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United States Department of the Interior
National Park Service

National Register of Historic Places Multiple Property Documentation Form

This form is for use in documenting multiple property groups relating to one or several historic contexts. See instructions in *Guidelines for Completing National Register Forms* (National Register Bulletin 16). Complete each item by marking "x" in the appropriate box or by entering the requested information. For additional space use continuation sheets (Form 10-900-a). Type all entries.

A. Name of Multiple Property Listing

GRAIN MILLS IN INDIANA

B. Associated Historic Contexts

Grain Milling in Indiana 1730-1940

C. Geographical Data

The boundary of this context is the political boundary of the state of Indiana.

☐ See continuation sheet

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 Part 60 and the Secretary of the Interior's Standards for Planning and Evaluation.

John T. Castle — 7-23-90

Signature of certifying official — Date

Indiana Department of Natural Resources

State or Federal agency and bureau

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.

by Patrick Andrus — 12/7/90

Signature of the Keeper of the National Register — Date

E. Statement of Historic Contexts

Discuss each historic context listed in Section B.

One of the oldest industrial pursuits of man, grain milling, has made a significant contribution to the broad patterns of history in Indiana. The purpose of this study is to provide a historic context for a multiple property nomination related to the theme of grain milling in Indiana. The time is 1730 to 1940, which includes the earliest recorded French settlements to the end of the fifty year cut-off for eligibility for the National Register of Historic Places. Within this larger time frame, milling may be organized into three overlapping periods of significance: buhr mills-1730 to 1880, roller mills-1870 to 1940, and feed mills-1900 to 1940. The place is the entire state of Indiana, which covers a range of sites from small water powered gristmills to large consolidated mill complexes. The rise of the grain milling process from crude hand-held mortars to sophisticated modern mills has had an important and continuing effect upon the quality of life and economic well-being of Indiana residents.

Several generalizations have emerged from the research on grain mills in Indiana. First, until the early 1900s, Indiana's economic base was overwhelmingly agricultural. Most of the people were engaged in agriculture and raised a plentiful supply of wheat, corn, oats, and rye for the milling industry. Sixty-five percent of the population still lived in rural areas in 1900. Second, flour and grist milling ranked either first or second among the industries in the state in value of product measured according to the census, in every decade until 1920 when milling began to decline. However, milling continued to rank in the top twenty industries until 1940.[1] Third, the early grain milling industry was highly decentralized. There were over a thousand flour and grist mills in Indiana as early as 1840, a testimony to the significance of milling in the pioneer years.[2] The number of mills remained high until the twentieth century when larger mills became centralized in urban areas like Indianapolis, Evansville, and Vincennes. Small rural mills gradually closed because they were not able to compete, although many continued to serve local markets or converted to feed production. Finally, the number of flour and grist mills extant in Indiana from the period before 1900 is small and declining, although there are still some fine representatives. Three early mills are listed in the National Register of Historic Places: Adams Mill in Carroll County, Bonneyville Mill in Elkhart County, and John Wood's Mill in Lake County.

[X] See continuation sheet

E. Continuation sheet: Statement of historic contexts

Although the significance of grain milling is primarily industrial, it is impossible to separate milling from other themes that are interrelated and that have had a direct impact upon the development of milling in Indiana. Industrial significance is related to settlement in the early decades of migration to the state when the presence of a grain mill often influenced the location of new communities. The availability of corn and wheat influenced the number, size, location, and success of mills. The buying and selling of mill products locally, regionally, and nationally involved commerce on several levels, and both the early limits and subsequent improvements in transportation had a tremendous impact upon the milling industry throughout the period. It is useful to determine the influence of these themes on grain milling and their relationship to the evolution of the industry and related historic properties.

From a technical standpoint, grain-milling devices have developed along three main lines: pounding or impact crushing, pressing, and rubbing or shearing. The pounding and rubbing methods evolved directly into the buhr, roller, and hammer technology used during the period of the context and in milling today. The pounding method dates from the Old Stone Age and represents the oldest type of milling. Mortars have been found in Asia, Europe, Africa, and the North and South American continents where the Indians were the first millers. The first white settlers in Indiana also used the mortar as a stop-gap measure until a mill could be erected. The ancient pounding method is the ancestor of the modern hammer mill, which utilizes rotating arms to strike and crush grain for cattle feed.[3]

The rubbing or shearing type of grinding developed in the New Stone Age and involved a combination of shearing and pressure crushing. At first it was characterized by a reciprocating motion like the saddle stones used by the Egyptians. Later the Romans took the next step beyond the saddle stone when they developed the raised-center quern about the third century before Christ. The Romans used an upper and a lower stone but with a rotary rather than a reciprocating movement. Operators sat beside the mill and turned the upper stone round and round while they fed in the grain at the center. The grain traveled around and outward as it was reduced. During the Middle Ages querns were enlarged until they became the buhr stones that were the primary milling devices utilized into the twentieth century. An offshoot of the early Roman raised quern developed into the modern roller mill, which shears the wheat between two cylinders rotating at different speeds. The roller mill is still the standard technology used all over the world today.[4]

The milling methods of the ancient world changed very little for hundreds of years until the fifteenth century when windmills were first introduced in Europe. The waterwheel, which may have originated in Greece, represented another advance in the industry. European technology arrived in America in the

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seventeenth century with the early settlers. There is considerable controversy over the date and location of the first grain mills in America, but it is probable that the wind-driven post mills erected in coastal towns in the 1640s were the earliest. Other types of mills like water wheels, horse-driven and ox-driven mills came into use early in the colonial period, although water-powered mills were soon the most popular. As Europeans and Americans spread over the New World, they established mills as soon as possible after initial settlement, because the grinding of grain was so essential for survival.[5]

From the early 1730s, Indiana was a favorable stopping place for settlers travelling westward because of its rich natural resources. The rivers and their tributaries provided the major transportation routes for settlement and trade in Indiana for over one hundred years. The system of small rivers and streams that flowed into the Ohio provided drainage for the state, adequate water supplies, and water power for the grist mills and sawmills that served the growing population. (See Map 1.) The state also had numerous springs which could also be utilized to rotate mill wheels. Beck's Mill, built in 1808 in Washington County, is a good example of an early Hoosier mill driven by water from a spring. Most of the state was originally covered with dense hardwood forests, which provided the raw material for saw mills and ample wood for shelter, tools, and trade.[6]

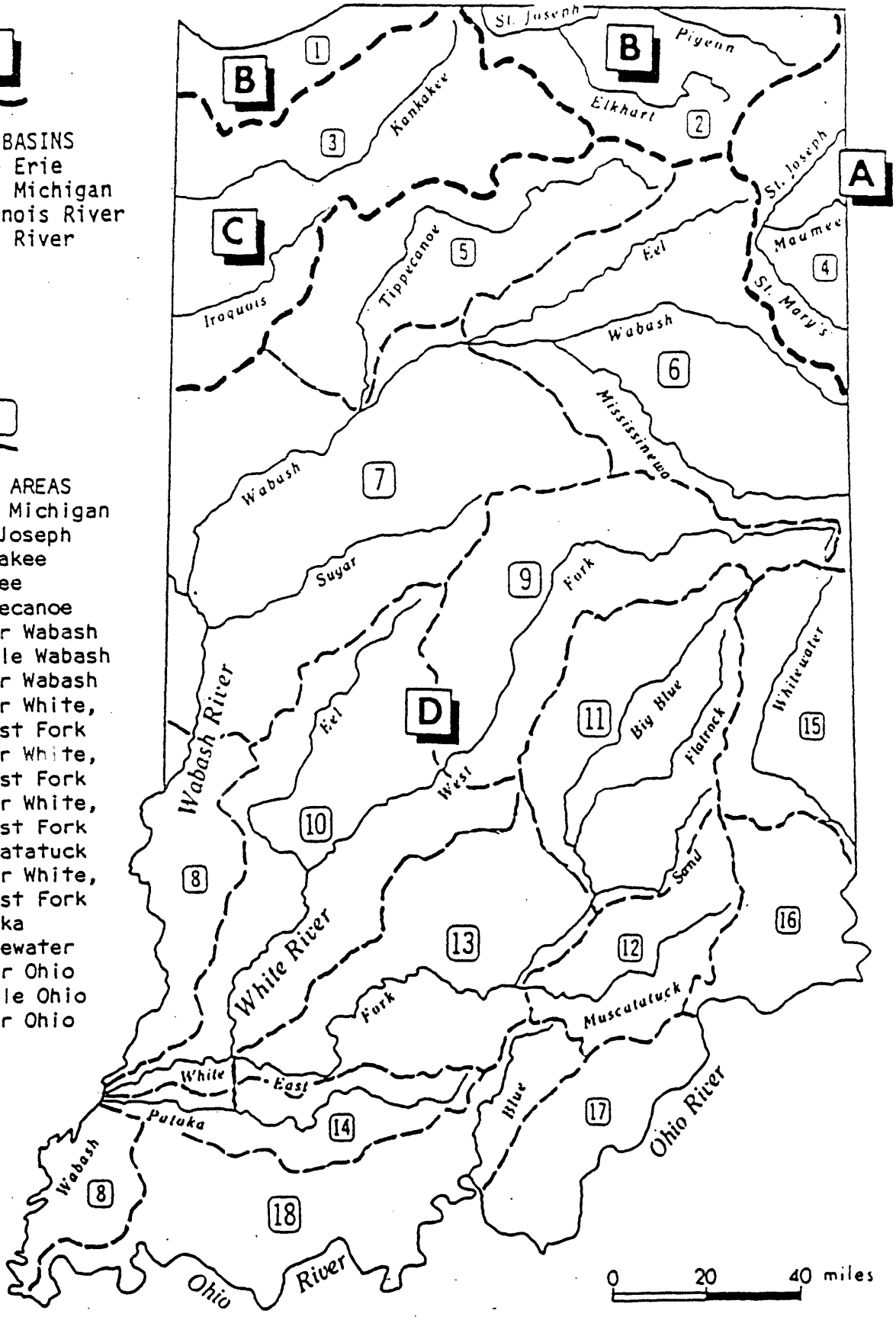
The fertile soil, especially in the northern two-thirds of the state, could support a rich agricultural economy dominated by the production of grains and livestock. The growing season averaged 120-150 days in most of Indiana and 200 days in the southwest without a killing frost. There were big yields of corn on the virgin land - sometimes as many as sixty to eighty bushels per acre in the early 1800s. After the soil had been cultivated for a few years, it often produced twenty to thirty bushels of soft red winter wheat per acre. Soft red winter wheat was preferred in Indiana and surrounding states until the 1850s. The flour was particularly suitable for bread and pastry. The harvest season in Indiana was mid-July for wheat, late July for oats, and October for corn. In the early days, farmers often left corn in the fields for stock and sowed winter wheat between the rows of standing corn. The harvest time was critical and lasted only two or three weeks. Farmers depended upon their own families for help, because hired hands were scarce and expensive.[7]

The earliest settlements in Indiana were outposts established in the seventeenth and early eighteenth centuries by the French missionaries, fur traders, and explorers who came down the waterways from New France, which is now Canada. By the 1750s, Anglo-American fur traders began to challenge French dominance, the French expanded their outposts into palisaded forts. New settlers invariably practiced self-sufficient agriculture, hand milling, and home manufactures based on the

Map 1

DRAINAGE BASINS
- A Lake Erie
- B Lake Michigan
- C Illinois River
- D Ohio River

WATERSHED AREAS
- 1 Lake Michigan
- 2 St. Joseph
- 3 Kankakee
- 4 Maumee
- 5 Tippecanoe
- 6 Upper Wabash
- 7 Middle Wabash
- 8 Lower Wabash
- 9 Upper White, West Fork
- 10 Lower White, West Fork
- 11 Upper White, East Fork
- 12 Muscatatuck
- 13 Lower White, East Fork
- 14 Patoka
- 15 Whitewater
- 16 Upper Ohio
- 17 Middle Ohio
- 18 Lower Ohio



Source: Robert Kingsbury, An Atlas of Indiana (Bloominton: Indiana University Foundation, 1970), p. 18.

E. Continuation sheet: Statement of historic contexts

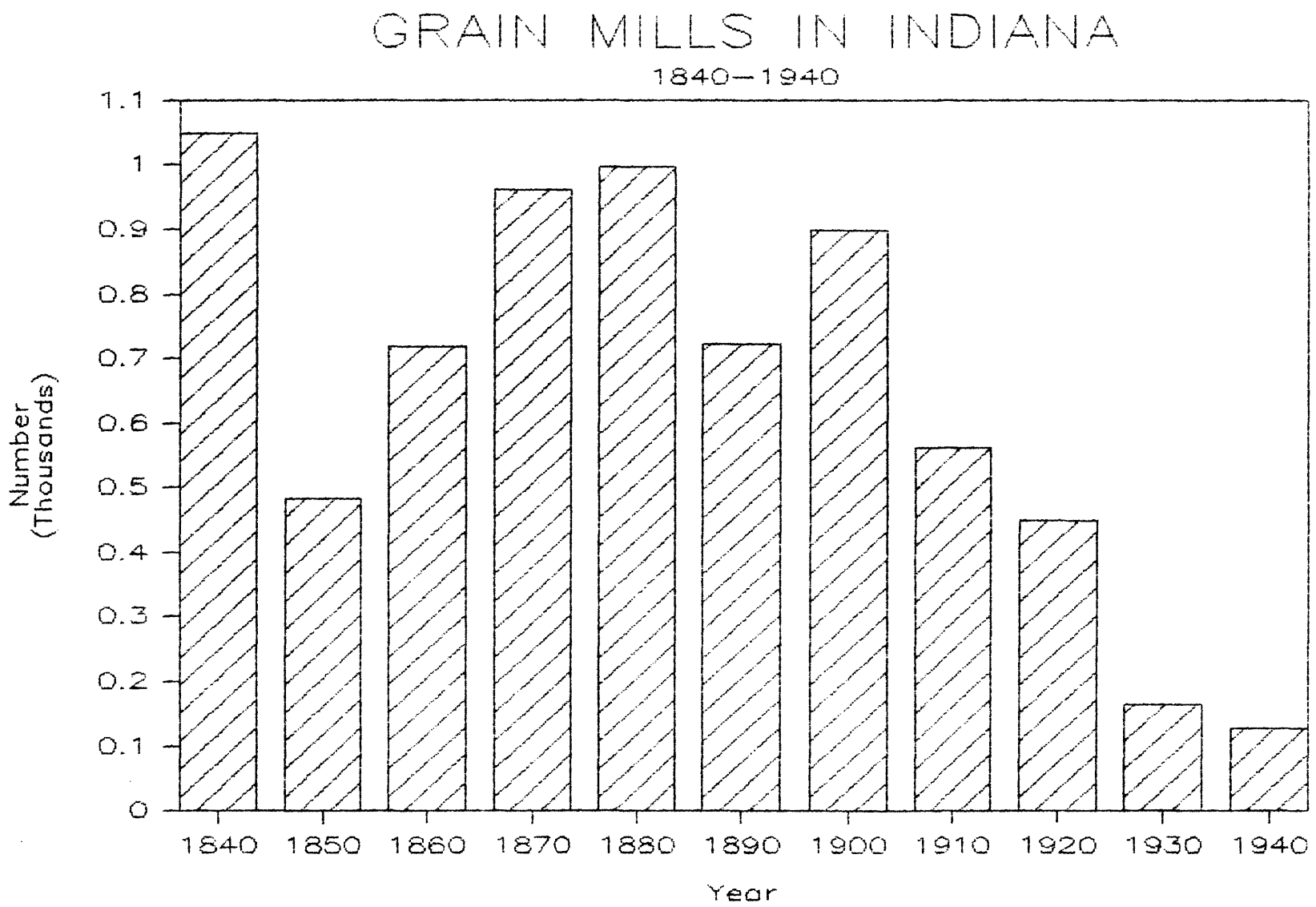
crops or natural resources provided the necessities in a culture centered on the fur trade.[8] However, power mills developed early in the area near Vincennes. The French constructed small water mills on streams. They also made use of the floating mill, a small flat-boat tied to the bank, its wheel turning slowly with the natural current running between the flat and a small pirogue anchored in the stream. Floating mills kept busy moving up and down the navigable waterways, tying up where business looked promising.[9] There are no floating mills extant, and there is little secondary material concerning them. However, early drawings confirm the use of floating mills. Fur traders bartered their small surplus locally or sent it down the Ohio with pelts to New Orleans on flatboats.

The period between 1763 and 1800 brought the end of French and English domination, and the establishment of United States control of the territory. The Land Ordinance of 1785 provided broad guidelines for the disposal of land in the West, and the Northwest Ordinance of 1787 established the basis of government in the Northwest Territory. However, until the Treaty of Greenville in 1795, the continuing Indian threat discouraged settlers.[10]

The settlement pattern of Indiana gradually moved northward from the Ohio River. A record number of settlers from the Upland South crossed the Ohio and located along the river valleys and buffalo traces of southern and central Indiana after 1800, encouraged by the liberalization of the land policy, the survey of government lands, and the opening of land offices. A scant 5,641 people lived in Indiana in 1800; by 1810, 24,520 had arrived. Another group of settlers from the Middle Atlantic states streamed into central Indiana from Cincinnati and the Miami Valley area after the War of 1812. Land purchases were handled by land offices established in Terre Haute and Brookville. By 1820, the population had risen to 147,176, representing the period of largest migration to the state. A network of small communities was in place by 1830.[11]

Settlers established these early communities along streams and rivers because of the water supply and ease of transportation. However, a favorable mill site, one with a sufficient flow of water year round, influenced the particular location of many towns, like Beck's Mill in Washington County, the Red Mills at Boggstown in Shelby County, and the Bridgeton Mill in Parke County. The mill became the nucleus of the community. Grist mills and flour mills, often with attached saw mills, brought the first relief from total subsistence living. The 1840 census recorded 1048 flour and grist mills in the state indicating their vital function. (See Graph 1.) The mills improved the quality of flour and corn meal produced and greatly increased efficiency. The early mills were toll mills. The farmer took his grain to the mill and, for a fixed toll, had his grain ground. The Indiana General Assembly declared that all

GRAPH 1.



Source: Census of Manufactures, 1840-1940.

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toll mills were public in 1810, and in 1818, legislators set the toll at one-eighth of the farmer's grain for grinding and bolting wheat or rye into flour, and for grinding Indian corn, oats, barley, and buckwheat.[12]

The millwright constructed the mill and placed the wheel where it could best capture the flow of water from the stream that provided the source of power. The position of the wheel in relation to the millhouse varied. Some millwrights placed the wheel outside next to the building; others put the wheel inside the mill. A few wheels transferred power by means of a series of pulleys from across the stream. The point where the water comes into contact with the wheel determines the general classification of the wheel: over the top (overshot), in the center (breastshot), underneath (undershot).[13]

Although water mills were preferred, when water power was unavailable, buhr mills mounted on wagons or horse mills replaced the simple hand mills used at home. Horse mills consisted of a simple shaft and pulley arrangement turned by a horse, (an ox, or even a dog,) that worked below the floor. There were horse mills as late as 1840 in some Indiana counties, and at many water mills, millers kept horses in reserve to power the buhr stones in case the water power failed. There are no remaining wagon or horse mills and information about them is limited. Hoosiers also built primitive tub mills that ran in a circular enclosure like a tub without a bottom. The upper millstone was directly attached to the shaft of the wheel.[14]

The first mill buildings were usually horse or water powered buhr mills constructed of round logs or hewn wood cut from the surrounding forests. The early millhouses resembled barns with windows to provide for adequate lighting. The milling process required simple technology and performed three functions. First, the wheat or corn was cleaned of dirt and chaff; then the clean grain was ground. Finally, the ground product was bolted or sifted to separate the flour from the coarser, unground particles. All three processes were usually included at the mill. However, in some locations, the farmer cleaned and bolted his own grain, and depended upon the mill only for the grinding. The millstones (a matched pair or run of stone) were the heart of the old grist mills. Sometimes the stones came from a nearby quarry, but in a surprising number of cases the millers brought imported stones from France with them when they migrated from the East. This was not a small feat, as some of the stones weighed over 2500 pounds. The size of the mill building and the mill's capacity was determined by how many run of stone it had.[15]

The miller was an important man in the community. He had to have a good knowledge of woodworking and brick and stone masonry, as well as mechanical, civil, and hydraulic engineering. In the absence of a trained millwright, the miller built his own mill, operated it, and took care of the constant upkeep. The miller also had to be a businessman, because his mill usually

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provided many services other than grain milling. Millers often added carding mills, cider mills, distilleries, and ice houses. The ice house stored ice cut from the mill pond or waterway adjacent to the mill. Many millers sold groceries and other necessities.

Mills often served as a community, commercial, and social center for farmers and their families who sometimes lived many miles away. The U. S. Postal Service opened offices at many of these mills, and after the dam and mill race were completed, it was easy to attach a saw mill. Many farmers utilized the mill as a merchant mill that bought and sold their grain. A trip to the mill might mean a week away from home as the farmer waited in line for his grain to be ground during the peak season. The mill became a clearing house for the news of the day for isolated, small farmers and townspeople alike. Customers posted notices of all kinds at the mill, and it was here that they debated political and religious questions and exchanged the news of the neighborhood.[16]

New Orleans was the primary destination of the Indiana grain trade in the early decades of the nineteenth century. Flatboats floated down the Muskingham, Miami, White, and Wabash Rivers to the Ohio, connecting the state to regional and national markets. By the 1820s, there were sixty-seven steamboats operating on the Ohio River; many flatboats from the smaller Indiana rivers transferred their cargo to steamboats when they reached the big river. Flour and grist mills were often the center of the small industrial complexes that developed close to convenient flatboat landings along the rivers and streams.[17]

Milling technology had remained relatively unchanged since the fifteenth century until Oliver Evans, a young American inventor and engineer, devised the first automatic flour mill in Delaware in 1785. Although the impact of his invention was not felt until the 1840s, it eventually revolutionized the milling industry. Before that time grinding grain and processing flour and meal had been a slow and tedious task. A sack hoist raised the wheat to the top of the mill, from which the grain went through the three-process system of cleaning, grinding, and bolting by means of gravity. Inspired by the Industrial Revolution in England and the potential of steam power, Evans combined several mechanical principles, applied them to milling, and produced a mill that utilized mechanical power from start to finish. The elevator, an endless belt with buckets, lifted the grain from the ground floor to the attic. Gravity fed the grain back down from floor to floor. A conveyor belt moved grain from one machine to another, and a "hopper boy" spread the flour for cooling. The automatic process cut the labor force in half. Evans also improved the manufacture of millstones, thus eliminating the need to import the more expensive French buhrs.[18]

Evans successfully demonstrated his mechanical flour mill in Brandywine Creek, Delaware. His mill produced 100,000 bushels

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annually with only six employees whose primary job was to close barrels. However, even though Evans proved that output could be increased, most mills remained small and operated only during and immediately after the harvest season.[19] Evans wrote two books, The Young Millwright and The Miller's Guide to show others how to build his automatic mill, but his ideas had little effect upon American milling for many years. American millers were skeptical and resisted the new methods. Indiana millers, like their counterparts in agriculture, were especially inclined to cling to the old ways. Acceptance of Evans' ideas depended upon the growth of a more theoretical disposition among millers who resisted the sophisticated engineering technology. In addition, automatic milling machinery was expensive and required more capital investment than most small millers could afford. By the time Evans died in 1819, many of his ideas had been adopted. However, automatic mills did not become widespread until 1843 when Joseph Dort of Rochester, New York, revived Evans' concept and invented a grain raising process for storage in grain elevators. Giving Evans full credit for the idea, Dort solved the problem of loading huge wheat supplies by developing a steam-powered mechanism to raise grain for storage automatically.[20] Steam mills achieved an economy of scale that permitted them to produce large amounts of meal and flour and to undersell the small, traditional buhr mills. However, in order to succeed, these mills required access to sufficient fuel, reliable transportation, and sizeable markets.

In Indiana, steam power elevated a few progressive urban industrial enterprises beyond the pioneer stage as early as 1818 when a steam mill was constructed in Vincennes.[21] Steam allowed large quantities of steady, cheap power to be centered in one place enabling a mill to function year round. Indianapolis, Madison, and Fort Wayne all built early steam powered mills. Led by Nicholas McCarty, ambitious Indianapolis merchants built the Indianapolis Steam Mill Company in the early 1830s. The three-story building contained enough steam boilers to provide power for a grist mill, a steam mill, and a wool carding mill under one roof. Poor transportation and inadequate markets ended the project. However, the popularity of steam power grew in the 1840s and 1850s, especially in towns such as Evansville, Terre Haute, and Indianapolis with transportation connections to the coal fields of southwestern Indiana.[22]

Transportation developments hastened the settlement of the northern counties of Indiana and connected the milling industry with distant markets. Connections to the East promoted the growth of the milling industry and soon the Midwest became a granary for the eastern seaboard. The National Road, begun in Maryland in 1811, stretched across the middle of Indiana from Indianapolis to Terre Haute by the mid-1830s. The Michigan Road, which linked Indianapolis to the northern part of the state, was completed by 1840. The construction of canals prompted the

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building of numerous mills as evidenced by the number of requests for lease agreements from millers to the superintendent of the Wabash and Erie Canal.[23] The canals provided a steady source of water power and a convenient water route for millers to ship their surplus products. The Whitewater Canal, completed in Southwestern Indiana in 1846, enhanced the development of the small towns of Connersville, Brookville, and Lawrenceburg. The Wabash and Erie Canal, which covered 468 miles and became the longest canal in the country, linked Lafayette to Terre Haute in the 1840s and to Evansville in 1853.[24]

The tremendous expansion of the railroad overshadowed other means of commercial transportation in the 1850s. Railroad lines from the East strengthened Indiana's interregional connections by the late 1840s, and by the 1850s, the railroad network spread over much of the state, especially in the central and northern sections where two-thirds of the new lines were located. The advances in railroad transportation promoted an interdependent economy and provided access to new sources of energy and raw materials. Railroads connected urban centers and broke down the isolation and protected markets of small local mills.[25]

In the late 1840s, a group of millwrights and their families migrated to Indiana from as far away as Virginia and North Carolina. Among them were the Nordyke and Marmon families whose milling machinery earned a world-wide reputation for many generations. Nordyke and Marmon established their first factory in Richmond in 1851. Then in the late nineteenth century, the company moved its entire operation to Indianapolis. Nordyke and Marmon knew that the critical elements necessary for success in the manufacture of milling machinery were present in the Hoosier state. First, the fertile soil in Indiana and the surrounding states was producing record crops of corn and wheat. The transportation improvements required for the widespread marketing of their milling products were at last coming to Indiana and the midwest. Finally, nearby coal deposits could supply power for their factories.[26]

By mid-century, the milling industry in Indiana operated on two levels. On one level, a few large, centralized steam mills emerged in the towns with access to cheap steam power and convenient transportation that enabled them to send flour and grist mill products to regional, national, and international markets. Indianapolis, Evansville, Terre Haute, and Vincennes all had larger mills and became centers of soft winter wheat flour production. Madison, on the Ohio River, claimed one of the largest flour mills in the West. Central and northern mills shipped their products to the East by rail or via the Great Lakes. Southern Indiana mills continued to use the Ohio River route toward the South interrupted only by the Civil War, after which commercial river traffic resumed. On a second level, most of the milling industry in the state remained highly decentralized and consisted of hundreds of small, locally owned

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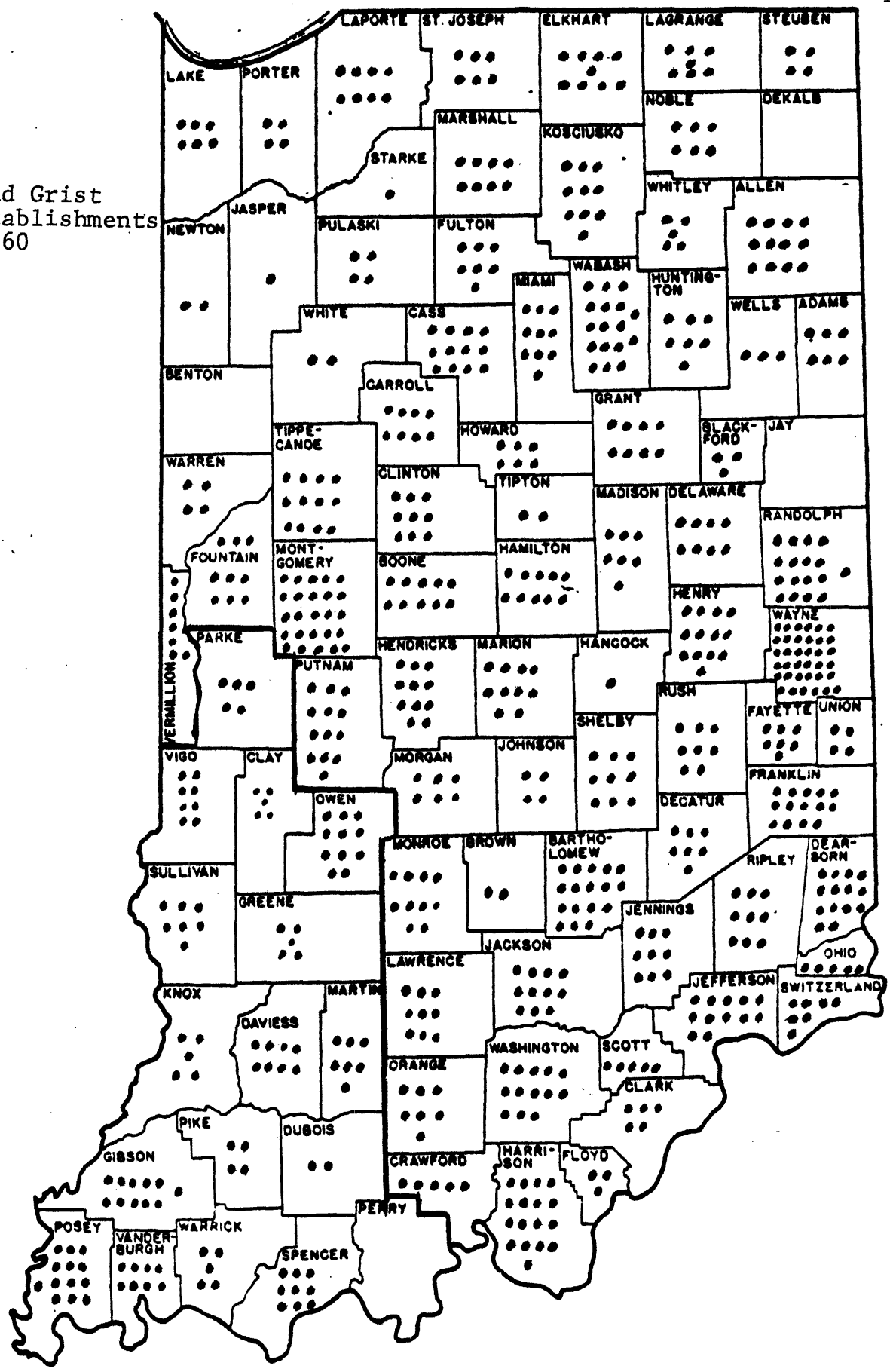
mills. They required simple technology and flourished in almost every community in Indiana. (See Flour and Grist Mill Establishments, 1860.) Some early toll mills had been replaced by exchange mills, which gave the farmer a fixed amount of flour or corn meal for each bushel he brought rather than the identical amount of wheat or corn. Other mills acted as merchant mills through which the farmers' grain was sold to larger urban mills, although most continued to do custom grinding for the neighborhood.[27]

In general, industry and milling have not been widely researched. Secondary sources linking industry to demographics are surprisingly few in number. Also, the effect of urbanization upon the centralization of the milling industry needs to be researched in much greater detail. Census statistics do not always measure the same aspects of the grain milling industry in every decade; comparisons may result in misleading conclusions. Although the number of flour and grist mills generally increased until 1880 and declined thereafter, a look at Graph 1 demonstrates that one must carefully analyze the way each census counted the mills.

The turbine began to replace the vertical water wheel in American flour mills in the 1830s and 1840s. The metal turbine, a horizontal wheel that required no gearing, replaced the earlier wooden tub wheel. The force of the water outside of the wheel turned the turbine. There were fewer maintenance problems with the turbine than with the water wheel and it seldom froze in the cold weather. A Frenchman, Benoit Fourneyman, devised the first efficient turbine in France in 1827. (His eighty-seven percent efficiency rate is a successful result even today). The trend toward the use of turbines reached Indiana at mid-century, when many millers used them to replace water wheels. Years later, millers often harnessed the excess power of mill turbines to generate and transmit electricity for surrounding farms, homes and businesses in the state until the power companies and the rural electrification projects took over. James Leffel of Ohio was the premier manufacturer of turbine mills in the United States and he sold to many millers in Indiana. In his catalogues, Leffel offered a wide variety of turbines. He encouraged millers to communicate their particular needs to him. Leffel then made every effort to tailor the turbines to the specific mill.[28]

The heart of grain production in the United States moved gradually westward from the Atlantic coast to the Rocky Mountains as pioneers settled and cultivated the vast open lands. Indiana and the states of the Old Northwest became an important part of the national granary by the 1840s. In every decade from 1840 to 1900, Indiana ranked between fourth and seventh in the nation in corn production. In the same sixty year period, the state ranked between second and seventh in wheat production, recording peak yields in 1860 and 1880.[29] Large-scale milling tended to follow

Flour and Grist
Mill Establishments
1860



George Davis King, The Industrialization of Indiana, 1860-1920 (Bloomington: Indiana University, 1963)

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the westward movement of the grain supply. However, Indiana cities did not develop as important regional milling centers. Nearby Cincinnati, Chicago, and St. Louis grew into huge flour and grain markets.

After the 1870s, the important wheat growing areas shifted to the Great Plains of the Trans-Mississippi West signaling the rise of milling in the hard winter wheat area. Minneapolis and later Kansas City became the foremost milling centers in the country. Mennonites introduced new varieties of wheat such as "Turkey Red," a hard red winter wheat to Kansas. Settlers found the harder wheat more adaptable to the soil and climate. Before the 1880s, American farmers, millers, and bakers preferred soft winter wheats, the staple of the oldest areas of the country, including Indiana. Later the milling process improved to grind the new hard wheats. With their better supply of proteins, the hard wheats supplanted the Midwest's soft wheat in popularity, although the Midwest continued to produce large portion of the nation's wheat crop. Millstones were slow and did not process hard wheat as effectively as soft wheat. This created a need to find efficient ways to process the hard-grain spring wheat of the northern and western prairies. The result was a series of innovations, some borrowed from Hungarians and other European millers, others invented at home.[30]

There had been few significant changes in milling machines and methods between the invention of Oliver Evans' automatic mill in the 1790s and the advent of the New Process in the late 1860s. Purification of the flour lagged substantially behind the grinding art. Before 1870, milling was done by simple machines that basically cleaned the grain, ground it between stone buhrs, and bolted it once. Revolutionary innovations in milling came in the 1870s and 1880s that are still in use in modern milling today: the New Process purification, the LaCroix gradual reduction method, and the Hungarian roller milling process.

The middlings purifier was the key to the New Process. It provided a solution to the problem of the middlings or coarse bits of grain that remained after the first bolting or sifting. Although the purifying process had been developed in Austria and Hungary in the early 1800s, two French Canadian engineers, Edmund and Nicholas LaCroix, perfected the process. The brothers came from Montreal to install an experimental middlings purifier at the huge Washburn Mills in Minneapolis in 1865. In the New Process, the middlings were graded in a moving sieve and subjected to an air blast for purifying. Then the clean middlings were reground, producing a purer flour that enabled millers to grind the hard winter wheat efficiently. The new five-step milling produced better flour and the New Process gained widespread popularity.[31]

Minneapolis became the experimental center for American milling in the late nineteenth century. Spurred by the success of the middlings purifier, a committee of Minneapolis millers

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went to Europe in 1873 to investigate French, German, and Hungarian mills. The committee learned that European millers had abandoned the millstone for the roller. The idea of two cylinders rolling against each other at different speeds had been developed in Hungary in 1839. The chilled iron rollers with numerous spiral grooves and ridges on their exterior surfaces, ground the grain as it passed between them. The millers could set the space between the rollers with great accuracy, opening the kernels of grain without crushing them. Through the gradual reduction process, the grain was cleaned, dampened, blended, broken, sifted several times, purified, reduced, and graded into various flours by machinery that moved the grain from one device to another with great efficiency. The millers could produce larger proportions of better-grade flours with the rollers, and the process was much better adapted to large enterprises than the old millstones. The visiting American millers ordered thirty-six pairs of rollers to try in their mills.[32]

The improvements adopted in the large Minnesota mills revolutionized the milling industry and caused a boom in mill construction in the latter nineteenth century. The use of rollers, and the purifying and gradual reduction processes spread quickly throughout the United States. Those Indiana millers who could afford it abandoned their buhr stones and rebuilt their old mills to accommodate rollers or built new mills to house them. The new mills looked less like the old millhouses and took on a more factory-like appearance as they were adapted for the new machinery. Mansfield Mill in Parke County, is a good example of the changes that were going on all over Indiana. Jacob Rohm installed the machinery in his newly rebuilt mill in 1884, although he kept the buhrs in reserve in case the rollers failed. Other mills in the county followed suit. Most of the mills that still remain in the state were built as roller mills or were converted in the 1880s or later. Many millers kept their buhr stones for backup or continued to use them for corn processing, but the mill operated entirely with millstones passed from the Hoosier scene.[33]

Before 1880, there were still some advantages for small mills, over 900 of them, located in the heart of the grain-growing regions of Indiana. The state was one of the largest corn and wheat producers in the nation. Small mills could get the choicest local wheat at the lowest prices, and when machinery and processes were simple, the large mill had no particular advantage. Buying and selling on the local market, small millers were not exposed to national price fluctuations like the large millers. However, after the revolution of milling technology, the situation changed. The availability of capital, the economy of construction and operation, better management techniques, and wider markets independent of local fluctuations gave the advantage to the centralized urban mills. To make a full roller mill pay in the 1880s, the mill had to produce over 125 barrels a

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day.[34] Only a few successful Hoosier millers were able to install enough stands of rollers and produce enough volume to remain profitable. The number of flour and grist mills in Indiana gradually declined from a post-Civil War high of 996 in 1880 to 563 in 1910 to 126 in 1940, reflecting the trend away from small local mills toward centralization.[35] (See Graph 1.) In Indiana, the larger mills were located in Marion, Knox, Vanderburgh, and Posey Counties where they not only ground wheat and corn, but also produced related products like hominy and grits.[36]

Many small millers who could not afford to expand or rebuild were gradually squeezed out. Some went to the "short system," or three breaks and five reductions rather than the full gradual reduction method, although this practice ended by 1890, because the quality of flour was poor. Some community mills located along small rivers and streams were washed out as a result of the erosion caused by deforestation in the latter years of the nineteenth century. Other millers sold their millstones or used them for custom grinding and bought relatively inexpensive attrition mills that did not grind grain fine enough for flour, but produced feed for livestock. The hammer mill, a later mill for grinding cattle-feed, that developed around the turn of the century, derived from the ancient impact crushing process. It enabled millers to enlarge feed mill operations and allowed numerous small mills to stay open. Millers often built additions to their older mills to house the more lucrative feed grinding. The Wiese Mill at Bridgeton in Parke County is a good example.

In the early twentieth century, feed mills developed in three ways: independent houses, line elevators (several elevators located along railroad tracks owned by one miller who had a seat of the Grain Exchange), and farmers' elevators. As the agricultural economy turned sour after World War I, farmers organized cooperatives in many counties as a reaction to the high prices of the line elevators and to provide a more efficient and profitable outlet for their grain and agricultural products. By 1920, the Indiana Federation of Farmers' Associations, later called the Indiana Farm Bureau, officially affiliated with the new National Federation of Farm Bureaus. The Indiana Farm Bureau lobbied in the state legislature for farmers' interests and promoted cooperative marketing of farm products and purchasing of farm supplies.[37] Indiana Farm Bureau cooperatives can still be found in virtually every county in Indiana with their cluster of storage elevators, and the feed mill with its characteristic tall square tower.

Among the potential research topics related to feed milling in Indiana are cooperative milling, line elevators, and the effect of a depressed economy upon milling. Virtually no secondary sources exist for feed mills and few for cooperatives

E. Continuation sheet: Statement of historic contexts

and line elevators. Of value would be studies linking these topics to the larger economic conditions of the period.

The growth of the milling industry after 1890 did not involve any major changes in the technology of milling, only refinements. The later changes in the industry were due to the interplay of several factors: cheap power, abundant and superior raw materials, developments in the marketing and transportation, and the modern business organization of the industry. In Indiana, large milling establishments developed in urban settings like Indianapolis, Vincennes, and Evansville, where sources of cheap power and the convergence of railroad lines made high-volume operation possible. Efficient transportation networks brought the finest wheat from expanded grain growing regions to the mills and carried the finished product to local, regional, and national markets. When the First World War began, domestic and foreign demands for American agricultural products skyrocketed boosting the flour milling industry. However, in the aftermath of the war, farmers were plunged into a long depression that resulted in lower wheat production and higher flour prices. Small local mills closed at an increasing rate, and by the 1920s, a few large milling centers were producing the bulk of wheat flour in the state.[38]

During the first 170 years of the state's history practically every community in Indiana had its own mill grinding one or more different kinds of grain. However, during the first forty years of the twentieth century, the flour milling part of the industry became more concentrated in large urban centers. Many small neighborhood flour mills were forced to close. A few local mills continued to grind wheat on a custom basis, and often added feed mill operations. Farm Bureau cooperatives, with their multiple services, thrived. The milling industry in Indiana merely reflected the trends of the larger society, which was changing from a rural/agrarian society to an urban/industrial one. In 1880, the transition was just beginning in Indiana. By 1940, because of the manufacture of steel in the Calumet region, Indiana was one of the most highly industrialized areas of the world.

E. Continuation sheet: Statement of historic contexts

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12. Eileen Ross Emison, The Emison Mills, Vincennes, 1939, p. 5, Record Group 52198, Indiana State Library, 140 North Senate Street, Indianapolis, Indiana.

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E. Continuation sheet: Statement of historic contexts

14. George Branson, "Early Flour Mills in Indiana," Indiana Magazine of History 22 (1926): 21.

15. Apps and Strang, Mills of Wisconsin and the Midwest, p. 55.

16. John Storck and Walter Dorwin Teague, Flour for Man's Bread (Minneapolis: University of Minnesota Press, 1952), p. 156; Apps and Strang, Mills of Wisconsin, pp. 13, 48; Interview with Robert Wiese, Mill Owner, Bridgeton, Indiana, 21 September 1889.

17. Clark, The Grain Trade in the Old Northwest, p. 24.

18. Alfred D. Chandler, Jr., The Visible Hand (Cambridge: The Belknap Press of Harvard University, 1977), pp. 25-253; Apps and Strang, Mills of Wisconsin, p. 60; Storck and Teague, Flour for Man's Bread, pp. 159-172; Kuhlmann, The Development of the Flour-Milling Industry, pp. 96-99.

19. Chandler, The Visible Hand, p. 55.

20. Kuhlmann, The Development of the Flour-Milling Industry, p. 99; Storck and Teague, Flour for Man's Bread, pp. 150, 180.

21. Interview with Richard Day, Curator, Old French House, Old Northwest Corporation, Vincennes, Indiana, 2 November 1987.

22. James H. Madison, The Indiana Way (Bloomington: Indiana University Press, 1986), p. 91-92.

23. William Reser Collection, File Number L358, Indiana State Library, 140 North Senate, Indianapolis, Indiana.

24. Madison, The Indiana Way, pp. 82-86.

25. Ibid., pp. 82-86; Storck and Teague, Flour for Man's Bread, p. 184.

26. Storck and Teague, Flour for Man's Bread, pp. 20-25; Nordyke and Marmon Company: An Institution, 1920, pp. 5-9.

27. Kulhmann, The Growth of the Flour-Milling Industry, p. 194; Emma Lou Thornbrough, Indiana in the Civil War Era 1850-1880 (Indianapolis: Indiana Historical Bureau and Indiana Historical Society, 1965), p. 411.

28. Apps and Strang, Mills of Wisconsin and the Midwest, pp. 12, 23; Storck and Teague, Flour for Man's Bread, p. 113.

E. Continuation sheet: Statement of historic contexts

29. U. S. Department of the Interior, Tenth Census of the United States, 1880, Agriculture, Part II, 91; Twelfth Census of the United States, 1900, Agriculture, II, 84-85; Thirteenth Census of the United States, 1910, Agriculture, I, 583: Sixteenth Census of the United States, 1940, Agriculture, III, 737-738.

30. Chandler, The Visible Hand, p. 251; Clark, The Grain Trade in the Old Northwest, pp. 3-4; Kuhlmann, The Development of the Flour-Milling Industry, pp. 7, 11, 14, 27, 243.

31. Kuhlmann, The Development of the Flour-Milling Industry, pp. 12-17; Storck and Teague, Flour for Man's Bread, pp. 32-34.

32. Ibid., pp. 37-40.

33. Branson, "Early Flour Mills in Indiana," p. 5.

34. Storck and Teague, Flour for Man's Bread, p. 267.

35. U. S. Department of the Interior, Tenth Census of the United States, Manufactures, II; Thirteenth Census of the United States, Manufactures, VIII; Sixteenth Census of the United States, Manufactures.

36. Fourteenth Census of Manufactures, Vol. IX, 1919 (Washington: Government Printing Office, 1923), 392.

37. Phillips, Indiana in Transition, p. 31.

38. United States Department of Commerce, Bureau of the Census, Federal Trade Commission, Letter of Transmittal. Washington: United States Printing Office, 1920.

F. Associated Property Types

I. Name of Property Type Buhr Mills

II. Description

From the times of earliest European settlement in Indiana (circa 1730) through the adoption of the roller process (circa 1873), Hoosiers used buhr mills to grind grains, such as wheat, corn, rye, and oats. Buhr mill buildings sheltered the buhr stones, two horizontal stones that ground grain through the rotation of a moving upper runner stone over a lower stationary bed stone. The first buhr mills in Indiana were rather simple industrial operations powered by man and beast. However, the

III. Significance

In Indiana, buhr mills draw their primary significance from the area of industry, but settlement, commerce, agriculture, and transportation contributed directly to the development of milling. So important was this industry to the life and livelihood of a community that people often named settlements, towns, creeks, and roads in terms of the local milling activity.

IV. Registration Requirements

In order to be listed in the National Register, a buhr mill must possess significance and meet most of the criteria for integrity as specified in Bulletin 16. The criteria for integrity are setting, location, design, workmanship, materials, feeling, and association. Industrial properties such as buhr mills are often modified over time to conform to technological and market changes. Such alterations may not detract from their integrity. As a rule of thumb, a buhr mill must still retain those elements of integrity that clearly convey its historical industrial function in order to be listed in the National Register.

[X] See continuation sheet

[X] See continuation sheet for additional property types

G. Summary of Identification and Evaluation Methods

Discuss the methods used in developing the multiple property listing.

The multiple-property nomination, "Grain Mills in Indiana," is based upon research conducted in primary and secondary sources. The research proceeded systematically and logically from the general to the particular. Secondary published sources ranged from comprehensive studies of the United States, Indiana, and its counties to texts concerning industrial and business history, especially those dealing with milling. From the general research, Nolan and Weintraut identified industry as the primary historic context. They designated the political boundaries of Indiana as the place and 1730-1940 as the historic period of significance for the nomination.

[X] See continuation sheet

H. Major Bibliographical References

[X] See continuation sheet

Primary location of additional documentation:

- [X] State historic preservation office
- [ ] Other State agency
- [ ] Federal agency
- [ ] Local government
- [ ] University
- [X] Other

Specify repository: Indiana Historical Society and Indiana State Library
Indiana Historic Sites and Structures Inventory

I. Form Prepared By

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growing demand for meal and flour encouraged millers to add more runs of stone and to utilize water and steam power. Because most buhr mills used water power, the mill pond, mill dam, head race, and tail race formed an important part of the mill site. After the middle of the nineteenth century, the milling industry began to centralize, which resulted in a gradual winnowing of some of the smaller, less efficient milling operations, especially those that used animals for power.[1] Even though many millers began to use rollers instead of stones for quality flour production after 1873, some continued stone grinding for the local populace into the twentieth century.

While many buhr mills were located in dedicated buildings, others were mounted on wagons and boats for mobility or located on the farm. Before a millwright erected a mill building for a community, traveling millers brought the stones to individual farms on wagons. Floating mills located on boats, utilized water power to grind the grain. This description written in 1848 illustrates the operation of one floating mill.

> The mill was erected on two boats; one of them five, the other ten feet wide and forty-five feet long. The smaller one was made of the trunk of a large hollow sycamore tree, and the larger, of timber and plank, like a flat boat. They were placed eight feet apart, and fastened firmly together by beams, running across the boats. The smaller boat on the outside supported one end of the shaft of the water wheel and the larger boat the other, in which was placed the mill stones and running gear, covered with a tight frame building or mill house, for the protection of the grain and meal, and the comfort of the miller. The space between the boats was covered with planks, forming a deck, fore and aft of the water wheel. It was turned by the natural current of the water and was put in motion, or cheeked [sic] by pulling up or pushing down a set of boards, similar to a gate, in front of the wheel.[2]

As late as the 1860s, "horse mills" on farms utilized horses, oxen, and even dogs to turn the runner stone. These horse mills ground quite slowly, yet represented labor savings over hand grinding.[3]

Nearly without exception, millwrights built mills upon solid rock where a road intersected with a source of water. Patrons sometimes traveled the waterway to the mill, but the more likely route was overland. A bridge usually spanned the stream or river near the mill to provide dry passage. The reliance of most mills on water for motive power determined location. Water sources included rivers, streams (especially spring fed streams,) springs, and after 1832, canals. There were a few good milling streams in Indiana, classified so because the drop in elevation provided a

sufficient head for reliable generation of power. One of the most notable examples was the Flat Rock River. If the river did not provide sufficient drop in elevation, millers dammed it. Millwrights built mills on solid rock to provide the structural stability to withstand erosion, floods, and the vibrations of the machinery.[4]

The changes in mill buildings over time corresponded to the evolving functions of the mill. The first mills in remote areas, especially pre-1820, probably resembled any of the other log buildings of the settlers. Reports indicate that they were small, perhaps not more than fifteen feet square. The owners constructed shed additions as more space was needed. As settlers cleared more land and the yields of crops increased, mills ground more grain.[5] After 1820, to accommodate the increase in activity, millwrights built larger mills of local materials that closely resembled barns with windows. These new mills were usually two or two and a half stories in height, and were clad with yellow popular clapboard. Some were of stone and brick construction. The roof form was predominately gable. Millwrights installed wide service doors on each floor in the center of one gable end. Because of the flammability of grain dust, millers preferred natural interior lighting to candles, torches, or kerosene lamps; buildings were usually three by four or three by three ranked, with six over six windows to admit sunlight.[6]

The millwright designed the interior to serve an industrial function. To withstand both seasonal floods and constant vibrations of the working machinery, the foundation was thick and made of rock. Posts supported the rectangularly shaped interior. In constructing mills illuminated by natural lighting, millwrights rarely used interior walls, so that light reached even the center area. Even at that, the center sections received less light; there millwrights installed wooden legs to move grain between floors.

The size of the mill depended directly on the capacity and the tangential functions that occurred within it. Mills that carded wool, wove fabric, sawed lumber, crafted wheels, made cider, or distilled whiskey housed those functions sometimes in the mill or in an adjoining shed. In simple mills, the miller installed only one or two runs of stone and a hand operated bolter. However, in the "better mills," stones, scales, sacking machinery, and an office occupied the first floor. On the second floor the miller placed separating machinery, and used the third floor for storage.[7]

Before 1850, most buhr mills in Indiana utilized water as motive power.[8] Water flowed over a dam through the race under the mill and exited back into the stream. At times an elevated wooden flume brought the water to the wheel. The dams of log mills were often little better than a beaver's dam, with logs, stones, and brush laid across the river or stream, while later ones were more permanently constructed of hewn timber or rocks. Long strips of

lumber called guards prevented debris in the river from entering the race and damaging the wheel. A partition with a movable wicket halted the flow of the water into the race when it was not needed. The area between the partition and the guards is known as the forebay or head race; the water beyond the partition as the tail race; and the stream above the dam as the mill pond or bay.[9]

Prior to the invention of the hydraulic turbine in 1844, most millwrights constructed vertical water wheels to power the mill. A water wheel, commonly placed outside the mill along one side, was connected to a shaft that ran into the mill and turned the runner stone. Some millwrights installed the waterwheel within the floor of the mill. The wheels themselves ranged in size from three to thirteen feet in width and from eight to twenty feet in diameter, and were typically made of the yellow popular found in the surrounding forest. The pit in which the wheel sat was known as a wheel pit and the covering over it, if it was covered, was called a wheel house.[10]

Vertical water wheels in Indiana included the undershot, the breast shot, the overshot, and the pitchback. Millers used the undershot wheel on floating mills; the current of a river or stream turned the wheel as the paddles dipped into the water. Millwrights built undershot wheels at mills located beside a running stream or close to a falls where the construction of a dam was not feasible. A breast shot wheel was one that received its water halfway between the top and the bottom of the wheel; the weight of the water forced the wheel to turn. The overshot wheel received water slightly forward of top of the wheel and then the weight of the water entered buckets on the wheel that in turn propelled the wheel downward. This type was the most efficient of all the water wheels, but it could not be used during periods of high water or flooding. The pitchback water wheel operated much like the breast wheel, using the weight of the water to power it, but unlike the breast wheel, water entered the buckets at the top of the wheel, powering it backward. This wheel turned in the opposite direction as the stream flow, and required a head of water higher than the wheel in order to operate.[11]

In addition to the undershot, breast shot, overshot, and pitchback waterwheels, horizontal wheels were used. A tub wheel or a reaction wheel with vertical paddles was simple and cheap to construct, but provided less power than did the vertical water wheels. After 1844, another horizontal wheel called a turbine proved to be enormously popular because it produced more power with lower head of water than other types of water wheels. Mills using turbines typically had arches along the side of the foundation facing the stream that allowed the water to enter and leave the water chamber beneath the mill.[12]

Besides the mill building, dam, pond, and race, the mill property sometimes encompassed other industrial buildings in the mill yard, including saw mills, wheel factories, woolen mills, cider mills, distilleries, and cooper shops. Storage buildings

contained such things as tools, hay, wood, coal, ice, grain, or flour. Stables often occupied a portion of the mill yard. Sometimes, scales built into the road or driveway weighed the incoming grain; more often, millers used rolling scales, especially in the first half of the nineteenth century. After 1850, railroads built sidings to mills, and millers constructed platforms to aid in the loading and unloading of grain, meal, and flour.

Preservationists can locate mills through a variety of sources. Nearly every community supported a mill at one time or other. In fact, the census of 1840 listed a total 846 "grist" and 204 flouring mills in Indiana. As late 1914, millers across the state still used 254 runs of stone, indicating the continued reliance upon the buhrstones. Mills were important to the community, so local libraries often contain secondary sources like county atlases and county histories that may be helpful for general information about a given mill. Maps, diaries, pictures, and government documents, such as articles of incorporation, published opinions of the Supreme Court, acts of the Indiana General Assembly, and reports of the Department of the Statistics, also provide useful information. Beyond written sources, preservationists can find converted buildings or archaeological traces of mills in such places as Mill Street, Mill Road, Race Street, along Mill Creek, and in Millville, Beck's Mill, and Millport.[13]

III. Significance continued:

On a local level, the industrial functioning of a buhr mill provided flour and meal for the community's food supply. In the absence of these industrial facilities, women ground grain into flour and meal by hand; an extremely labor intensive endeavor. Thus, a mill was a welcome addition to a community even if it produced a poor quality of flour or meal, because the local mill was all that stood between the settler and grinding by hand. In an effort to provide a better quality of flour and meal, many Hoosier millwrights purchased French buhrstones and endured much travail to transport them across a land virtually devoid of roads. As farmers cleared more land and crop yields increased, the local miller enjoyed a captive market, one that was restricted by a lack of overland transportation. Then, around the 1840s, mills in Indiana started to incorporate the innovations of Oliver Evans into their mill buildings at about the same time that improved transportation began to provide greater access to distant markets. [See historic context for a complete discussion of the contribution of Oliver Evans.] Thus, these changes in industrial process improved the quality and quantity of flour and meal and also influenced agriculture, commerce, and transportation.

By the 1840s, as mills in Indiana adopted the processes developed by Oliver Evans, milling became one of the most important, if not the most important, industry of the nineteenth century. Although regional milling centers did not develop in

Indiana as they did in neighboring states, the collective efforts of hundreds of individual mills represented a powerful economic force in Indiana. (See historic context for greater elaboration.) In fact, milling ranked either first or second in value of products during the era of buhr mills.

Good mills sites served as magnets that attracted settlement. A mill proved to be essential to the economic development of a locality and it was the focal point of settlement life and livelihood. The erection of a buhr mill signaled a change in the human condition in that area. The mill was a logical social gathering point and a place of commercial interaction: towns developed around mills. While waiting for grain to be ground, the settlers told stories, played games, fished, collected mail, and argued politics. At times, the mill served as a stop on the stage coach line.[14] Beyond that, a study of the mills in Indiana, is also one of the demographics of settlement. The wheat flour produced by the Yankee settlers as opposed to the corn meal produced by the upland southerners provides an interesting study of the northern and southern migrational influences upon the industry and commerce of an area.

The rise and decline of the buhr mill was closely tied to agriculture in Indiana, so much so that the mill even resembled a modified barn. (See description.) Settlers raised corn as soon as they cleared the land of trees, but not until the land "was improved" did wheat grow well. However, within a few years, farmers were able to raise an abundance of corn and soft winter wheat.[15] Mills ground some of this surplus grain into flour and sent the rest southward to national and foreign markets. The number of grain mills (1050 by 1840) testified to the yields from grain crops that, in essence, financed the construction of the mill buildings in Indiana. In the 1840s, new strains of summer wheat were developed that grew better in the climates to the west and northwest; this development eventually meant that the center of wheat production moved westward, away from Indiana. Still throughout the era of the buhr mill, milling remained an important means of processing agricultural surpluses.

The transportation network provided access to raw materials and to markets, two elements that profoundly affected a mill's success. Settlers traveled via foot and horseback along trails, traces, and roads to the mill. Millers used rivers as a means of transporting surplus crops to the markets in the South until the development of the railroad. Wharves along the Wabash River at Vincennes testified to the importance of the river in transporting flour and meal. However, most of the rivers in Indiana were not navigable much of the year, thus limiting the ability of Hoosiers to market their crops. The construction of the canal system provided a route to travel to eastern market, but it was limited in scope. (See the historic context for transportation for a map showing the location of canals in the state.) After 1847, the railroad system provided easy access to eastern markets. Mills

located along the tracks flourished; those that the rail lines by-passed declined.

Commercial activity in exchange mills and merchant mills often occurred on two different but overlapping levels. On the local level, the miller in an exchange mill ground the farmer's grain for a toll, usually one-eighth of the total grain. The miller then ground the grain that he took in toll and sold the resulting flour to consumers in nearby towns and cities. Also, exchange mills sold a range of products to their patrons from staple groceries to fuel. It is at this level of local interaction that most Hoosier mills had their greatest impact. Above that, mills shipped flour and meal to markets in the East and the South, and eventually to foreign consumers. Merchant mills purchased the grain, ground it, and sold it to local, national, and foreign markets. The commercial market of a buhr mill depended on several factors: the quality, quantity, and type of grain ground, the transportation network, and the demand of local, regional, national, and foreign markets for flour and meal.

IV. Registration Requirements continued:

In order to possess integrity of location, a mill must remain in the same place as it was during its period of significance. If the mill has been relocated, it still must be found within the geographical area on which it had its greatest impact. Obviously, a mill that has been moved twenty feet retains more of its integrity of location that a mill moved a greater distance.

Setting refers to the character of the place in which a mill was located during the period of significance. The setting is likely to have changed for most buhr mills because of the encroachment of urban and suburban development. However, enough of the elements of setting, such as the road or the railroad tracks and siding, should be visible to indicate its relationship to the mill property. Railroad tracks are rapidly being removed, which means that the visible evidence of the relationship between the milling industry and the rail lines is vanishing; sometimes only the railroad right of way suggests the historic relationship between milling and transportation.

In order for a mill to possess integrity of design, evidence of the industrial function should be clearly visible. As elaborated in the description, buhr mills have a distinctive appearance, closely resembling a barn of rectangular shape with frequent fenestration and few interior walls. Although an office may have been added to accommodate changing activities, its interior walls should not mask the industrial function. Further, enough of the elements of the milling process, such as the stones, the waterwheel, the elevator and the gravity legs, and the augers must be present to illustrate the historic function even if the mill no longer grinds grain. Of equal importance is the dam and the race. The dam is likely to be gone, but the archeological remains of the race helps convey a sense of the milling enterprise.

Continuation Sheet: Associated Property Types

Workmanship and materials are examined primarily in an industrial context. Millwrights designed and constructed buhr mills, with finely crafted shoots, augers, elevator legs, and gravity legs of wood with joints so tight that small pieces of grain could not escape. Beyond that, millwrights constructed buildings sturdy enough to withstand the vibrations of machines and the ravages of floods. Evidence of the use of this craftsmanship and materials should be visible.

Feeling and association are the most intangible of all of the aspects of integrity, because feeling relates to the historic aura evoked by a given mill and association refers to the evidence that links this mill to larger historical trends. Millers have likely made changes in mill buildings over time in order to compete with others in the industry. This does not necessarily compromise the integrity of a mill. If several of the other elements of integrity are present, the addition of items like a gas pump or a feed storage building should not detract from its integrity. It is at this point that the preservationist must examine the total milling site to determine if the mill, either in an inactive or modified state, still possesses the elements that call to mind the associations and feelings of the importance of milling to the area.

1. Data in William Reser Collection, Record Group L 358, ISL clearly indicate that horse mills were used in Indiana during the 1860s.

2. D. W. Garber, Waterwheels and Millstones: A History of Ohio Gristmills and Milling (Columbus: Ohio Historical Society: 1970), 14.

3. There are no known remaining examples of horse, wagon, or floating mills. If one is found, it will indeed be a rare and valuable example of a buhrstone mill and specific registration requirements must be developed on a case by case basis in conjunction with the Division of Historic Preservation and Archaeology.

4. See Denzil Doggett, "Flat Rock River--Water Mills," Outdoor Indiana, Vol. 5, No. 12 (June 1962): 9-14, 30-31; William Reser Collection, ISL has primary documents relating to mills located along canals; Oliver Evans, The Young Mill-Wright and Miller's Guide [1850] (New York: Arno Press, 1972), 282, 283.

5. Beck's Mill Documents, in the possession of Joyce Allen, Becks Mill, Indiana, current owner of Beck's Mill, illustrate the size of that first mill.

6. Evans, Young Mill-Wright, 282 discusses flammability in mills.

Continuation Sheet: Associated Property Types

7. Kuhlman, Flour Milling Industry, 95 discusses his definition of "simple" and "better mills."

8. Some urban mills used steam as early as 1819, but these were clearly atypical. In addition, wind mills may have been built. The premise of the wind mill was much the same as the waterwheel, except that paddles extended into the air from the upper story of the mill, caught the wind, and turned the shaft that turned the buhr stones. In maritime communities in the eastern United States, sails were used to catch the wind. Windmills provided only intermittent power. Only a small mill could afford to use such an uncertain source of power. See Storck, Man's Bread, 125.

9. Spring Mill in Spring Mill State Park near Mitchell, Indiana, illustrates the raised flume. Branson, "Flour Mills," 23-24, provides the terminology.

10. "Interview with Marion Owen Regarding Early Mills on the Flat Rock River," Mill Collection, General Box, Unnamed folder, Indiana Historical Society, 320 West Ohio Street, Indianapolis, Indiana. (Henceforth cited as IHS.) David Macaulay, Mill (Boston: Houghton Mifflin Company, 1983), 7 contains the terminology for the wheel pit; William Reser Collection, ISL, L358, Box 2, Folder 12 provided data for sizes of wheels.

11. Information on water wheels may be found in any one of several general sources on mills. The best description, however, comes from Apps and Strang, Mills of Wisconsin, 20-22.

12. Reser Collection, ISL; Interview with Robert Weise; Nicholl, Little Old Mills, 167-9, 133-4.

13. Data in this paragraph is from U. S. Secretary of State Sixth Decennial Census, 1840 (Washington: Blair & Rives, 1841), 296; Census of Manufactures, 1914, Volume 1, (Washington: Government Printing Office, 1918), 389.

14. Beck's Mill Documents; William M. Cockrum, Pioneer History of Indiana (Oakland City, Indiana: Press of Oakland City Journal, 1907), 326.

15. Dave O. Thompson, Sr. and William L. Madigan, One Hundred and Fifty Years of Indiana Agriculture (Indianapolis: Indiana Historical Bureau, 1969), 3.

F. ASSOCIATED PROPERTY TYPES

I. **Name of Property Type:** ROLLER MILLS

II. **Description:**

From 1873 (when roller mills were first introduced) until 1940, millers in Indiana constructed new mills and modified old ones to accommodate the processes associated with roller milling. The rotating cylinders in the roller mill sheared the wheat, producing a better quality of flour than in the buhr mill. With the addition of rollers and related machinery, mill buildings became taller because the grain flowed between the various levels in order to be separated, scoured, ground, purified, bolted, sifted, and sacked. Mill buildings and the sites on which they were located changed, as the millers incorporated new technologies in their milling operation. As the twentieth century progressed, the number of local mills declined because these mills could not compete with the large milling companies. These local mills either switched to feed production or closed their doors.

Several levels of milling occurred simultaneously in Indiana from 1873 until 1940. On the first level, millers ground grain with both rollers and stones in Indiana as late as 1920.[1] The transformation to roller milling progressed slowly, partly due to the increased cost of this technological change. Sometimes, an early roller mill looked exactly like a buhr mill, because the miller simply added one stand of rollers and continued to use his stones as well; he purchased more rollers and associated machinery later. Other millers embraced the new technology and discarded their stones. Still others never converted to rollers at all. On a second level, roller mills varied in scope of operation and size of building; some had but one stand of rollers, others two or three stands, and yet others had ten or more. As a rule of thumb, mills with more stands of rollers used more smutters (machines to clean the grain,) purifiers, bolters, and separators and correspondingly needed more storage. In addition, roller mills provided different kinds of services; some (custom mills) produced a custom mix for community patrons for a toll or a charge, while others (merchant mills) sold grain and flour locally, regionally, and nationally. The services provided by each individual mill determined the kinds of associated buildings and structures located in the mill yard.

Beginning in the 1870s, mill buildings began to change in form as the mill began to look more like an industrial structure and less like an agricultural one. Changes for Hoosiers have rarely been rapid; thus roller mills built in the 1870s and 1880s, especially in remote areas, bore a striking resemblance in size and shape to buhr mills with the addition of a monitor. (A monitor is a raised center section of a gable roof. Shutters or windows along the sides provide ventilation and light.) The style of mills in urban areas followed the variations in industrial architecture earlier than did those in rural areas, but by the end of the nineteenth century, both rural and urban mills incorporated contemporary architectural styling in their buildings.

As the architectural style of mills evolved, the construction

F. Continuation sheet: Associated Property Types

materials changed. In the 1870s and 1880s, millwrights built clapboard mills of timber and frame or stacked board construction. Later, non-flammable materials, such as brick, concrete, and rock-faced brick predominated. In part, this change was due to the fact that the dust in mills made them susceptible to explosion and fire. Also by 1890, Indiana was being deforested, which meant that lumber was not as abundant as it had been earlier in the state's history. Too, the massiveness and the permanence suggested by brick and concrete buildings indicated a philosophical change occurring in the milling industry. Charles Byron Kuhlman, author of The Development of Flour-milling Industry in the United States, wrote in 1928 that "in spite of their obviously utilitarian character [these new buildings] are not without a certain dignity and impressiveness."[2]

Most roller mill buildings retained the size and the functional rectangular shape of the buhr mill, but increased the height to accommodate the new machines associated with the New Process and "gradual reduction." (See historic context for greater elaboration of the new technology of milling.) Millers depended on natural lighting whenever possible until electrical lighting became available.[3] This reliance on natural lighting limited the size of each floor of the mill and the use of interior spaces. Not until after 1935 did utilities electrify many rural areas. Mill-men[4] built taller mills because they needed additional floors to accommodate the machines that scoured, sorted, ground, separated, ground, and sifted the grain again and again. Elevator legs and gravity legs in the center sections of mills conveyed the grain between machines on various levels.

As millers began to use several varieties of grain to produce a custom mixed flour, the need for storage increased. Warerooms within the mill building held grain for short periods of time, but their capacity was limited. Nordyke and Marmon, a company based in Indianapolis that manufactured precision flour milling machinery and the associated machinery, advertised in 1884 that "we have plans for small cheap elevators, to handle the wheat from wagon to bin and from bin to car or mill, without manual labor. Every mill-man should have one adjoining, and driven by shaft or wire rope from his mill."[5] Drawings of these attached elevators suggest that they looked very much like the huge elevators built through the 1940s. Each elevator had a center section of elevator and gravity legs with bins on either side to hold the grain.

Not all owners could afford to construct a building to shelter the new technology, so in some cases, they adapted buhr mills to the roller process. Often mill-men modified a building by raising the roof; additional floors provided space for the machines that bolted and sifted the flour. A monitor or a cupola housed the separator and the upper reaches of the gravity and elevator legs. Some roller mills never progressed beyond this stage; they contained only one or two stands of rolls and a single bolter. Some converted mills built attached elevators. Additional

F. Continuation sheet: Associated Property Types

buildings in the mill yard such as an office and warehouses often accommodated the functions that could not be contained in these adapted mills.

The types of related buildings that one found in the mill yard depended on whether the mill was a merchant or a custom mill. For example, a custom mill was more likely to sell a variety of products such as ice and coal than a merchant mill. The number of custom mills declined rapidly with the introduction of rollers, especially in the northern two-thirds of the state. The mill yard might contain an ice house, an oil storage tank, coal yards, coal bins, coal warehouses, cob houses, warehouses, cattle pens, hog pens, stables, cooper shops, saw mills, lumber yards, mill race, mill dam, mill pond, water tower, electric power plant, detached office, scales, and gravity dump. (Patented in 1871, a gravity dump allows the patron to unload grain through an opening in a driveway outside the mill. The front wheels of a wagon or a truck are raised until the grain flows from the bed into the bin beneath the driveway by gravity.)[6]

As the technology of motive power changed, mill-men adapted their mills. In the nineteenth century, water wheels and turbines moved the rollers in smaller mills, but larger mills needed more power to increase the capacity. To increase production some millers added more water wheels or a steam engine. For example, the Empire Roller Mill and Elevator in Logansport on the Wabash and Erie canal used five waterwheels. In 1914, water powered the wheels, the turbines, and the motors of a third of all the mills in the United States.[7] Other mills switched to the internal combustion engine. In this age of change and experimentation, at least one mill in Indiana (and there may have been more) used electricity provided by the interurban lines.

Routes of transportation were a prime factor in determining the location and success of a roller mill. By the time roller mills were first introduced in Indiana, most of the commercial transportation of grain occurred via the rails. Mill-men shipped grain and flour by railroad to markets in Indianapolis, Cincinnati, and Chicago. Thus, roller mills were nearly always located along railroad tracks. Those mills by-passed by the railroad typically either went out of business or moved to a location along the rail line, as in the case of the Joe Fry mill in Henry County. Most of the tracks were laid in the northern two-thirds of the state, and southward along the Wabash River to Evansville. Roller mills existed along these routes. In the southern third of the state where there were fewer rail lines, mills located along the Ohio River in order to utilize it to transport grain. The location of a mill along a road was equally important because farmers brought their grain to local mills by wagon.

Most mill-men built roller mills in or near towns and cities. As a rule, companies built large mills in urban areas; individuals constructed small mills in both rural and urban areas. The proximity of a supply of labor was not often a factor in

F. Continuation sheet: Associated Property Types

determining location, because most roller mills were automatically operated to a large extent. In the 1910s, not one milling establishment in Indiana employed more than two hundred and fifty workers. In 1914, the census recorded only three mills that employed over one hundred workers; seven with more than fifty-one, and merely sixteen with more than twenty-one.[8] The convergence of several roads and railroads probably exerted the greatest influence in the decision to construct a mill in a city.

Preservationists searching for roller mills can find sources in libraries to aid in their efforts. Sometimes, county atlases and county histories which are located in local and state libraries provide a bit of the general information about some of the mills. More specifically, maps showing the location of abandoned railroad tracks and the courses of the state's streams, rivers, and canals help determine the probable location of roller mills. Government documents like articles of incorporation, published opinions of the Supreme Court, reports of the Department of the Statistics, and acts of the General Assembly are useful to the study of milling. Also, city directories list mills and their addresses, and Sanborn Maps show the location, configuration, power, and the internal machinery for mills in some of the cities and towns in Indiana from the 1880s to the 1930s.

III. Significance:

Roller mills were significant primarily in the area of industry, but changes in agriculture, commerce, and transportation affected their growth and distribution. The invention and wide acceptance of the roller process of milling coincided with large shifts in technology, demographics, agriculture, industry, and commerce that were occurring locally and nationally.

The conversion of mills from stone to rollers marked a turning point in the milling industry. For centuries human beings had used stones to grind flour, and the process of milling had changed little. In 1785, Oliver Evans had devised an automated system of milling, but the basic method of grinding remained unchanged until rollers were invented. (See historic context for more detail.) The use of rollers coincided with the acceptance of other technological changes in milling, such as the New Process and "gradual reduction" of flour. After these innovations, millers consistently produced a superior flour and they ground more flour and meal with less waste. In addition, in 1904 the introduction of the Alsop process of flour bleaching eventually terminated the aging process in flour milling, so that mill-men no longer had tie up their capital while waiting for flour to whiten naturally.[9]

All of these changes in technology contributed to the gradual centralization of the flour milling industry. Larger mills could afford to purchase all of the machinery necessary to produce a high grade of flour in vast quantities. In urban areas at the convergence of lines of transportation, a few mills grew into large milling endeavors, but most mills in Indiana remained small and

F. Continuation sheet: Associated Property Types

significant locally. However, through 1920 the collective product of these small mills represented the bulk of the flour in Indiana and the United States. In 1920, the Federal Trade Commission noted that:

> Although there are still thousands of neighborhood mills in the United States, and although the largest milling concern in the country has never produced much, if any, over 10 per cent of the total output, the tendency toward concentration in the wheat-flour industry is notable. The crowding of consumers into limited areas incidental to the great industrial development of the country has created a situation in which a demand for standardized brands of flour has been developed. [10]

The process of centralization of the flour milling industry continued to gradually occur throughout the period of this context.

Commercial transactions were an important facet of the function of roller mills. Mill-men acted as middlemen for the farmers by selling grain to markets in Chicago, Cincinnati, St. Louis, and Louisville. Millers also sold cement, coal, sundry other items, and, of course, flour. After 1920, more people lived in urban areas than in rural areas in Indiana, and the demand for packaged flour increased. The increasing numbers of urban dwellers influenced the centralization of milling.[11] The trend toward packaged flour produced and distributed by national milling companies, caused the gradual demise of the small roller mill.

Changes in the agriculture influenced the development of the milling industry. Hoosier farmers have historically produced an abundance of grain. Without this product, millers had nothing to grind and nothing to market nationally. From 1840 until 1880, Indiana consistently ranked in the top seven states in corn and wheat production. With the development of hard strains of wheat, the center of wheat production moved westward, but the agricultural abundance in other types of grain allowed mills to continue to function as middlemen.

The transportation network provided access to raw materials and markets that were crucial to the function of roller mills. By the time that millers began using rollers, the railroads were already established in the northern two-thirds of Indiana; much of the southern third was not as well suited to large-scale agricultural development and railroads built fewer lines there. Roller mills rarely survived if they were not located at the intersection of a road and a railroad. In addition, railroad rates favored the large milling concerns, contributing to the growing centralization of the industry.

Registration Requirements:

In order to be listed in the National Register, a roller mill must possess significance and meet most of the criteria for

F. Continuation sheet: Associated Property Types

integrity as specified in Bulletin 16. The criteria for integrity are setting, location, design, workmanship, materials, feeling, and association. Industrial properties such as roller mills are often modified over time to conform to technological and market changes. Such alterations may not detract from their integrity. As a rule of thumb, a roller mill must still retain those elements of integrity that clearly convey its historical industrial function in order to be listed on the National Register.

In order to possess integrity of location, a mill must remain in the same place as it was during its period of significance. If the mill has been relocated, it still must be found within the geographical area on which it had its greatest impact. Obviously, a mill that has been moved twenty feet retains more of its integrity of location that a mill moved a greater distance.

Setting refers to the character of the natural and built environment. Few mills remain in a pristine setting because most areas have changed over time with the encroachment of industrial, suburban, urban, and agricultural development. However, some evidence of critical elements of setting, such the intersecting lines of transportation, should demonstrate the relationship of roller mills to larger patterns of development. Railroad tracks are rapidly being removed, which means that the visible evidence of the relationship between the milling industry and the rail lines is vanishing; sometimes only the railroad right of way may suggest the historic relationship between milling and transportation.

Materials and workmanship should reflect the manner in which mill-men built an industrial structure to meet the needs of the day. For example, wooden elevator and gravity legs and wooden augers display the workmanship of the period. Even if owners of mills have replaced wooden legs with a pneumatic system of conveyance, this change illustrates the evolution of workmanship in milling and may not considered as a breach of a given mill's integrity.

In order for a mill to possess integrity of design, evidence of the industrial function should be clearly visible. As elaborated in the description, roller mill buildings represent the transitional phase from a quasi-agricultural building resembling a barn with a monitor to an industrial building. However, certain key elements of design were utilized in most roller mills such as the rectangular shape, frequent fenestration, and few interior walls. Although an office may have been added to accommodate changing activities, its interior walls should not mask the industrial function. Further, enough of the elements of the milling process, which might include such items as the rollers, the turbine, the elevator and the gravity legs, the augers, and the scales should be present to illustrate the historic function even if the mill no longer grinds grain.

Feeling and association are the most intangible of all of the aspects of integrity, because feeling relates to the historic aura evoked by a given mill and association refers to the evidence that

F. Continuation sheet: Associated Property Types

links this mill to larger historical trends. Millers have likely made changes in mill buildings over time in order to compete with others in the industry. This does not necessarily compromise the integrity of a mill. It is the duty of the preservationist to examine the total milling site to determine if a mill, even in an inactive or modified state, still possesses the elements of integrity that call to mind the feelings and the association with larger historical trends in milling.

1. Census of Manufactures, 1914 Vol. I, 389 reported 245 runs of stone still in use. Fourteenth Census, Vol. IX, 393 still uses the term "Flour-mill and gristmill products."

2. Quote from Kuhlman, Flour-Milling Industry, 229.

3. Sanborn Maps reveal that kerosene and gas lights illuminated many mills at night or when the mill was not operating. The grain dust and an open flame created a combustible environment that millers avoided.

4. The term "miller" refers to the man who ground the grain. After 1870, the term "mill-men" began to appear in the literature to refer to men who owned or worked at merchant mills.

5. Descriptions of Mill Machinery Manufactured and Supplied by Nordyke and Marmon (Indianapolis: Baker and Randolph, Printers & Binders, 1884), 76.

6. Sanborn Maps document the range and variety of related properties.

7. Sanborn Maps for Logansport, 1885, 1890, 1906, 1911 at Indiana Historical Society Library show evolution of Empire Roller Mill; Census of Manufactures, 1914, 400 contains data for the whole United States, and the collection of Sanborn Maps at the IHS indicate that in Indiana steam, water, electricity and the internal combustion engine were all used simultaneously in the 1910s.

8. Census of Manufactures, 1914, 399.

9. Kuhlman, Flour-Milling Industry, 117-122 does a good job of describing these processes.

10. Federal Trade Commission, Report on Wheat Flour Milling (Washington, 1920), 14.

11. Federal Trade Commission, Report, 14.

F. Continuation sheet: Associated Property Types

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F. ASSOCIATED PROPERTY TYPES

I. Name of Property Type: FEED MILLS

II. Description

In Indiana after the turn of the twentieth century, individuals, co-operatives, and privately-owned companies operated feed mills, commonly known as feed elevators. Technically, however, an elevator is simply a storage facility for grain with elevator and gravity legs and the term does not refer to the mill itself. Feed mills ground grain into a coarse product for the consumption of livestock, and bought and sold grain. Feed mills were located in communities along railroad tracks, especially in the northern two-thirds of the state.

Around 1900, the flour mill and the feed mill took divergent paths. From 1873 until 1920, stones and rollers still ground wheat and corn into products for human consumption in small mills all over Indiana. However, these small mills could not compete with the larger mills that ground high quality flour in volume. Roller mills either grew large or switched to the manufacture of feed products. In 1914, in Indiana there were 2463 stands of rolls, 254 runs of stone, and 364 attrition mills. (Attrition mills ground the grain into a course product that was not fine enough for flour but adequate for cattle feed.) Later, mill-men who produced cattle feed as opposed to flour or meal switched from the roller and the attrition mill to the hammer mill because it was less expensive, albeit cruder, than a roller.[1]

A feed mill building often evolved from either a roller or a buhr mill; thus, one frequently finds a pre-twentieth century mill as the nucleus of a modern feed mill. Because of this, feed mills are absolutely fascinating studies in change over time. The core building is often square or rectangular and of stacked-board construction (two by eight boards laid one on top of another.) Mill-men built additions to accommodate changes in the mill's function, thus altering the configuration of the building. For example, a wareroom, or storeroom, was often added with a platform running between the building and the railroad track for ease in loading and unloading bags or barrels. The construction of this storeroom gave the mill an elongated look. On top of the mill building, a cupola was constructed to accommodate the upper reaches of the elevator legs. A shed roof, enclosed at times, covered a gravity dump that was located beside the mill. However, in areas of the state where bank barns were common, a bank was built to the center of the mill where the gravity dump was located. The farmer drove his wagon or truck through the center of the mill to unload his grain.[2]

The owners of the converted mills made changes beyond the configuration of the old mill in order to adapt it to feed grinding. As new sections of the mill were added for storage or clerical activities, these were typically clad in tin. To create an uniform appearance for the mill, the owners covered the old buhr or roller mill with tin, or they painted the clapboard silver.

Continuation Sheet: Feed Mills

With the addition of in-ground scales, mill-men built detached offices or shed additions for the office.

Typically, the owner built a new mill with twentieth century styling only when the old one burned. Conscious of the fire potential of grain dust, millers constructed the new building of concrete, cement block, or rock-faced brick. Although closely aligned with agriculture, these mills used industrial architectural styling, with flat roofs and utilitarian lines. Windows were few, often of glass brick. These new mills tended to be elongated, stretching beside the railroad tracks, with gravity dumps on the side of the building opposite the tracks. These newly constructed mills used wooden elevator legs and gravity legs to move the grain between the floors of the milling section of the building. On top of a two to three story feed mill, mill-men often built a cupola with a flat roof to contain the upper reaches of the legs. The electric, diesel, or steam motor that powered the mill was located in the basement or in an attached shed.

As in the buhr and roller mills, properties in the mill yard reflected the industrial and commercial function of the mill. Related properties for feed mills include office, scales, gravity dump, feed storage, gas pump, grain elevators, saw mill, lumber yard, railroad siding, coal yard, oil storage, water tanks, coal bins, coal drag lines, hog shed, cattle pen, cob shed, and warehouses.

Feed mills are located along railroad lines in every section of Indiana, with a greater distribution in the northern two-thirds than in the southern third of the state. Because water rarely, if ever, powered a feed mill, water routes seldom proved to be a factor in selecting a location. However, some feed mills are located along a river, simply because they were built on the ruins of a buhr or roller mill or evolved from one. Farmers continued to use roads to bring their crops to the mill, so the feed mills are most likely to be located at the intersection of a rail line and a road.

Although there are few archival sources concerning feed mills, preservationists searching for them need only follow the railroad tracks. Maps showing the location of railroads at various periods in history provide the routes of now abandoned lines. City directories are helpful in locating addresses, and Sanborn Maps used in a series for a given city illustrate the changes in a mill building and the related properties in the mill yard.

III. Significance

A product of twentieth century needs, the feed mill is significant in the area of industry, even though changes in the areas of agriculture, transportation, and commerce bore directly upon its development. During the first quarter of the twentieth century, as the flour milling industry became increasingly centralized, the feed mills began to grind the grain for cattle

Continuation Sheet: Feed Mills

consumption on a local basis, linking agriculture and industry for the rural population of a community.

The feed mill served an industrial function for the farmers of a locality. As with the first flour mills, cattle feed was ground on the farm for many years. Farmers with large farms owned their own hammer mills, while traveling millers brought hammer mills to smaller farms. As flour milling became a more centralized endeavor, the smaller roller mills began grinding cattle feed. Farmers in a community loaded their grain on wagons or trucks and took it to the mill where it was ground into feed for their cattle.

Some feed mills may be significant because they demonstrate some of the larger trends occurring in the milling industry in terms of ownership. Individuals, companies, and co-operatives all owned mills in the twentieth century. Mill companies that controlled a line of elevators became an important facet of the milling industry because of their close relationship with the railroad companies. Co-operatives arose as a reaction to the corrupt practices of many of the line elevators as farmers banded together to pool their resources. The Indiana Farm Bureau Co-operatives, the most well-known and long lasting of all the co-operatives, located their mills and elevators in every corner of Indiana.

Because agriculture and industry formed a mutually sustaining relationship, agriculture is one of the secondary areas of significance. The fact that nearly every community had a feed mill that ground local grain into cattle feed testified to the agricultural surpluses that insured the mill's existence. After World War I, the ownership of mills by cooperatives arose, as farmers united to sell and to grind their grains themselves. Some feed mills are tangible symbols of this endeavor. In addition, educative efforts of Purdue University and the Farm Bureau began to change the way that farmers thought about cattle raising and milk production. Mills began to add nutrients to the cattle feed, indicating the increasing sophistication of the business of farming.

The feed mill was important to the commerce of an area. Mill-men acted as middle-men; they bought and sold grain for the farmers of a community to a national market. In addition, as in the custom buhr and roller mills, feed mills offered a variety of commercial services for the patrons such as buying and selling goods like eggs, coal, cement, and hay.

Feed mills were invariably located at converging lines of transportation in order to provide access to raw materials and to markets. Farmers raised more crops than they or their cattle could consume; the mill acted as a collection point in the transporting of grain. Farmers brought their grain to the mill via roads and mill-men stored or loaded it on railcars to transport it to distant markets. Thus, lines of transportation determined the location of feed mills; few mills survived the change into the twentieth

Continuation Sheet: Feed Mills

century without being located along a railroad. Sometimes railroads even owned mills.

IV. Registration Requirements:

In order to be listed in the National Register, a feed mill must possess significance and meet most of the criteria for integrity as specified in Bulletin 16. The criteria for integrity are setting, location, design, workmanship, materials, feeling, and association. Industrial properties such as feed mills are often modified over time to conform to technological and market changes. Such alterations may not detract from its integrity. As a rule of thumb, a feed mill must still retain those elements of integrity that clearly convey its historical industrial function in order to be listed in the National Register.

In order to possess integrity of location, a feed mill must remain in the same place as it was during the primary period of significance. Because no large regional feed mills were constructed in Indiana prior to 1940, it has been traditionally a industry that has served local needs. If a mill has been relocated, it must still be found in the same geographical area in which it had its greatest impact. Thus, a mill that has been moved twenty feet possesses more of its integrity of location than a mill moved a greater distance.

Setting refers the natural and built environment. In order to possess integrity of setting, elements such as roads or the railroad siding and tracks should indicate the historic environment of the mill. However, the railroad right of way may be the only clue remaining to the historic relationship of milling with transportation; this right of way may be sufficient for registration, if enough of the other criteria for integrity still exist.

In order for a mill to possess integrity of design, evidence of the historical industrial function should be clearly visible. As elaborated in the description, feed mills have a distinctive appearance, usually an elongated building with a raised center section clad in tin. The mill should retain enough of those elements of interior and exterior design to clearly illustrate that this building was indeed a feed mill. Examples of interior design might include such items as the hammer mill, the bins, the elevator and the gravity legs, and the augers.

Workmanship and materials reflect the way that mill-men built and modified an industrial structure to meet changing needs industrial needs. Sometimes tin elevator legs have replaced the wooden ones, but other evidence such as wooden shoots, a man-lift, or wooden augers should still clearly indicate the workmanship and materials from the period of significance.

Feeling and association are two less tangible aspects of integrity, because feeling relates to the historic aura evoked by a given mill and association refers to evidence that links this mill to larger historical trends. As the milling of feed becomes a more

Continuation Sheet: Feed Mills

centralized endeavor, then mills cease to function and are abandoned or converted to another function. It is at this point that the preservationist must examine the total milling site to determine if the mill, even in an inactive or modified state, still possesses the elements that call to mind the feelings and the associations with larger historical trends of milling.

1. Census of Manufactures 1914, 389; Interview with Dewayne Calbert, Miller, Bargersville Farm Bureau Cooperative, Bargersville, Indiana, January 1990.

2. A series of Sanborn Maps is especially useful in tracing the changes in configuration, and in exterior cladding of a mill building. These maps also show the power source, the related buildings, and the relationship of the mill to lines of transportation

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