of the barns examined in Carver County have gambrel roofs.

A few of the barns have a hay hood projecting from the top of an end wall. In 19th century barns the hay hood was likely added (Fig. 18). In an early 20th century Stable Barn the hay hood may be original.

Most roofs are framed with a common rafter system. There are no principal rafters and usually no collar ties. (Principal rafters are heavy timbers that serve as part of a triangular roof truss incorporated into each bent.) The rafters are most often butt-joined and nailed at the roof ridge with no ridge plate. The rafters are generally step-lapped onto purlin plates.¹²⁶

Sheathing boards up to 22" wide usually overlay the rafters. Most roofs were originally covered with wood shingles. Witmer found barns in central Wisconsin that retain physical evidence of having originally been thatched.¹²⁷

Floor System

The walls of the barn are generally built on a system of four sill beams that are lapped and pinned at the corners to form a strong base. They are often held above the ground on large stones. The sills often support a network of intermediate sill beams (longitudinal and transverse), and heavy floor joists that collectively create a very strong mow floor.¹²⁸

Sill beams are often large, heavy timbers ranging up to 10" x 12" in cross-section and 30' long. Floor joists are generally made of dimensional lumber such as 2" x 10" boards, but in some barns are made of 6" x 8" timbers. In some barns the joists are made of irregular wood or logs (Fig. 52).

One of the barns, the Meyer Barn in Nicollet County (NL-CTT-050), has rare "gunstock" or jowled posts supporting the beam (Fig. 51). Jowled posts were designed to support multiple beams coming together with complex joinery. Their use suggests the barn was built by an highly-skilled joiner trained in a European tradition.¹²⁹

Mow floor boards were often installed with a tight fit to prevent dust and debris from sifting down into the stable below. This also prevented moisture from rising from the stable into the mow where it might spoil the hay. In some Basement Barns, the wagon drive has a double-layer of floor boards to give it extra strength. One of the layers may be made of interlocking tongue-and-groove boards.

<u>Joinery</u>

The structural framework in Minnesota's German immigrant timber frame barns is connected with mortise and tenon joints, which were much stronger than nailed connections. When barns were built

¹²⁷ Witmer 1983, 37-42.

¹²⁶ See Upton 1981 for 18th century German roof framing styles documented in the eastern U.S.

¹²⁸ See Upton 1981: 77 for comparisons of German and English floor framing in 18th century buildings in the eastern U.S.

¹²⁹ Visser 1997, 21; Dornbusch and Heyl 1958; Ensminger 1992, 118; Sobon and Schroeder 1984, 27-29.

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with green wood, the joinery tended to tighten as the wood shrunk, becoming even stronger. Nails were only used for minor framing connections and elements like siding, roofing, doors, and stable partitions.

The mortise and tenon joints were secured with wooden pegs, usually handmade. The pegs were sometimes left long so they could be driven farther as the wood dried. Sometimes a long peg passed entirely through a joint (Fig. 47).

A few of the barns have an unusual joint treatment not seen in most of the barns that form the basis of this MPDF. In these barns, some of the tenons are not "blind" or buried within the mortise but instead pass entirely through the mortise and project out the other side. These are found largely on horizontal beams that tie a purlin post to a wall post (Fig. 41). The tenons project only slightly. A much more exaggerated version of this joint (not observed in Minnesota) is a character-defining feature of Dutch immigrant barns in New York. Dutch Barns have a large tenon that projects several inches through the mortise. The joint in a Dutch Barn was particularly strong if a wedge was added to the end of the tongue so the joint could not be pulled apart.¹³⁰ Joints with projecting tongues were used in Germany as well as by the Dutch. According to Wilhelm, "Use of this construction detail is concentrated between Lower Saxony and Friesland, in northwestern Germany and parts of the Netherlands. It involves a mortise that is totally cut through the timber, allowing the tenon of the interlocking beam to protrude." Wilhelm notes, "The survival of this specific construction detail in rural western Ohio is one more example of the diffusion of this and other traits and forms by a group of German immigrants there."¹³¹

Assembly Marks and Scribe Joinery. About 22 of the German immigrant timber frame barns on which this MPDF is based display assembly or "marriage" marks usually indicative of rare "scribe rule" joinery (Figs. 53-55). These barns were built circa 1875-1895. Scribe rule carpentry is a traditional method of preparing mortise and tenon joints that was rarely used in the U.S. after the 1820s except by isolated communities of European immigrants. Finding marriage marks in the Minnesota barns suggests that European-trained carpenters familiar with the scribe rule built them, rather than carpenters familiar with joinery methods used in the U.S.

Architectural historian Thomas Durant Visser explains the scribe rule:

Also known as the Latin scribe rule, the obscure origins of this framing technique date back at least to medieval Europe. After a mortise was cut in one timber, the tenon on the joining timber would be cut. The two timbers would be brought together to adjust the fit of the joint. After being joined, the irregular shape of the receiving timber was scribed to the end of the timber being inserted. Excess wood was removed to the scribe line.

After fitting, the joints on each timber would be inscribed with 'marriage marks' to identify how to reassemble the frame. These were usually located on the outside faces of the timbers where they would not show after the barn was boarded. By carefully examining a frame produced by the scribe rule, one will typically find these Roman numeral-like marriage marks. Scribed horizontal 'level lines' will often be found at two or three feet above the foundation and at 24" below the top of the plate. These lines were used to level and align the building during

¹³⁰ Sobon and Schroeder 1984, 42.

¹³¹ Wilhelm 1992, 70.

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construction.132

The scribe rule was particularly necessary in Europe where diminishing wood supplies necessitated using timbers that were irregular, crooked, or curved, or cut to uneven lengths – all of which required careful custom joinery.¹³³

Scribe rule joinery required a higher level of skill than American methods. Not only were the joints harder to cut, but the method required the carpenters to lay out the frame on the ground before joints could be cut and test-fit. Fitchen writes that after the frame was laid out and the joints cut, "it was absolutely essential to number all the pre-assembled members so that there could be no mistaken substitution or confusion in their subsequent installation."¹³⁴

Barn historians indicate that not all components of scribed barns were necessarily marked, but pieces with unique joinery were almost always marked. Rafters and other interchangeable pieces were almost never marked.¹³⁵

Experts on historic timber framing and timber frame barns report that assembly marks are rarely found on timber frames that were not created with the scribe rule.¹³⁶ At the least, the presence of marriage marks indicates the frame was laid out on the ground and test fit.

Because North American forests had abundant straight timbers, in most of the United States scribe rule joinery was replaced around the 1820s by so-called square rule joinery, which developed in New England.¹³⁷ The square rule relied on fairly square, straight timbers that carpenters cut to predetermined lengths and in which they cut standardized mortises and tenons. There was no customizing or test fitting, and a given tenon could fit in any number of mortises. Noble and Christian explain that square rule carpentry "did not require stacking the timbers in mock assemblies to align the joinery." Instead, carpenters envisioned and marked an imaginary, slightly smaller, "perfect" square timber contained within each timber they worked with. According to Noble and Christian, "the carpenter would snap 'chalk lines' on the faces of the hewn timbers that indicated where a smaller timber would [exist] inside it. In this way he could work all of the timbers to a known size by removing the wood at the joints that was beyond the chalk line. The fact that each timber only had to be handled once meant much less work was involved, so the new system quickly replaced the old."¹³⁸

A related American method was called the "mill rule" or mill rule layout. Mill rule was used when the timbers received from the sawmill were so close to perfect that envisioning a "perfect" timber within the timbers was not necessary. These timbers required very little cutting or reducing at the joints. Very long timbers, however, which invariably twisted as they exited the sawmill, often required some square

¹³² Visser 1997, 19.

¹³³ Noble and Christian 2005, 14; Visser 1997; Rudy R. Christian, "Old Ways of Measuring," *Timber Framing* 44 (June 1997).

¹³⁴ Fitchen 1968, 36-37.

¹³⁵ Ibid., 37; and others.

¹³⁶ Sobon 2006; Martin 2006; Noble and Christian 2005, 15; Christian 1997; Jack A. Sobon, *Build a Classic Timber-Framed House* (Pownal Vermont: Storey Communications, 1994), 135.

¹³⁷ Sobon 2006; Christian 2006; Martin 2006.

¹³⁸ Noble and Christian 2005, 15.

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rule cutting.139

Although American carpenters began to using the simpler square rule joinery in the early 19th century, carpenters in Europe, who worked largely with crooked timbers and uneven lengths, continued to use the scribe rule system.

Historic timber framing experts indicate that the scribe rule is very rare in post-1830 buildings in the United States. Scribe rule barns are generally found only among isolated groups of German immigrants such as in rural settlements in Pennsylvania, where scribe rule barns were built as late as the 1920s. Perrin, Tishler, and others have found assembly marks on timber frame barns built by German immigrants in Wisconsin. Tishler indicates that the Wisconsin marks are similar to marking systems used by carpenters in Germany.¹⁴⁰

The 22 barns with marriage marks are located in Nicollet County (18 barns), Dodge County (two barns), and Steele County (one barn). None have been located to date in Carver County. Barns with marriage marks in Nicollet County, built circa 1875-1895, include the following:

Courtland Township	
Klippstein Barn	(NL-CTT-017)
Sommer Barn	(NL-CTT-024)
F. and A. Kohn Barn	(NL-CTT-025)
Zieske Barn	(NL-CTT-028)
Arndt Barn	(NL-CTT-031)
J. and L. Kohn Barn	(NL-CTT-033)
Studtmann Barn	(NL-CTT-047)
Meyer Barn	(NL-CTT-050)
Seeman Barn	(NL-CTT-052)
Bruns Barn	(NL-CTT-058)
Poehler Barn	(NL-CTT-061)
Nicollet Township	
Engel Barn	(NL-NCT-003)
K. and L. Bode Barn	(NL-NCT-008)
H. and S. Bode Barn	(NL-NCT-011)
W. and M. Bode Barn	(NL-NCT-015)
Thom Barn	(NL-NCT-021)
Dahms Barn	(NL-NCT-034)
Latayette Township	<i></i>
Wellner Barn	(NL-LFT-008)

In Dodge County the two barns with marriage marks are located in Claremont Township: the F. and M. Lehmann Barn (DO-CLT-031), built circa 1895, and the A. and L. Lehmann Barn (DO-CLT-047), built

¹³⁹ Sobon 2006.

¹⁴⁰ For Wisconsin: Tishler 2006; Tishler "Fachwerk" 1986, 279, 281; Perrin 1965, 17; Perrin 1981, 33; and Witmer 1983, 54-

^{56;} for other states: Sobon 2006; Noble and Christian 2005, 15; Christian 2006; Martin 2006; and Dornbusch and Heyl 1958.

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circa 1919.¹⁴¹ In Steele County the two barns with marriage marks stand in Havana Township: the Homeyer Barn (ST-HAV-032), circa 1895, and the Dunker Barn (ST-HAV-035), circa 1900. The Dodge and Steele county barns are clustered near one another close to the Dodge-Steele county line.

Dimensional Lumber, Siding, and Roofing

In most of Minnesota's German timber frame barns, elements such as rafters, exterior siding, and floor boards were built using standard size dimensional lumber. This was also fairly common in other states when immigrant-built structures were constructed after dimensional lumber was available and roads had been improved so that getting to town to purchase building materials was reasonably efficient.¹⁴²

Most of Minnesota's German barns are sided with board and batten siding. Some boards may have been farm- or locally-cut rather than purchased from a lumberyard. Boards and battens were commonly used on barns in the late 19th and early 20th centuries because they could be readily cut and installed, and because the vertical boards shed water well. In many barns, the exterior walls were trimmed with corner boards and wide frieze boards.

Many of the Minnesota barns retain their original siding. It is increasingly common, however, to find barns whose original siding has been covered with a more recent material such as corrugated metal. In a few cases the original barn siding has been removed.

Most of the barns are painted red. Some are white, a color some historians indicate was associated with cleanliness or sanitary dairy conditions. Van Ravenswaay notes that most German immigrant barns in Missouri were not painted originally.¹⁴³

Most of the barns were originally shingled with wooden shakes, often homemade. Many of the barn roofs are now covered with asphalt shingles or corrugated metal sheets. Sometimes the original wood shingles remain in place beneath the more recent materials.

Doors and Windows

Minnesota's German timber frame barns had doors and windows that were generally very utilitarian. Doors were often hand-built and display simple construction techniques. Windows may have been hand-built or purchased from a millwork shop or lumberyard.

Wagon Doors. Most of the barns originally had one or two wagon doors to access the mow, depending on the barn type (see Barn Form and Type above). The wagon doors were built of vertically aligned, nailed wood. (These are often called "batten" doors.) Many barns retain their original door leaves. The leaves generally opened outward on hinges or slid open on a track (Figs. 11, 15, 20, 22). Tishler indicates that outward-opening wagon doors are sometimes a sign of immigrant barn construction. He says that eventually farmers in the Midwest realized that outward-opening doors required too much snow shoveling in the winter and favored instead door panels that slid open on a

¹⁴¹ For details on the A. and L. Lehmann Barn see Susan Granger and Scott Kelly, "Lehmann, Amos and Lena, Barn (DO-CLT-047)," Minnesota Historic Property Record, Dec. 31, 2014.

¹⁴² Noble and Christian 2005, 12-13.

¹⁴³ Van Ravenswaay 1977, 268.

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track.144

Most of the barns had one or two wagon doors at the stable level.

Man Doors. None of the mows in the Basement Barns forming the basis of this document was built with a pedestrian door. If a Basement Barn has a pedestrian door in the mow, it was almost certainly cut in later.

All the barns, regardless of form or type, have narrow stable doors used by farmers and animals (Fig. 12). The doors usually open outward, but sometimes slide on a track. Many barns have split or "Dutch" style doors that provide ventilation while keeping animals out (or in) (Fig. 16).

Hay Doors. Stable Barns (see Barn Form or Type above) were usually built with a hay door high in one of the gable or gambrel ends. The hay door is sometimes sheltered by a hay hood (Fig. 18). If a hay door appears in other than a Stable Barn, it was likely cut in later.

Many of the barns have one or more small doors in the mow that could be opened outward on hinges or, less commonly, slid open on a wooden track. The door openings might be $5' \times 5'$. The doors provided ventilation and were used to drop hay to the livestock yard below. Examining the edges of an openings will help determine if a door was original or cut in later.

Mow Windows. It was often dark within the mows of the barns; incorporating windows would have meant the loss of wall storage space for hay. Many of the barns have one or two (more rarely three) small windows high in the end walls. The window openings are most often square, rectangular, or diamond-shaped (Fig. 17). Less common are round, rounded-arched, or semicircular openings (Figs. 11, 15, 22). Sometimes the windows are double-hung (Fig. 29).

The F. and M. Lehmann (DO-CLT-031) and Homeyer (ST-HAV-032) barns are unusual in that they have window openings above the wagon doors (Figs. 22 and 24).

Stable Windows. All of the barns have operable windows at the stable level to provide light and air. Older barns may have very few windows. Barns built after circa 1910 generally have more stable windows as dairy experts increasingly recommended them. Stable Barns (see Barn Form or Type above) typically have the most stable windows (Fig. 61).

Ventilators, Weathervanes, and Lightning Rods

Nearly all of Minnesota's German immigrant timber frame barns (like most Minnesota dairy barns of all types) originally had some sort of ventilator at the roof ridge to help keep the hay dry and free of mildew. In some barns, rooftop ventilators have chases that extend all the way into the stables. In many barns, the ventilator(s) doubles as a decorative element.

Wooden ventilators might be fairly simple in design, or take the form of an ornate cupola (Fig. 22 and 30). Today most timber frame barns have prefabricated round steel ventilators (Fig. 15). Steel ventilators might be original equipment if the barn were built in the early 20th century, but on earlier

¹⁴⁴ Tishler 2006.

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barns they probably replace wooden versions. Many ventilators are topped by a weathervane which is sometimes ornate.

None of the Minnesota barns are known to have the gable-end ventilation slits or cut-outs found in some German immigrant barns in Wisconsin, Iowa, Indiana, Ohio, Pennsylvania, and elsewhere.¹⁴⁵ (For a description of holes cut in a Stearns County barn to allow pigeons to enter and roost, see Pigeon Cote below.)

Some Minnesota barns (regardless of ethnicity) retain lighting rods that were mounted to the peak of the roof to help prevent fires. Often the barn was the only building on the farmstead thus protected. Not only was it the tallest structure on the property, but the loss of a barn and the hay it contained could be devastating, whether the fire was caused by lightning, a kerosene lamp, or faulty electrical wiring.

Ornamentation and Date Stones

Minnesota's German immigrant timber frame barns typically have very little decoration. On some of the barns, the trim boards are painted white to contrast with red-painted siding. In a few of the barns, the gable end windows were likely chosen for aesthetic reasons. Ventilators and weathervanes were often decorative as well as practical.

Many of the Minnesota barns do have subtle decorative treatment in the gable end siding. An example is the wide curve created in the siding in the Homeyer Barn, built circa 1895 in Steele County (ST-HAV-032) (Fig. 22). More typically, the upper gable end boards simply overlap the ground-level siding forming a straight line. The lower end of the upper boards in some barns in Carver County is rounded like a popsicle stick.

Van Ravenswaay includes a photo of a German immigrant basement barn in Missouri with a gable end pattern similar to that of the Homeyer Barn but made of wood shingles and with a shallower curve.¹⁴⁶ One source notes that gable end boards that project over those at the ground level likely have Germanic and Swiss origins and may be descendant from projecting bays or other elements in the gable ends of Swiss alpine houses.¹⁴⁷

It is not known whether any of Minnesota's German barns have a date stone or stone carved with the farmers' surname. Such elements are evidently rare in Minnesota, but found among German-built houses and barns in other parts of the United States.¹⁴⁸

Interior Mow Elements

At the mow level, many of the barns retain interior granaries, ladders, hay chutes, and other early components. Some are typical of most Minnesota dairy barns.¹⁴⁹ Several interior mow features are described below:

¹⁴⁵ For example, Ensminger 1992, 196; Morrison 2002, 5; Keyser and Stein 1975.

¹⁴⁶ Van Ravenswaay 1977, 269.

¹⁴⁷ Sickels-Taves and Allsopp 2005, 99.

¹⁴⁸ For example, Van Ravenswaay 1977, 272.

¹⁴⁹ See Granger and Kelly 2005.

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Low Walls on Interior Bents. A few of the Basement Barns have an approximately 3'-tall wall built on the lower part of the bents flanking the wagon drive. This low wall helped keep loose hay from spilling into the wagon bay from the storage mows. In barns built east of Minnesota before the advent of mechanical threshers, the low walls also helped funnel wind through the bay to winnow the grain during hand-threshing.

Extra Hay Storage Platforms. Several barns have an elevated platform built above one end of the wagon drive to provide additional storage space, usually for hay (Figs. 37 and 39).

Hay-Moving Equipment. Many of the timber frame barns retain hay-moving equipment in the mows. In the earliest barns there may have been no equipment – the hay was simply hand-pitched – or the device may have simply consisted of a rope looped around a horizontal member for hoisting. Some provision for hay moving was common by the 1870s. Manufactured hay carriers were widely adopted after the turn of the 20th century. Many consisted of a track, attached to the bottom of the roof ridge, that supported tongs or a fork or sling that lifted hay from a wagon bed and moved within the mow.

Hay was typically loose, rather than baled, until the introduction of the field-baler in the 1930s. Bales became universal after World War II. While hay-moving equipment helped make loading the barn more efficient, the hay still had to be hand-pitched or -carried from the center of the mow outward and upward to evenly fill the space. The job was strenuous and invariably occurred on some of the hottest days of the summer. Eventually mechanical belt conveyors helped move bales from a wagon bed into the loft.¹⁵⁰

Hay Chutes. Most of the timber frame barns were built with one or more hay chutes to allow hay to be dropped from the mow to the stable below. Chutes were sometimes simply holes cut in the mow floor, although this practice was dangerous. More often the hole had a hinged or sliding lid. Sometimes a wooden box or chute extended vertically some distance down into the stable to help control dust when the material was dropped. Chutes were often positioned over the stable's mangers or feed alleys. The Feltmann Barn in Carver County (CR-YAT-004) has an unusual, elaborate, enclosed chute whose housing projects from the exterior wall of the barn. The chute has its own gabled roof (Fig. 29).

Ladders and Stairs. Nearly all of the timber frame barns have built-in ladders used to move between the stable and mow and/or climb up within the mow. Ladders are common to most pre-1950 barns in Minnesota, no matter the barn type. Most ladders are simply boards nailed to the framework. A few of the barns have more elaborately designed or carefully crafted ladders (Fig. 56). Some of the barns have staircases rather than ladders to allow movement between the stable and mow.

Granaries. Some of the mows have original wooden granaries in which loose and sacked feed grain – especially oats – was stored. Typically the granary was a wooden enclosure located within one of the storage mows adjacent to the wagon drive. Sometimes it was built over one end of the wagon drive (Figs. 23, 39, 57). The grain was shoveled out as needed and often dropped through a chute to the stable.

Pigeon Cote. The Benike Barn in Olmsted County (OL-FRM-020) has an unusual dovecote or pigeon

¹⁵⁰ Ibid.

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loft built over the wagon bay that was used to trap pigeons for the Benikes' table (Figs. 39 and 58). Pigeons entered the enclosed structure via two small holes cut in the exterior barn wall above the wagon door. The dovecote retains wooden roosting shelves, nesting boxes, and a small door giving the farmer access to the enclosure. In their 1975 study of Tri-Level Ground Barns built by Germans in Pennsylvania – most dating from the 18th century – Keyser and Stein write, "Pigeon boxes were at times mounted over the threshing floor [wagon floor] doors or in the gable at water-table level, or above the stable doors."¹⁵¹ In 1982 Brinkman and Morgan documented an early Germanic barn in Stearns County with holes cut in the barn to allow pigeons to enter and roost. The family caught them for pigeon soup.¹⁵²

Interior Stable Elements

The stables in Minnesota's German immigrant timber frame barns are either located in the basement in Basement Barns, or on the ground floor in Two-Level Ground Barns, Stable Barns, or the Saxon Barn. Many of the stable elements described below were common to all types of Minnesota dairy barns.¹⁵³

Walls and Floors. Stable walls were stone or concrete block in Basement Barns and Stable Barns (Fig. 61), and built of wood in Two-Level Ground Barns and Saxon Barns (Figs. 42 and 49). Many of the stable walls retain evidence of being coated with whitewash or white paint. (Some stone walls were first parged with a thin layer of concrete.) Dairy barn stables in the Midwest have typically been coated with whitewash since the early 20th century, and state dairy laws eventually mandated the practice. Whitewash was a low-cost paint made from slaked lime (calcium hydroxide) and chalk. It had mild antimicrobial properties, smoothed rough surfaces to make them more cleanable, and increased visibility in the barn by reflecting light (Fig. 61).

Barns built before circa 1910 usually had a dirt or gravel stable floor. Poured concrete floors, often with built-in manure gutters, were installed in the 1920s through 1940s. They were eventually required by state dairy laws. The Feltmann Barn, built circa 1925, in Carver County (CR-YAT-004), has cow rows paved with wooden blocks (Fig. 62).

Stalls. Stables were open-plan rooms with few interior walls. The arrangement of the posts that support the mow floor often influenced the arrangement of alleys and pens (Fig. 39). In early barns the alleys are generally more narrow, indicating they predate the era of wide carts and mechanical carriers used for hauling feed and manure. When dairy stables were upgraded, for example in the 1930s, it was common for some of the wooden posts to be replaced with round steel posts which were considered more cleanable. Some stables retain mechanical litter carriers and gutter cleaning systems.

Stables contained stalls in which cows were milked, wooden box stalls for draft horses, and a box stall for calving or isolation of a sick cow, all separated by aisles or alleys (Figs. 60, 62-63). In some barns, working pairs of horses were housed together in a single stall. Stanchions kept cows from moving during milking and also helped the stalls remain clean by keeping the cow's rear aligned over the manure gutter. If the barn was built around 1920 the steel stanchions might be original, but in earlier barns the equipment might represent an upgrade.

¹⁵¹ Keyser and Stein 1975, 16.

¹⁵² Brinkman and Morgan 1982, 110-111.

¹⁵³ See Granger and Kelly 2005.

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Handmade Staves. A few barns like the Bruns Barn, built circa 1890 in Nicollet County (NL-CTT-058), retain mangers or pens that feature vertical staves or pickets built of tree branches (Fig. 59). The Benike Barn, built circa 1875 in Olmsted County (OL-FRM-020), has an elevated horse manger with staves made from branches. Nearby is a tack hook for hanging bridles made from a branch.¹⁵⁴

Other Elements. If a German timber frame barn was built before 1910 and has a silo, the silo probably postdates the barn (Fig. 24). Some stables have a passage or connection between the stable interior and the base of the silo.

Some stables have a small enclosed feed room where ground grain was mixed and stored.

Most dairy barns have an accompanying milk house. If attached to the barn, the milk house was likely an addition. Some stables have an enclosed passage from the barn to the milk house. In the Benike Barn (OL-FRM-020) a wooden horse stall in the corner of the stable was converted to a milk room around 1970.

Typical Alterations

None of the German immigrant-built timber frame barns examined during preparation of this MPDF has escaped alteration. The mows of the Minnesota barns have generally changed less than the stables.

Some of the barns have an early addition, perhaps built within the first 20 years, that was usually designed to expand the cow-handling and hay-storage capacity. These expansions generally enlarged the basement as well as the mow. In many cases, the addition is supported by two or three additional timber frame bents (Fig. 35). In a few barns, an early addition is perpendicular to the original barn (Fig. 30). In some cases the addition has a plank or balloon frame rather than a timber frame.

Constructing an addition to a timber frame barn usually involved removing some members from an end wall to create an opening between the original and new portions of the barn. In some cases an entire end wall was removed.

Many barns have post-1950 additions. Most of these expansions are balloon frame. Sometimes the addition is a prefabricated Quonset or pole barn structure.¹⁵⁵

The most common alterations to Minnesota's German immigrant-built timber frame barns include the following:

Siding and Roofing

- original board and batten siding covered with modern materials such as corrugated steel; less often, original siding removed
- original wood shingles replaced with asphalt shingles or steel sheets, or modern roofing materials installed over original wood shingles

¹⁵⁴ Keyser and Stein 1975 describe similar elevated mangers and homemade tack hooks in 18th and early 19th century Germanic Tri-Level Ground Barns in Pennsylvania, p. 7.

¹⁵⁵ See Granger and Kelly 2005.

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- wooden cupolas and ventilators replaced with metal ventilators, or ventilators removed without being replaced
- lightning rods added to roofs; lightning rods removed from roofs

Foundation

 part or all of an original stone foundation replaced with early 20th century concrete block or clay tiles, or with post-1950 concrete block or poured concrete

Mow

- original timber members removed, often to open up more space for hay-moving equipment
- planks or cables added to strengthen or support the timber frame, sometimes after original timber members had been removed
- mow door leaves replaced; hinged leaves replaced with sliding leaves (Fig. 15)
- small mow doors, often with hinged leaves, cut in to mows to facilitate hay moving and ventilation
- large hay doors, some with hay hoods, added high in mow end walls
- hay-carrying equipment added; hay-carrying equipment removed

Stable

- stable door leaves replaced; stable door openings widened slightly
- window sash replaced (in original openings)
- additional window or door openings cut into the stable walls
- stable layout rearranged including location of partitions, alleys, and stalls
- stable upgraded with concrete floor, running water, steel stanchions, steel posts, and other elements, some required by state dairy laws (Fig. 63)
- stable structures and equipment removed

Silos and Milk Houses

- silo and silo link added; pre-1960 silos are usually smaller than later silos (Figs. 10, 24, 27); silo removed
- milk house added, often connected to the barn via a small link (Fig. 20); pre-1960 milk houses are generally smaller than modern milk houses

Setting

- adjacent cow yard paved with concrete to meet state dairy requirements (Figs. 16 and 30)
- fencing removed from adjacent livestock yards or pens

See Assessing Historic Integrity in the Registration Requirements below.

Character-Defining Features

Listed below are some of the essential character-defining features of Minnesota's German immigrant timber frame barns. The list is not all-inclusive. In addition to the features listed below, each barn will have other elements and characteristics that comprise part of its historic fabric and contribute to its historic character and integrity.

- located on a farmstead where the barn was often the largest building
- surrounded by a work yard and fenced livestock areas
- provides both crop storage and livestock stable
- originally owned and/or built by a person of German immigrant stock
- practical, utilitarian design with only subtle ornamentation

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- built with hand labor and hand tools
- rectangular footprint
- moderately-pitched gabled or gambrel roof
- timber framework
 - exposed (visible) structural framework of large timbers connected with mortise and tenon joints affixed with wooden pegs
 - o series of timber frame bents, perpendicular to the roof ridge, forming bays
 - o bents typically in cross-beam-and-queen-post or post-to-purlin style
 - o walls built of sills, wall plates, posts, girts, and braces
 - o rafters supported by purlin plates
- Germanic details such as:
 - o square panel framing
 - o diagonal plate-to-sill braces
 - o use of irregular or curved timbers
 - o assembly marks suggesting scribe carpentry
- nailed lumber (often of standard dimensions) used for roofing, siding, and other elements
- board and batten siding
- windows and doors with utilitarian designs and simple construction
- wood wagon doors that open outward or slide open
- rooftop ventilator(s)
- mow:
 - o large open mow with few windows and doors
 - o wood plank flooring, sometimes tongue and groove
- stable:
 - o stable with open plan (few interior walls)
 - o pens or stalls for cows and horses
 - o older barns (those built before about 1910) have fewer stable doors and windows
- Basement Barn form:
 - o two-level barn built against a slope or accessed via a man-made ramp
 - o stone or concrete basement housing a stable
 - o mow accessible via a wagon door near the center of the long side of the barn
 - o mow wagon bay flanked by storage bays
- Two-Level Ground Barn form:
 - o two-level barn on flat terrain
 - o drive-through wagon bay near the center of the long side of the barn
 - wagon bay flanked by stables
 - o open mows above the stables
- Stable Barn form:
 - two-level barn with stable on ground level
 - o entire upper level occupied by mow
 - o hay door high in an end wall
 - o stable doors usually at end walls
- Saxon Barn form:
 - o expansive gabled roof
 - o low side walls

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- o gable end wagon entrance
- o central longitudinal aisle flanked by side aisles
- o stables in side aisles, mows above stables

Significance

Minnesota's German immigrant timber frame barns serve as direct architectural links to the settlement of the state by European immigrants, a major theme in state history. Many of the barns display forms, design details, and construction techniques that represent the direct transfer to Minnesota of traditional German cultural practices from immigrants moving to Minnesota from German-speaking Europe or from older German-American immigrant communities in states farther east. In some cases the design and construction details found in the Minnesota barns are believed to be rare nationwide.

Within the context of state agricultural history, Minnesota's German immigrant timber frame barns represent a significant early phase in the development of farms and farm buildings. The barns are associated with the era in which ethnically based cultural practices influenced the design and construction of farm buildings. This period ended around World War I. Some of Minnesota's German immigrant barns represent the use of Old World practices long after standardized designs, techniques, and materials were prevalent in the state. Farm buildings exhibiting traditional cultural characteristics are increasingly rare in Minnesota and are vastly outnumbered by buildings whose design and construction reflects the influence of science- and engineering-based approaches to agriculture.

Minnesota's German immigrant timber frame barns will likely be eligible for the National Register under Criterion A for associations with important events or broad patterns of history, and/or Criterion C, for design and construction.

Registration Requirements

To be eligible for the National Register under the historic context "Minnesota's German Immigrant Timber Frame Barns, 1865-1925," a barn must have a timber frame structural system, including interior bents and exterior walls, which is connected with mortise and tenon joinery. Barns with nailed frameworks, plank frames, or balloon frame walls are not eligible under this context. The timber frame barn must have been originally owned and/or built by persons of German immigrant heritage. The barn will probably have been built between 1865 and 1925.

A National Register-eligible barn must retain sufficient historic integrity to be able to convey its historic appearance, associations, and significance. Barns with multiple alterations and additions have typically lost their ability to meaningfully convey the essence and details of their German immigrant design or construction. (See Assessing Historic Integrity below.)

It is important that the entire farmstead and surrounding farmland be evaluated as part of the National Register evaluation of any German immigrant timber frame barn. The historic integrity of a barn is strengthened considerably when it stands on a farmstead or farm that also retains integrity and

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contains, for example, a preserved farmhouse, outbuildings, windbreak, farmyard, pastures, and fields.¹⁵⁶

National Register Criterion A

A German immigrant timber frame barn may be significant under National Register Criterion A for its association with local or regional agricultural development. It may be significant for its association with the settlement or development of an area by German immigrants. It may reflect the design influences, construction techniques, or cultural practices of this ethnic group, or be in another way associated with the contributions of German immigrants to the development of the region. Areas of significance will likely include Agriculture, Exploration/Settlement, and/or Ethnic Heritage: European. The level of significance will likely be Local or State.

The barn must retain sufficient historic integrity to continue to convey its historic character, significance, and associations. For properties eligible under Criterion A, the period of significance will be the period during which the property's association with the significant events occurred. Alterations and additions made during the period generally do not diminish the property's historic integrity even though the changes may postdate original construction of the barn.

National Register Criterion B

Under this historic context, it is possible that a German immigrant timber frame barn may be eligible for the National Register under Criterion B – association with an important person – but eligibility under Criteria A and C are more likely. For barns that represent the work of a particular designer or builder, see Criterion C. Areas of significance will likely include Agriculture, Exploration/Settlement, and/or Ethnic Heritage: European. The level of significance will likely be Local or State.

The barn must retain sufficient historic integrity to continue to convey its historic character, significance, and associations. For properties eligible under Criterion B, the period of significance will be the period during which the property's associations with the person's significant contributions occurred. Alterations and additions made during the period generally do not diminish the property's historic integrity even though the changes may postdate original construction of the barn.

National Register Criterion C

Barns may be eligible for the National Register under Criterion C if they embody the distinctive characteristics of a type, period, or method of construction or represent the work of a master. Such buildings may clearly illustrate the character-defining features of a German immigrant timber frame barn built in 1865-1925. (See Character-Defining Features above.) The barn may represent a well-preserved example of one of the four forms the state's Germanic timber frame barns appear to take: Basement Barn, Two-Level Ground Barn, Stable Barn, and Saxon Barn. Two-Level Ground Barns and Saxon Barns are less common than the other forms and therefore preserved examples may be more significant.

The barn may display the influence of traditional European or German-American cultural practices or a

¹⁵⁶ See Granger and Kelly 2005.

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significant construction technique. Examples include square panel framing, diagonal plate-to-sill braces, use of irregular or curved timbers, and assembly marks suggesting scribe carpentry. A barn may possess traditional or ethnic-influenced ornamentation, or include a distinctive interior element such as a pigeon cote or an especially well-built interior granary. It is suspected that barns with particular traditional or ethnic-influenced elements are rare and fast-disappearing, and that extant examples that retain integrity are important statewide.

A barn eligible under Criterion C may be particularly well-built or include a high level of craftsmanship or special aesthetic qualities. The barn may be associated with the range of design and detail seen in the property type, or may be associated with a particular barn designer or builder. A group of barns sharing particular characteristics or representing the work of a particular builder may be important.

Areas of significance for Criterion C barns will likely include Agriculture, Architecture and/or Ethnic Heritage: European. The level of significance will likely be Local or State.

The barn must retain sufficient historic integrity to continue to convey its historic character, significance, and associations. For properties eligible under Criterion C, the period of significance will usually be defined as the year the barn was built, or the span of years if the barn was built in stages. Alterations and additions made during the period of significance will not diminish the property's historic integrity.

National Register Criterion D

A German immigrant timber frame barn, or a set of barn ruins, could be eligible under Criterion D if the property has the potential to yield information helpful in answering research questions important to the historic context. The could represent a rare form or type or contain rare Germanic construction details. The assistance of an historical archaeologist should be sought when evaluating the significance, historic integrity, and eligibility of a barn under Criterion D.

Criteria Consideration B – Moved Properties

A German immigrant timber frame barn that has been moved from its original site may be eligible for the National Register if the new location is a rural setting similar to the barn's historic setting.

Assessing Historic Integrity

Many of Minnesota's German immigrant-built timber frame barns represent uncommon barn types, incorporate rare construction details, and serve as direct links to the state's immigrant past. Unfortunately, many of the barns are falling into disrepair. Because of their multi-level design and modestly-sized windows and doors, many barns cannot be fully used by modern farm operations. Many stand on properties that are no longer working farmsteads. Owners often have difficulty justifying the cost of maintaining the buildings, and leaking roofs and deteriorating timbers are becoming common.

A barn eligible for the National Register under this historic context may be in poor physical condition and still convey its historic design intent, character, associations, and significance. In other words, poor physical condition does not in itself render a property ineligible for the National Register. If a barn is in ruins, its National Register eligibility under Criterion D should be evaluated (see above).

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Most barns have sustained some alteration. (See Typical Alterations above.) In many cases, however, the essential qualities that characterize this distinctive property type often remain dominant and understandable, and the properties continue to convey their historic character, associations, and significance.

Barns that appear to be rare examples of a particular form, or which contain rare construction details, may justify a lower threshold of physical integrity.

Historic physical integrity is somewhat less important for barns eligible under Criteria A or B than for those eligible under Criterion C.

When assessing integrity, the ease with which an alteration could be reversed and the amount of historic fabric still present are important to consider.

The cumulative effect of alterations should be considered. Sometimes a property's historic integrity is significantly diminished by an accumulation of small changes rather than by a single more dramatic change (Figs. 20-21). On the other hand, a barn with several alterations may still be eligible for the National Register if enough elements that comprise the property's location, design, setting, materials, workmanship, feeling, and association have been retained.

The integrity of each property should be carefully evaluated by assessing how much it retains the seven aspects of integrity identified in the National Register criteria for evaluation: location, design, setting, materials, workmanship, feeling, and association. Each is briefly discussed below:

Location and Setting. The barn should be located in a rural setting adjacent to farm land and preferably near other farm buildings so the barn's historic working relationship to farm operations can be understood. A barn standing in a crowded suburban setting would not likely retain sufficient historic integrity to meet these registration requirements.

The historic integrity of a barn is strengthened considerably when it stands on a farmstead with a farmhouse, other outbuildings, a windbreak, farmyard, and other farmstead elements, or stands on an entire farm that retains integrity.¹⁵⁷

A barn may be moved from its original location, but should be relocated in a rural setting (see above).

Design. Design is the combination of elements that create the form, plan, structure, and/or style of a property and includes such elements as spatial organization, proportion, scale, materials, texture, and ornamentation.¹⁵⁸

Minnesota's German immigrant-built timber frame barns were practical, utilitarian structures. The historic function of the barn – crop storage and animal stable – should be readily apparent. Ornamentation should remain subtle.

¹⁵⁷ See Granger and Kelly 2005, pp. 7.1-7.19.

¹⁵⁸ National Park Service, *How to Apply the National Register Criteria for Evaluation [National Register Bulletin 15]* (Washington, DC: National Park Service, U.S. Dept. of Interior, 1990; rev. 1997), 44-45.

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The original massing of the barn should be readily apparent and the roof should retain its historic shape. The barn may have an addition, but it should be modestly sized so it does not visually overwhelm the original structure.

The timber frame structural system should be visible on the interior and generally unaltered. Timber members may be missing, or extra boards or stabilizing cables added, but the framework must retain enough integrity that an observer can clearly understand how the structural system was designed and performs.

The historic location and function of the wagon drive, entrances, stables, and storage mows should be readily apparent, as should their functional interrelationship.

A Basement Barn should have a stone or concrete basement and a mow level accessed by a slope or ramp.

A barn's mow should retain its historic character as a large open interior space. The wagon or hay door(s) through which a mow was loaded should be in historic locations.

A stable should retain a largely open plan with few interior walls. Original aisles, stalls, pens, stanchions and other features need not be retained, but their presence strengthens historic integrity.

A modest number of new window and door openings may be added to the barn after the period of significance, but the timber framework should not have been substantively disrupted. The mow must retain its original sense of being a largely window- and door-less space. The number of windows and doors in the stable should not be changed dramatically.

Materials. Most barns had board and batten siding. The barn should retain its original siding or in-kind replacement. The siding may be covered on the exterior with a new material such as metal, as long as there are not too many other changes to the building.

The mow should retain its original wood floor or an in-kind replacement.

Basements should retain most of their original stone or concrete.

Original wood roofing shingles may be covered with or replaced by modern materials.

Most windows and doors should be made wood and of simple design and construction.

Workmanship. The barn should continue to embody and convey the fact that it was built with hand labor, hand tools, and skilled craftsmanship.

The mortise and tenon joints should be fixed with wooden pegs.

Barns that contain traditional European or Germanic construction details such as diagonal sill-to-plate braces, irregular or curved timbers, square panel framing, and marriage marks should retain those

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elements.

Feeling and Association. Feeling and Association refer to the property's ability to convey its historic character or sense of a particular period of time – the period of significance. A German immigrant timber frame barn eligible for the National Register should retain integrity of feeling and association.¹⁵⁹

Assessment Under "Euro-American Farms in Minnesota, 1860-1960" Historic Context

In addition to being evaluated under the German immigrant timber frame barn context established by this MPDF, barns should also be evaluated under the statewide historic context "Euro-American Farms in Minnesota, 1860-1960." The parameters of that historic context, its associated property types, and National Register eligibility guidelines are included in a 2005 historic context study.¹⁶⁰ A barn may meet the historic context guidelines for National Register Criterion C, for example, if it retains historic integrity and is "a rare example of a significant property type," if it "displays distinctive or unusually well-developed ethnic-influenced design or construction or an important cultural tradition," or if it is "a distinctive (e.g., very early) or unusually well-developed example of a significant design type, structural form, or technological stage or advancement," among other criteria.¹⁶¹ German immigrant timber frame barns may meet these guidelines.

Establishing Boundaries

When the boundary of a National Register-eligible German immigrant timber frame barn is determined, the boundary should include as much of the surrounding farmstead that retains historic integrity as possible. Ideally the entire farmstead would retain sufficient historic integrity to be eligible. At minimum, the boundary of the National Register-eligible property should include space around the barn that was historically occupied by the cow yard, other livestock pens, and the barn-related work area, as well as an appropriate portion of the wagon drive approaching the barn. These areas were critical to the barn's use during the period of significance and should be included so observers can perceive the barn's historic character and understand how it functioned. For example, the boundary of the Benike Barn, which was listed on the National Register in 2011, is comprised of a 2,000' by 1,500' rectangle that contains both the 30' x 48' barn and the space around it that was historically occupied by fenced yards for cows and horses, open work areas, and a portion of driveway that approaches the barn's wagon ramp.¹⁶²

¹⁵⁹ See National Register bulletins and Granger and Kelly 2005, 7.6-7.9, for information on assessing integrity of feeling and association.

¹⁶⁰ Granger and Kelly 2005.

¹⁶¹ Granger and Kelly 2005, pp. 7.20-7.21.

¹⁶² Granger and Kelly 2011.

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G. Geographical Data

The geographical area covered by this MPDF covers the state of Minnesota. The counties in which Minnesota's German immigrant-built timber frame barns are most likely to be found are shaded gray on Figure 4.

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H. Summary of Identification and Evaluation Methods

This Multiple Property Documentation Form (MPDF) for Minnesota's German immigrant timber frame barns was prepared by the Minnesota Department of Transportation (MnDOT) as required by stipulations in two Memoranda of Agreement (MOA) between the Federal Highway Administration (FHWA) and the Minnesota State Historic Preservation Office (MnSHPO). The MOAs were prepared in compliance with Section 106 of the National Historic Preservation Act and executed in 2010. They were developed to help mitigate adverse effects to historic properties caused by the reconstruction and realignment of two segments of U.S. Highway 14 in southeastern Minnesota – a 22-mile segment between New UIm and North Mankato in Nicollet County, and a 19-mile segment between Owatonna and Dodge Center in Steele and Dodge counties.

This MPDF's property type information is primarily based on fieldwork and research on 44 German immigrant-built barns conducted in 2005-2008. The work was conducted for MnDOT during cultural resources surveys along highway corridors in Carver, Dodge, Nicollet, and Steele counties. Carver and Nicollet counties historically had particularly dense concentrations of German immigrants. Information on an additional barn was gathered during preparation of a National Register nomination for MnSHPO which was completed in 2011. The fieldwork and research was conducted by Susan Granger and Scott Kelly of Gemini Research, and Daniel R. Pratt, now of ARCH3, LLC. The locations of the 44 barns examined are listed on the table below. A Minnesota Architecture-History Inventory Form was prepared for each barn. The forms are on file at the MnSHPO and summarized in the final survey reports referenced below.

number		
<u>of barns</u>	<u>county</u>	location
25	Nicollet	22-mile U.S. Hwy 14 corridor between New Ulm & North Mankato ¹⁶³
03	Steele	11-mile U.S. Hwy 14 corridor between Owatonna & east county line ¹⁶⁴
03	Dodge	8-mile U.S. Hwy 14 corridor between w. county line & Dodge Center ¹⁶⁵
12	Carver	12-mile U.S. Hwy 212 corridor between Norwood-YA and Chaska ¹⁶⁶
01	Olmsted	Farmington Township (8 miles northeast of Rochester) ¹⁶⁷
44 total		

¹⁶³ Susan Granger and Scott Kelly, *Phase II Evaluation of Historic Structures Along TH 14 Between New Ulm and Mankato, Nicollet County, Minnesota* (prepared for MnDOT by Gemini Research, May 15, 2006).

¹⁶⁴ Susan Granger and Scott Kelly, *Phase I and II (Identification and Evaluation) Investigation of Historic Structures Along TH* 14 Between Owatonna and Dodge Center, *Minnesota* (submitted to MnDOT by Gemini Research, Nov. 15, 2007); Susan Granger and Scott Kelly, *Phase I and II (Identification and Evaluation) Investigation of Historic Structures Along Additional TH* 14 Alternatives Between Owatonna and Dodge Center, *Minnesota* (SP 2001-32) (submitted to MnDOT by Gemini Research, Oct. 2008).

¹⁶⁵ Granger and Kelly, Nov. 15, 2007; Granger and Kelly, Oct. 2008.

¹⁶⁶ Susan Granger and Scott Kelly, *Phase I and II (Identification and Evaluation) Investigation of Historic Structures Near US Highway 212 and Market Avenue in the Vicinity of Cologne, Carver County, Minnesota* (submitted to MnDOT by Gemini Research, Feb. 18, 2008); Susan Granger and Scott Kelly, *Phase I and II (Identification and Evaluation) Investigation of Historic Structures Near US Highway 212 From Norwood Young America to Co. Rd. 147 (CSAH 11) in Carver County, Minnesota* (submitted to MnDOT by Gemini Research, July 2008).

¹⁶⁷ Granger and Kelly, "Benike Family Barn," March 2011.

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GLOSSARY

This brief glossary explains some of the terms referenced in this document. Additional information and illustrations can often be found by inserting one of the terms into an internet search engine.

Bank barn. Generally refers to a basement barn built against a hillside to provide wagon access to the mow level (Fig. 11). Sometimes also refers to a barn built on flat terrain with a manmade earthen ramp.

Basement barn. A two-level barn with a basement level, which usually houses the stable, located beneath a mow level (Figs. 11, 17). The basement typically has walls of stone or concrete.

Bay. An interior space. Often refers to the space between a timber frame's evenly-spaced bents.

Beam. Horizontal member of a timber frame.

Bent. A section of heavy timber framework that is generally perpendicular (lateral) to a barn's roof ridge. The exterior bents form a barn's end walls. The bents between the end walls are called interior bents (Fig. 5, 14).

Brace. A diagonal member used to stabilize the frame (Fig. 5). Usually installed in opposing pairs. Short diagonal braces are sometimes called sway, wind, arch, or knee braces or sometimes struts. The short braces often extend from a queen post up to a purlin plate, or from a wall post down to a sill plate or up to a wall plate (Figs. 34, 41). Long diagonal braces, which are more rare, often extend from a wall plate to a sill plate to a sill plate (Figs. 42-44). In Germanic timber framing these long diagonal, plate-to-plate braces are sometimes called *strebe* braces (*strebe* meaning "brace" or "buttress").

Cross beam. Usually a horizontal member that crosses from side wall to side wall (e. g., from end post to end post) (Fig. 5).

End post. A wall post located at the end of a bent.

Fachwerk. The German word for timber framing (*fachwerk* meaning "framework" and *fach* meaning "panel" or "compartment").

Forebay. A section of the mow level of a barn that projects out past (i.e., overhangs) the basement level (Fig. 9). None are known to be extant in Minnesota although forebays are found in Germanic barns in Wisconsin.

Girt. A horizontal wall member located somewhere between the sill plate (at floor level) and, if on a side wall, the wall plate (at the top of the side wall). A wall may have one or more girts depending on the height of the barn and the density of the framing (Figs. 5, 36).

Ground barn. A barn without a basement (Fig. 22).

Joists. Multiple horizontal members that rest on plates or beams to support, for example, flooring boards (Figs. 5, 52). Often made of dimensional lumber.

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Lap joint. A timber framing joint in which two members, meeting either end-to-end or perpendicular, are joined by cutting away material from each and laying one member over the other (Fig. 48). The two planar surfaces are straight (i.e., parallel with the timbers) rather than angled as in a scarf joint. A lap joint is sometimes secured with a wooden peg and sometimes interlocking.

Marriage marks. Also called assembly marks or carpenter's marks. Marks made with a chisel-like tool to identify and number unique mortise and tenon pairs (Figs. 53-54). Used to efficiently assemble a timber frame.

Mortise. A slot or hole cut in a timber member to receive an inserted tenon. Mortise and tenon joints are usually secured with wooden pegs.

Mow. A dry storage area, usually for hay or straw. May contain a small granary room. A mow can occupy an entire level of a barn, only part of a level, or be an elevated loft.

Nogging. Material such as bricks, woven sticks, or a mixture of mud and straw used to fill the panels of square panel framing, usually for insulation (Figs. 6, 8). Nogging was often coated with plaster for weather resistance.

Pent roof. Also called a pent eave. A shallow sloped overhang across part of the lower level of a barn (e.g., over an entrance), usually to provide shelter from rain or sun (Fig. 17).

Plate. Horizontal member of a timber frame (Fig. 5). A wall plate is located at the top of a side wall. A sill plate is located at the floor level. A purlin plate is usually located half-way between the side walls and roof ridge to support the rafters.

Post. Horizontal member of a timber frame (Figs. 5, 40). A wall post is located on an exterior wall. An end post is a wall post at the end of a bent. A purlin post supports a purlin plate. A queen post is a short post that rests on a beam and supports a purlin plate.

Purlin plate. Often shortened to simply "purlin." A longitudinal horizontal timber usually located half-way between the wall and the roof ridge to support the rafters (Fig. 32).

Purlin post. A post, usually tall, that supports a purlin plate (Figs. 36, 38).

Queen post. A post that rises from a bent's cross beam to support a purlin plate. A queen post can be straight (vertical) or installed at an angle (Figs. 32-34). Angled queen posts are sometimes referred to as "inclined," "splayed," or "canted."

Rafters. Multiple members, usually made of dimensional lumber, that support roof boards (Fig. 5). Rafters are usually supported by wall plates and purlin plates. In Minnesota's German timber frame barns the ends of the rafters are lapped at the peak of the roof rather than being nailed to a ridge board.

Scarf joint. A means of joining two timbers end to end. The joint consists of two angled planes that overlap and are often pegged. The members are usually the same thickness and one-half of each member's end is removed. Sometimes the joint is fashioned so the timbers interlock. Similar to a lap

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joint except the planes are angled.

Sill plate. Sometimes shortened to "sill." A horizontal member located at the base of the wall. It usually rests on the foundation and supports the wall posts (Fig. 42).

Square panel framing. Also called box framing. A pattern of timber framing that forms a lattice or grid of square or rectangular shapes (Figs. 6-7, 45). The panels or spaces between members are sometimes nogged.

Stable. The part of a barn where animals are housed.

Tenon. The projecting half of a mortise and tenon joint. Inserted into a mortise. Most tenons are not visible because they are "blind" or buried within the mortise. A Dutch tenon is a tenon that continues all the way through a post and projects out the opposite side (Fig. 41).

Timber framing. A structural system of heavy wooden timbers traditionally connected with mortise and tenon joints. Smaller members such as braces may be connected with large nails.

Wall plate. The horizontal member at the top of a side wall. It is supported by wall posts and, in turn, supports cross beams and rafters.

Wall post. A post located on an exterior wall. It generally rests on a sill plate. On a side wall it supports a wall plate.

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Figure 1. Distribution of German Immigrants in the U.S. in 1890. Map by Juergen Eichhoff (1988) reprinted in Don Heinrich Tolzmann's *The German-American Experience* (2000, p. 14).

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Figure 2. In 1880, more than 75% of the population of the townships colored black was of German stock (i.e., German immigrants and their children). In the townships shaded dark gray, those of German stock comprised 50% of the population in 1880. (Reproduced from Hildegard Binder Johnson's "The Germans" in *They Chose Minnesota* 1981.)

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Figure 3. Southeastern and central Minnesota were dominated by deciduous forests at the time of Euro-American settlement. Forested areas are colored orange and green on this map depicting vegetation at the time of the U.S. Public Land Survey, which was conducted in 1847-1907 in advance of the sale of public land. (Reproduced from John Fraser Hart and Susy Svatek Ziegler's *Landscapes of Minnesota* 2008.)

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Figure 4. It is believed that Minnesota's German immigrant-built timber frame barns are most likely to be found in the counties shaded gray. The 44 barns that form the basis for this MPDF are located in the six outlined counties: Carver, Dodge, Nicollet, Olmsted, Steele, and Washington (Gemini Research sketch).

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Figure 5. Components of a simple timber frame. Three to five bents, consisting of posts and cross beams, were often assembled on the ground, tipped up into place, and then attached to the sills and wall plates. (Reproduced from Jack Sobon and Roger Schroeder's *Timber Frame Construction: All About Post-and-Beam Building* 1984.)



Figure 6. Lower Saxon house barn (*Niedersachsenhaus* or *Fachhallenhaus*) built 1795, located at Winsen Museum Farm at Winsen in northwestern Germany (2009 photo by Axel Hindemith, released to public domain, Wikimedia Commons).

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Figure 7. Historic timber frame Ground Barn with vertical wood siding, similar to those in southeastern Minnesota, preserved at Bergisch Open Air Museum at Lindlar in northwestern Germany (2011 photo by Ziko van Dijk, released to public domain, Wikimedia Commons).



Figure 8. Historic timber frame Ground Barn with square panel framing and brick nogging near Bassum in northwestern Germany (2011 photo, released to public domain, Wikimedia Commons).

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Figure 9. Pennsylvania German bank barn located in Indiana. The distinguishing feature of the so-called Pennsylvania Barn is the mow forebay, at right, which extends over the basement wall. No examples are known to exist in Minnesota, but many were built in Wisconsin (2011 photo by Nyttend, released to public domain, Wikimedia Commons).



Figure 10. The Poehler Barn is a Basement Barn built ca. 1875. Its German-influenced design has European square panel framing and long diagonal braces. Some of the timbers are irregular or slightly curved. On the roof is the remnant of a gabled ventilator or cupola made of wood. Courtland Twp., Nicollet County (NL-CTT-061) (photo by Dan Pratt, 2005).

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Figure 11. Most of Minnesota's German immigrant-built timber frame barns are Basement Barns. Most, like this example, are built into a natural slope. In early examples the wagon doors typically open outward, seen above, while in later barns they often slide open. Bruns Barn, ca. 1890, Courtland Twp., Nicollet County (NL-CTT-058) (photo by Dan Pratt, 2005).



Figure 12. The non-slope side of the same 36' x 56' barn. The stable walls are built of fieldstone parged with concrete. The stable has one large door and about five smaller doors. Bruns Barn, ca. 1890, Courtland Twp., Nicollet County (NL-CTT-058) (photo by Dan Pratt, 2005). (See also Figure 59.)

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Figure 13. Typical plan of the mow of a Basement Barn. This barn measures 36' x 60'. Most of Minnesota's German immigrant-built timber frame barns have three, four, or five bays. Schmidt Barn, Dahlgren Twp., Carver County (CR-DHL-049) (Gemini Research sketch).



Figure 14. In a Basement Barn, the doors at the top of the ramp open onto a wagon bay, seen here with machinery stored in it. To load the barn with hay, wagons were driven into the bay and the hay was pitched by hand into the flanking storage bays (foreground in the photo). The bays would often be filled nearly to the roof. The wagon was then backed out of the barn and down the ramp. H. and S. Bode Barn, ca. 1875, Nicollet Twp., Nicollet County (NL-NCT-011) (photo by Dan Pratt, 2005).

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Figure 15. This Basement Barn has a man-made ramp since no natural slope was available. The walls retaining the ramp were originally limestone and replaced ca. 1935 with poured concrete. The leaves of the wagon door, first built of vertical wood and opening outward, were replaced with sliding leaves of horizontal wood. The rooftop ventilator was originally wood and is now a manufactured steel model. Benike Barn, ca. 1875, Farmington Twp., Olmsted County (OL-FRM-020) (photo by Scott Kelly, 2008).



Figure 16. The opposite site of the same barn, which has a 30' x 48' footprint. The limestone was quarried near the farm. Note that the stable doors are split or "Dutch" style. Benike Barn, ca. 1875, Farmington Twp., Olmsted County (OL-FRM-020) (photo by Scott Kelly, 2008). (See several other photos of the Benike Barn herein.)

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Figure 17. Scholars indicate a pent roof, seen over the door of this basement stable, is characteristically German and related to the forebay and pent roof tradition of the Pennsylvania Barn. Klippstein Barn, ca. 1890, Courtland Twp., Nicollet County (NL-CTT-017) (photo by Dan Pratt, 2005).



Figure 18. An elaborate enclosed hay hood has been added to this 30' x 50' Basement Barn, built ca. 1875. Meyer Barn, Courtland Twp., Nicollet County (NL-CTT-050) (photo by Dan Pratt, 2005). (See also Figures 43, 51, and 52.)

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Figure 19. The Heim Barn is a 34' x 60' Basement Barn built in 1907. The left-hand portion is an 18'-wide addition, built ca. 1910 to provide a horse stable and milk room. Courtland Twp., Nicollet County (NL-CTT-026) (photo by Dan Pratt, 2005).



Figure 20. This Basement Barn has several alterations including a milk house addition, modern roof vents, out-of-scale attached silos, a large addition to the basement, and reconstruction of a substantial part of the basement walls. While a barn can sustain a few alterations and retain historic integrity, the cumulative effect of all of these changes makes this barn unable to clearly convey its historic character, function, and significance. Benton Twp., Carver County (CR-BNT-147) (photo by Scott Kelly, 2007).

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Figure 21. Another Basement Barn with several alterations. The southeastern part of the basement has been rebuilt with modern concrete block. Double-hung sash and glass block have been installed in the original basement window openings. The mow's original siding has been covered with corrugated metal. Buckentine Barn, ca. 1895, Dahlgren Twp., Carver County (CR-DHL-045) (photo by Scott Kelly, 2007). (For a plan, see Figure 35.)

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Figure 22. The 40' x 60' Homeyer Barn, built ca. 1895, is an excellent example of a Two-Level Ground Barn. These barns have no basement. In the Homeyer Barn the horse stable is to the right of the wagon drive and the cow stable is to the left. Above each is a large storage mow. (Siding is missing at the barn's left corner.) Note the curved pattern in the gable end siding, which is Germanic. Havana Twp., Steele County (ST-HAV-032) (photo by Scott Kelly, 2007). (For a plan, see Figure 23; see also Figures 46 and 57.)

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Figure 23. Most of Minnesota's German immigrant Two-Level Ground Barns have a door at each end of the wagon drive, allowing wagons to drive through the barn rather than having to back up. This is a plan of the Homeyer Barn, ca. 1895, Havana Twp., Steele County (ST-HAV-032) (Gemini Research sketch).



Figure 24. This Two-Level Ground Barn, like the Homeyer Barn, has a large footprint (40' x 60') and is taller than most. The plan is similar to that seen in Figure 23. Note the narrow transom window above the sliding wagon doors. The silo was added ca. 1945. F. and M. Lehmann Barn, ca. 1895, Claremont Twp., Dodge County (DO-CLT-031) (photo by Scott Kelly, 2007). (See also Figures 36 and 40.)

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Figure 25. The wagon bay of a Two-Level Ground Barn. The cow stable is at left and the horse stable at right, both with storage mows above. The wagon bay is about 15' wide. A. and L. Lehmann Barn, ca. 1919, Claremont Twp., Dodge County (DO-CLT-047) (photo by Dan Pratt, 2014). (See also Figures 26, 28, 42, 48-50, and 55.)



Figure 26. The same barn's cow stable is visible through the doors. The photo was taken from the wagon bay shown in the previous photo. The cow stable's strong ceiling serves as the floor of a large mow. A. and L. Lehmann Barn, ca. 1919, Claremont Twp., Dodge County (DO-CLT-047) (photo by Dan Pratt, 2014).

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Figure 27. A Two-Level Ground Barn built ca. 1905. It has a 30' x 70' footprint. The lower walls are built of rockfaced concrete block. Studtmann Barn, Courtland Twp., Nicollet County (NL-CTT-047) (photo by Dan Pratt, 2005).



Figure 28. Exterior of the 35' x 60' barn seen in Figures 25 and 26. This is a late, gambrelroofed example of the Two-Level Ground Barn, built ca. 1919. The carpenters were the U.S.-born sons of German immigrants. A. and L. Lehmann Barn, Claremont Twp., Dodge County (DO-CLT-047) (photo by Scott Kelly, 2007).

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Figure 29. A Stable Barn built ca. 1925. Note the unusual gable-roofed hay chute near the center of the side wall (left of the silo). This 36' x 70' barn was loaded via a hay door high in the gambrel end (opposite the end shown). Feltmann Barn, Young America Twp., Carver County (CR-YAT-004) (photo by Scott Kelly, 2008). (See also Figures 30, 41, and 61-62.)



Figure 30. The Stable Barn in the previous photo has an early 30' x 52' addition (at left) perpendicular to the original wing (at right). The addition was built ca. 1930. Note the wooden rooftop ventilator on the original barn. Feltmann Barn, ca. 1925, Young America Twp., Carver County (CR-YAT-004) (photo by Scott Kelly, 2008).

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Figure 31. The Dunker Barn has a German- and Dutch-influenced form, called by some scholars the Saxon Barn, which is unusual among Minnesota's German immigrant timber frame barns. Built ca. 1900, the barn measures 48' x 60'. Characteristic are a sweeping gabled roof, low side walls, gable end entrance(s), and a large central aisle (originally open to the roof) flanked by side aisles where the stables were located. The wagon doors on this barn have been moved to the side walls. Havana Twp., Steele County (ST-HAV-035) (photo by Scott Kelly, 2007).

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Figure 32. Roughly half of the German immigrant-built timber frame barns forming the basis of this MPDF have bents similar to this ca. 1875 barn, with posts supporting a cross beam, and queen posts on the cross beam supporting purlin plates, which in turn support the rafters. In this example, the queen posts are aligned vertically. Note that the cross beam is connected to the wall post below the top of the post. Note the diagonal braces and the very rare use of crooked timbers. Seeman Barn, Courtland Twp., Nicollet County (NL-CTT-052) (photo by Dan Pratt, 2005). (See also Figure 44.)

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Figure 33. Most of the barns have queen posts that slant outward (i.e., are "inclined" or "splayed") rather than being vertically aligned. This created more room for the operation of hay-moving equipment suspended from the roof ridge. (Note the ropes and pulleys.) Thom Barn, ca. 1890, Nicollet Twp., Nicollet County (NL-NCT-021) (photo by Dan Pratt, 2005).



Figure 34. The barn in this photo has inclined queen posts spread farther apart than those in the barn in Figure 33. The wider spacing is more typical. Note that in both barns, the queen posts are stabilized with pairs of opposing sway braces. Arndt Barn, ca. 1890, Courtland Twp., Nicollet County (NL-CTT-031) (photo by Dan Pratt, 2005).

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Figure 35. An inclined queen post configuration is evident in the four original bents of this barn (bents 1 through 4), shown in the drawings in the right column. The barn was built ca. 1895 with three bays, a central wagon drive, and a footprint of 30' x 48'. Two more bays (bents 5 and 6) were added ca. 1905, bringing the total barn length to 80'. Buckentine Barn, Dahlgren Twp., Carver County (CR-DHL-045) (Gemini Research sketch).

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Figure 36. Roughly half of the German immigrant barns forming the basis of this MPDF have a post-to-purlin bent configuration, shown here, rather than the cross-beam-and-queen-post bent shown in Figures 32-34. In the post-to-purlin style, each bent has two very tall principal posts (also called "purlin posts") that extend from the floor all the way to the purlin plates. A cross beam ties the two tall posts together. (That beam has been removed in the barn shown above.) A shorter beam ties each principal post to the bent's wall post. The post-to-purlin bent style could provide a more open mow than the bent style seen in Figures 32-34. Note the empty mortise in the wall post at right which indicates an angled brace has been removed. F. and M. Lehmann Barn, ca. 1895, Claremont Twp., Dodge County (DO-CLT-031) (photo by Scott Kelly, 2007). (See also Figures 24 and 40.)

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Figure 37. The Benike Barn, built ca. 1875, also has post-to-purlin bents. The lateral beam that joins the two principal posts is seen at upper right. Each post is also tied to the bent's wall posts with three beams (Figure 39). Note the unusual X-bracing and the built-in ladder. The material at lower left is piled on a simple platform that is located over one end of the wagon drive for extra storage. Farmington Twp., Olmsted County (OL-FRM-020) (photo by Scott Kelly 2008).



Figure 38. The Heim Barn, built in 1907, also has principal posts that extend from the mow floor to the purlins. Courtland Twp., Nicollet County (NL-CTT-026) (photo by Dan Pratt, 2005).

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Figure 39. The sketch at upper right shows the interior bents (bents 2 and 3) of the Benike Barn with posts that extend from mow floor to the purlins. The bents of the end walls (bents 1 and 4) are more densely built with a traditional post-supported cross beam. The plan of the mow (lower left) shows a typical three-bay arrangement with central wagon drive. There is an interior granary located in one of the storage mows. Hay was dropped to the basement through narrow chutes with hinged lids. Benike Barn, ca. 1875, Farmington Twp., Olmsted County (OL-FRM-020) (Gemini Research sketch).

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Figure 40. Many of the barns are heavily built. Shown above are posts about 25' tall and 10" x 10" in cross section in the F. and M. Lehmann Barn, built ca. 1895. The Homeyer Barn, about the same age and standing a few miles away, has similar massive posts. Both barns measure 40' x 60'. F. and M. Lehmann Barn, Claremont Twp., Dodge County (DO-CLT-031) (photo by Scott Kelly, 2007). (See also Figures 24 and 36.)

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Figure 41. A heavily built mow wall. Note that the tie-beam tenon at upper left projects all the way through the post. Sometimes called a Dutch tenon, this feature is uncommon in Minnesota but is typical in northwestern Germany and the Netherlands. Feltmann Barn, ca. 1925, Young America Twp., Carver County (CR-YAT-004) (photo by Scott Kelly, 2008). (See also Figures 29-30 and 61-62.)



Figure 42. Several of the barns have long diagonal braces, characteristic of German timber frame construction. In this case, the braces are 18' long and extend from a wall post (out of sight above the stable ceiling) to a sill. A. and L. Lehmann Barn, ca. 1919, Claremont Twp., Dodge County (DO-CLT-047) (photo by Dan Pratt, 2014).

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Figure 43. Some of the barns have rare dense European square panel framing. The gridwork of posts and horizontal members forms squarish spaces that are roughly even in size. In Europe and in a few German immigrant communities in the U.S., the panels were nogged with brick, stovewood, or other materials, particularly if the building needed to be insulated. This is a 30' x 50', three-bay, Basement Barn built ca. 1875. Note that some of the diagonal braces are made of curved or crooked timbers, also very rare. Meyer Barn, Courtland Twp., Nicollet County (NL-CTT-050) (photo by Dan Pratt, 2005). (See also Figures 18 and 51-52.)

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Figure 44. Another Nicollet County barn with European square panel framing, long diagonal plate-to-sill braces, and the use of irregular, curved, or crooked timbers. This barn is 36' x 50' and is a Two-Level Ground Barn. It has an addition, whose curved rafters can be seen at lower right. Seeman Barn, ca. 1875, Courtland Twp., Nicollet County (NL-CTT-052) (photo by Dan Pratt, 2005). (See also Figure 32.)
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Figure 45. Dense European square panel framing in an interior bent. This Basement Barn has four bays and a 40' x 70' footprint. K. and L. Bode Barn, ca. 1875, Nicollet Twp., Nicollet County (NL-NCT-008) (photo by Dan Pratt, 2005).



Figure 46. Unusual, complex bracing in the Homeyer Barn, ca. 1895. Havana Twp., Steele County (ST-HAV-032) (photo by Scott Kelly, 2007). (See also Figures 22-23 and 57.)

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Figure 47. In the Benike Barn, built ca. 1875, the wall plate at the top of the photo is let into the wall post rather than resting on top of it. Farther down on the post, the wooden pegs securing the mortise and tenon joint at the cross beam are clearly visible. The barn was built by members of the extended Benike family. The patriarch, Carl Ludwig Benike, was born near Brandenburg in northeastern Germany and worked as a cabinetmaker and carpenter before emigrating. Farmington Twp., Olmsted County (OL-FRM-020) (photo by Scott Kelly, 2008).

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Figure 48. Long members such as wall plates are typically made of two or three timbers joined together. This wall plate is made of lap-joined timbers. A. and L. Lehmann Barn, ca. 1919, Claremont Twp., Dodge County (DO-CLT-047) (photo by Scott Kelly, 2007).



Figure 49. Mortise and tenon joints connect wall girts to a long diagonal brace in the wall of a stable area. The walls of this stable have an inner lining of 6"-wide tongue-and-groove boards, seen above, installed beneath the exterior's 12"-wide board and batten siding. A. and L. Lehmann Barn, ca. 1919, Claremont Twp., Dodge County (DO-CLT-047) (photo by Scott Kelly, 2007).

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Figure 50. Multiple mortise and tenon joints at an interior bent. The cross beam at center right has cracked. A. and L. Lehmann Barn, ca. 1919, Claremont Twp., Dodge County (DO-CLT-047) (photo by Scott Kelly, 2007).

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Figure 51. Rare "gunstock" or jowled post. The posts are fashioned with a splayed top to support multiple beams coming together with complex joinery. Meyer Barn, ca. 1875, Courtland Twp., Nicollet County (NL-CTT-050) (photo by Dan Pratt, 2005).



Figure 52. Floor joists made of irregular timbers. Meyer Barn, ca. 1875, Courtland Twp., Nicollet County (NL-CTT-050) (photo by Dan Pratt, 2005).

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Figure 53. Roman numeral-like assembly or "marriage" marks. Each mortise and tenon set is custom-cut. Because the timbers are not interchangeable, each mortise and tenon pair is marked to make assembly of the barn more efficient. Dahms Barn, ca. 1895, Nicollet Twp., Nicollet County (NL-NCT-034) (photo by Scott Kelly, 2006).



Figure 54. Assembly mark in the Dunker Barn, built ca. 1900. Havana Twp., Steele County (ST-HAV-035) (photo by Dan Pratt, 2014). (See also Figure 31.)

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Figure 55. Well-crafted joinery and assembly marks in the A. and L. Lehmann Barn, built ca. 1919. Claremont Twp., Dodge County (DO-CLT-047) (photo by Dan Pratt, 2014).

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Figure 56. Unusual well-built ladder incorporated into an interior bent. The post is 8" x 10" in cross-section. This barn is beautifully crafted. Benike Barn, ca. 1875, Farmington Twp., Olmsted County (OL-FRM-020) (photo by Scott Kelly, 2008).

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Figure 57. Some barns retain an interior granary, often located near the horse stable and used to store oats. This well-built granary is suspended over the wagon drive in the Homeyer Barn, built ca. 1895. Note the granary's strong walls and sliding door. Havana Twp., Steele County (ST-HAV-032) (photo by Scott Kelly, 2007).



Figure 58. This barn has an original dovecote or pigeon loft, built above the wagon drive, that was used to trap pigeons for the supper table. The enclosed structure has roosting shelves and a small door (with vertical boards at right) to give the farmer access. The birds entered the loft via two small holes in the barn's exterior above the wagon door. Benike Barn, ca. 1875, Farmington Twp., Olmsted County (OL-FRM-020) (photo by Scott Kelly, 2008).

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Figure 59. The stables of a few of the barns retain mangers or pens built with staves made of tree branches. Bruns Barn, ca. 1890, Courtland Twp., Nicollet County (NL-CTT-058) (photo by Dan Pratt, 2005).



Figure 60. Box stalls for work horses in the Schwake Barn, built ca. 1900. Some box stalls were large enough that a working pair of horses was housed together. Havana Twp., Steele County (ST-HAV-038) (photo by Scott Kelly, 2007).

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Figure 61. Barns built later in the period often have stables with more windows than older barns. The walls of this well-preserved stable also have an inner lining of wood sheathing, visible between the windows. Beneath the windows, the lower part of the walls are built of concrete block. Feltmann Barn, ca. 1925, Young America Twp., Carver County (CR-YAT-004) (photo by Scott Kelly, 2008).



Figure 62. A few feet away from the wall pictured above is a cow row where dairy cows were stanchioned. The floor has rare wooden block paving. The metal posts are original; in many barns the metal posts replace earlier wooden posts. Feltmann Barn, ca. 1925, Young America Twp., Carver County (CR-YAT-004) (photo by Scott Kelly, 2008). (See also Figures 29-30 and 41.)

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Figure 63. In 19

manure gutters, s Figure 6atterations systems of the principal supports were built-up from long planks na states solid square timbers. Barns with plank frames and "stud" wa not included within the purview of the MPDF. Peterson Barn, Obuster (WA-AFROD40) (photo by Scott Kelly, 2009). Datafore Two

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