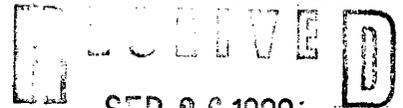


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NATIONAL REGISTER

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

GRISTMILLS IN BERKS COUNTY, PA

B. Associated Historic Contexts

Milling in Berks County, 1700-1939

C. Geographical Data

Berks County, Pennsylvania

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.

Brent D. Glass

9/18/90

Signature of certifying official
Dr. Brent D. Glass, Pennsylvania Historical & Museum Commission

Date

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.

Kathleen Andrus

11/8/90

Signature of the Keeper of the National Register

Date

E. Statement of Historic Contexts

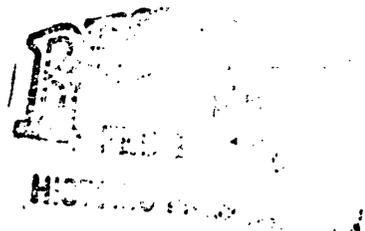
Discuss each historic context listed in Section B.

MILLING IN BERKS COUNTY, 1700-1939

The raising of grain crops, especially wheat, and their processing in gristmills, have been important Berks industries throughout the county's history. Nature has endowed Berks County with very suitable conditions for such enterprise (as it has done for Southeastern Pennsylvania as a whole): a temperate climate, adequate rainfall, and favorable soils, in particular large deposits of very fertile limestone-based soils. During most of the period of our concern, waterpower was necessary for the refinement of grain into flour, meal, and feed, and here too nature was obliging. The rolling, sometimes hilly topography of the county combines with its numerous small rivers and streams to provide many excellent sites for mills. The Schuylkill River wends its way across the county, dividing it into rough halves. The shallow Schuylkill was only fitfully a reliable waterway to Philadelphia for early Berks businessmen and farmers, but its course created a natural route for land travel.

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Settlement

European settlement was begun in Berks by Delaware Valley Swedes in the first years of the eighteenth century, the first documented instance dating to 1704. Settlers' initial occupation of the region (circa 1700-1740) took place in a discontinuous manner, occurring in a number of distinctly separate locales. Settlement proceeded on a logical progress up the banks of the Schuylkill, but more activity took place in a series of scattered locations evidently chosen for their rich valley limestone soils. These were the Oley, Caernarvon, Maxatawny, Tulpehocken and Ontelaunee areas. The pioneers were about evenly divided between new German immigrants on the one hand, and English, Welsh, Scottish, Swedish and Dutch people from older eastern settlements on the other. Each of the places mentioned above was largely the domain of one or two particular groups of settlers.

Settlement in Berks expanded rapidly during the 1740s and 1750s, and by the end of the latter decade accounted for practically all the arable land within the present-day boundaries. In 1748 the proprietors laid out Reading, and in 1752 this fledgling market town became the seat of the newly erected county of Berks. The county was a union of areas hitherto administered as parts of Philadelphia, Chester and Lancaster counties.

The completion of the initial settlement process drastically altered the ethnic composition of the county population, as the post-1755 arrivals were almost entirely German. From 1750 through many decades thereafter the people of Berks were some 85-

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90% of German heritage. This made Berks "more German" than any other contemporary county in the province, except Northampton. A relative handful of black slaves, owned largely by ironmasters, merchants and lawyers during colonial times, evolved into small free black communities in Reading and the ironmaking villages. A trickle of non-German arrivals between the Revolution and the Civil War was more than offset by continued German immigration, so that Berks County's cultural character remained distinctively German throughout the nineteenth century.

As regards church membership, in the late-colonial period there was a smattering of German sectarians, there must have been a number of churchless people, and of course the English-speaking component included Quakers, Anglicans and Baptists. But the evidence suggests that a large majority of the county's residents adhered to the Lutheran or Reformed churches, to the extent that Berks could be considered something of a "heartland" for these denominations.

Early Agricultural Development 1700-1740

From the commencement of settlement until ca. 1740 the export of wheat products from the Berks County area was probably negligible. For the province as a whole no commodity was exported in significant amounts until 1730, and Berks as a more recently settled region must have lagged behind somewhat, except in iron production. The early decades were taken up with the backbreaking work of clearing fields, starting orchards and

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livestock herds, and building houses, barns and other structures. The number of man-hours and the amount of material a family would have to expend in initial homesteading and successive improvements before it could produce a substantial surplus to sell at market should not be underestimated.

People had to eat, though, and bread made from wheat or rye flour was the main dietary staple of the colonial Berks farmer. (Lemon, 154-56.) To make the flour grain had to be ground, and gristmills appeared rapidly in areas of new settlement. Comprehensive research carried out by the Oley Valley Heritage Association shows that a miller had constructed a gristmill in the Association's study area by 1713, when only eleven homesteads are definitely known to have been established there. By 1736 there were at least seven mills in the Berks area. There are no known physical remains of these early gristmills, except possibly the earlier foundations beneath the Bertolet Mill in Oley Township. This existing mill was built in 1841 on a site where John Henry Kersten had begun operating a mill by 1725.

Pennsylvania: Breadbasket to the Atlantic World 1740-1818

Pennsylvania began to realize an economic breakthrough around 1730. The years from that date through the early 1760s saw a steady expansion in the province's exports as farmers were able to produce ever greater surpluses for the market. From 1731 to 1763 per capita exports of wheat products increased by more than 50%. About 1740 the rate of expansion picked up consider-

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ably. (Lemon, 223-25.) By that year a substantial number of farmers in Berks and other second-generation settlement regions must have been participating, and there is probably nothing coincidental in the timing (1748) of the Penn family's decision that a market and service town in Reading's location would be of value.

The predominant element in these surpluses available for export, by a considerable margin over any other, was wheat. This remained so until 1815, a considerable duration for such a pattern by any reckoning. Wheat was what Pennsylvania had, that the rest of the eighteenth-century Atlantic world needed. Hence when the typical southeastern-Pennsylvania farmer made his planting decisions, wheat cultivation was what he allocated all available resources to after he had made allowance for his family's own well-rounded subsistence needs. In 1770 wheat products contributed about two-thirds of the value of all commodities exported from Pennsylvania:

Wheat products	L554,000
Corn	39,000
Wool	33,000
Flaxseed	30,000
Meat	25,000
Corn	12,000
Miscellaneous	107,000
Total	L800,000

These 1770 figures are believed to be fairly representative in their proportions for the period 1730-1800. It is estimated that

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by 1770 one third of the annual Pennsylvania wheat crop was being exported. (Lemon, 181.) Some of this was raw wheat, some was ship's bread, but the great bulk was flour. Pennsylvania wheat products traveled to several destinations, countries which were net importers of food: the West Indies, with its slave-labor plantations, New England, with its maritime economy, Spain and Portugal, and after 1765, Great Britain. Many ships were constructed in Philadelphia with holds especially designed to transport flour. (Doerflinger, 117.) A successful flour inspection system, instituted by the Pennsylvania government in 1725, helped ensure high international prices for the Pennsylvania product.

Integral to the expansion of the Pennsylvania wheat export trade after 1725 was the rapid growth of a certain way of conducting the milling business. This was "merchant" milling. Traditionally, in Europe and in early colonial Pennsylvania, a miller had worked on a "custom" basis. He took a part of the farmer's grain, generally 10%, in return for his services. The merchant miller's preferred method was the outright purchase, before milling, of a large quantity of wheat from the farmer. The merchant miller's method of obtaining his livelihood was by necessity a more speculative and hence more dangerous one than the custom miller, but one potentially much more lucrative.

In truth, it would be misleading to attempt to draw a hard, fixed line between merchant milling and custom milling in eighteenth-century or even nineteenth-century Pennsylvania.

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Those millers who did some custom work in addition to extensive merchant activity appear to have formed a much larger group than either the exclusively merchant or exclusively custom millers. The number of merchant mills grew rapidly in the course of the 1700s, more or less in step with the growth of the wheat export trade. The merchant mill soon dominated this business, practically to the exclusion of the custom mill. But the existence side by side of merchant mills, custom mills, and a very large number which did mostly merchant work but also some custom continued through the 1800s.

An understandable assumption would be that eighteenth-century Pennsylvania farmers simply took their wheat to their "local miller" to be ground. This does appear to have been the case with most of the wheat grown. (Lemon, 207.) Those few scholars who have considered the question posit that the typical early American mill served customers living within a distance of five to ten miles. (Walzer, 279-80; Stilgoe, 308-09.)

But in reality a wide array of possibilities was open to Pennsylvania farmers. They had choices as to where to sell their wheat, how to sell it, and to whom to sell it. Many husbandmen strove to make the most profitable possible decision. A man could sell his crop to a local merchant miller, to one in a more distant place, to a Reading merchant, or to a Philadelphia "flour factor" as soon as he had gathered it in, or several months later, when the harvest glut would be well past: at his farm, at the Philadelphia waterfront, or at one of many points between.

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He might pay a merchant to store his wheat, ship it, or act as his selling agent. He might store it himself, and undertake its transport himself. A larger-scale farmer could play it safe with one part of his wheat crop, and pursue a more speculative course with the remainder.

The Dutch traveler Theophile Cazenove, passing through Kutztown, Berks County, on October 30, 1794, noted that many of the area's

farmers take their wheat to the German Town mills, 7 miles from Philadelphia, where they were still paid 11 s. 9 d. a bushel, on the 28th of October. The dealers in the [Kutztown] stores pay 10 shillings to those who want to sell theirs here and so avoid the trouble of sending it by land, 53 miles, to German Town. (Nolan, 159.)

The proportion of eighteenth-century Berks farmers who did business with this sort of speculative attitude is unknown (and must have varied over time), but evidently it was a substantial one. Perhaps James Lemon's figure, that one third of Pennsylvania's wheat crop was exported in 1770, is some indication. (Lemon, 181.)

The inevitable staleness of information in regard to wheat prices in international markets was enough of a problem to ruin quite a few Philadelphia merchants and others. But many farmers sought such news avidly. Local merchant mills were considered the best place to obtain it. Merchant millers were the main conduits by which the business news of the Atlantic world reached the colonial Pennsylvania countryside. The banker's role which the merchant miller often played, advancing loans to local

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farmers against their future crops, strengthened his mill's position as economic focus of the community.

Reinforcing the mill's function as a community business and social center still further was the common practice among millers of operating additional waterpowered industries. Run on a custom basis, these other mills enabled local people to meet their subsistence needs with less reliance on time-consuming handwork. Each kind of mill had different processing machinery, in keeping with its particular function. But the transfer of power from the downward flow of water to the work at hand happened via similar systems of waterwheels, gearing, and transmission shafts. Hence the miller, who understood the common engineering principles at work in different kinds of mills, might operate two or more mills situated on one millrace.

Thus in 1768, of the sixty-nine known gristmill owners who were not ironmasters (who necessarily ran larger industrial complexes), seventeen also operated sawmills, one a fulling mill and one a paper mill. Sawmills were especially numerous among Berks waterpowered industries (fifty-three present in 1768 as opposed to six fulling mills and three paper mills) because of farmers' frequent need to refine some of the hardwood trees on their properties for a variety of uses, especially construction. Some of this lumber was sold to local builders, coopers, cabinet-makers and wagonwrights, and was parlayed into a variety of objects for Berks Countians' everyday use, such as barrels and furniture. The amount of flour alone produced by Berks grist-

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mills must have demanded a very high number of wooden barrels per year.

Later types of waterpowered industry which were often seen in an auxiliary role to Berks gristmills in the late eighteenth and early nineteenth centuries included oil mills, hemp mills, carding mills, gypsum mills and clover-seed mills. The tendency for a gristmill to be at the center of a complex of businesses owned by the miller persisted into the early 1900s, when Berks feedmill proprietors often ran farm supply stores, hardware stores or lumber yards as well as their mills. The mill's function as an informal local social center proved equally long-lived.

Six gristmill buildings in Berks County are definitely survivors from the late-colonial and Revolutionary periods (1740-1789). (Some nine more mills for which we lack firm dates at this time appear likely to be contemporaries of these six.) The Kaufman Mill (Upper Bern Township, pre-1775) and the Snyder Mill (Exeter, ca. 1779) are excellent examples of mill buildings from this era. With their stone construction and modest size (35-to-40 feet long, 25-to-30 feet deep, one-and-one-half stories plus basement), the oldest sections of these two enlarged buildings are probably typical of the early Berks mills. The Snyder Mill retains a ruined eighteenth-century-type wooden waterwheel in what had originally been an external wheel pit.

The Kaufman Mill, however, was constructed with an enclosed wheelpit. This mill's little-altered fenestration gives clear

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evidence of the position of its original multi-level first-floor plan ("multi-level," i. e. as opposed to the simple unbroken floors found in a house of the same period). This multi-level scheme was geared to the work the gristmill's men and machinery performed, and was typical in eighteenth-century mills.

Another significant aspect of the Kaufman Mill is its survival as an intact house-mill, a two-part structure in which the miller's dwelling house directly adjoins his mill, all under one roof. House-mills were common in northwestern Europe, and the frequency of this architectural arrangement among eighteenth-century Berks mills is intriguing evidence of the persistence of European folk practices among American colonists. Four of the fifteen probable pre-1790 Berks gristmills have attached houses, and in addition there are four standing house sections of probable pre-1790 house-mills (with the mill sections absent or rebuilt). Hence over 40% of our probable pre-1790 gristmills, for which evidence exists, had attached houses. So we have reason to suspect that house-mills were common in early Berks County. The latest firmly dated Berks specimen was built in 1786. The house sections of the Kaufman Mill and the Guldin Mill (Maiden Creek, house section 1781, mill section rebuilt 1822), are distinguished by their beautiful Pennsylvania-German decorative detail, similar to that found in the finer Pennsylvania-German folk houses such as the Main House in Pike Township. The half-timber construction of the upper stories of the house section of the Kaufman Mill lends that building yet more significance. There are very few surviving

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examples of eighteenth-century half-timbering in the United States. The presence of this building method is another interesting instance in which the Kaufman Mill embodies the persistence in Berks County of common European folk-building practices.

Another early mill deserving of mention is the Brobst Mill (Albany, probably pre-1790). This mill is similar in size to its likely chronological fellows but is set apart by the log construction of its upper stories (the bottom story is stone). Our surviving sample of probable colonial and Revolutionary mills is too small to justify generalizing (15 although there were 117 gristmills in 1784), but the known prevalence of log houses in colonial Berks suggests that there may have been many mills built partially or entirely of log.

During the strong surge in the expansion of the wheat crop that took place between 1748 and 1763 there occurred in response several interrelated developments in the processing of the product. The number of gristmills increased disproportionate to the population, reaching at least 75 in Berks County in 1768 (an additional 10 businesses described simply as "mills" appear in tax lists). The construction of mill buildings became more substantial, often of stone. (Del Sordo, 75.) Millers began to employ the expensive imported French burr stones essential to the refinement of the higher grade flour demanded on the European market, and installed new power-driven machinery to clean grain before milling. (Howell, 147-48, 155.)

After 1763 the expansion of wheat production and export

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continued, though at a much slower pace than formerly. Despite this deceleration of growth, Pennsylvania attained an unprecedented wealth during the years 1769-1775. (Lemon, 224; Doerflinger, 176-77.) Britain's evolution as an ever greater net importer of foodstuffs sent wheat prices to very high levels. As a result Pennsylvanians enjoyed a standard of living in these halcyon days which they would not surpass until 1830. The Pennsylvanians of the early 1770s were possibly the most generally prosperous people in the world of their time. (Lemon, 149, 227.) The profits earned during the previous four decades of expansion had been almost completely reinvested in productive assets (more, bigger and better mills, barns, houses, fields, orchards, herds, etc.). Now people began putting significant sums into consumption, buying more imported and nonessential goods. It was at this time that the richly decorative Pennsylvania German folk art, to which Berks County made such a significant contribution, began to flower. (Swank, viii.) People had money they could spend to make their everyday surroundings and implements more beautiful.

Some people, as always, were more able to indulge their material and aesthetic yearnings than were others. Most of the families which had settled in Berks in the early years had seized the opportunity to occupy the most fertile limestone valley lands, in places like Oley and Maxatawny. At any rate, the early arrivals had had more time to develop and improve their farms. In any given year they had more cleared land they could put into

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... and more fields planted meant a larger surplus and a bigger profit. These were the farmers who were best able to participate in the more commercial market behavior described above. Millers were another sort who occupied a more profitable position in the wheat product trade. Research in depth would no doubt bear out the impression that it was the early arrivals and the millers, along with local ironmasters, who made up the participants in the "first wave" of substantial stone house-building in the third quarter of the eighteenth century.

The War of Independence (1775-1783) and the attendant dislocations brought a temporary halt to the Pennsylvania wheat export boom. The flour market collapsed, but Berks millers remained busy on account of the American army's need for sustenance. Some millers may even have prospered on account of the war. Of Berks County's five gristmills and three house sections of house-mills with firm dates from before 1790, one mill and one house section are known to date to the dark war years from 1779 through 1781, and two mills to 1783, when the war had virtually ended but the general American economy was badly depressed and the wheat export business moribund. Tax lists show an expansion in the number of Berks gristmills from circa 75-85 in 1768 to 117 in 1784, though it is possible that many of the new mills were started during the rich pre-war years of 1768-1775.

Real recovery for the Pennsylvania wheat export trade did not come until 1789, but from then through 1815 wartime condi-

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tions and poor harvests in Europe brought a return of Pennsylvania's pre-Revolutionary good times. The gristmilling industry was further stimulated by the rise of the whiskey-distilling business, which demanded ground rye. The return of favorable conditions for farmers and millers was reflected in the occurrence of a second wave of substantial stone house-building during this period. Appearing alongside the Federal-Georgian and Georgian-influenced houses were the first of Berks County's large barns.

Some millers constructed the first Berks examples of the classic gristmill building type. These large structures, such as the Hunter Mill (Hereford, 1791) and the Knabb Mill (Oley, 1809), represented an architectural development growing out of the steady expansion of merchant milling during the eighteenth century. By the nature of the business (having to buy wheat in quantity to sustain increases in production) the merchant mill had a requirement for storage capacity that the custom mill had never faced. Designing an additional floor, above the floor on which the millstones were positioned, was the solution to the need for space for storage and additional machinery. This gave the typical mill building its characteristic tall, block-like shape. From this period through the Civil War era (to 1863) a length of 40 to 53 feet, a width of 30 to 45 feet, and a height of two-and-a-half stories plus basement would be standard dimensions for a Berks County gristmill. The new buildings dwarfed earlier mills. The large size of these buildings, which

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put mills among the most imposing structures on the rural nineteenth-century Berks landscape, was necessitated by greater production. More flour called for more waterwheels, more millstones and more storage space than the typical colonial-period mill could contain. Berks gristmill architecture attained its aesthetic zenith with the Knabb Mill. With elegant Federal-Georgian decorative detail on both exterior and interior, it is the county's only industrial structure which demands recognition as one of its most beautiful buildings.

**Pennsylvania German Country: Breadbasket to the Philadelphia
Region 1818-1870**

The world changes; no industry's good times will last forever. The end of Europe's Napoleonic torments combined with the onset of Britain's "Corn Laws" and the rise of the "Old Northwest" as a great American wheat-growing region to bring a final collapse in southeastern Pennsylvania's international wheat export trade in the late 1810s.

Although wheat cultivation decreased markedly in southeastern Pennsylvania as a whole, grain production persisted as the primary agricultural enterprise in Berks and a handful of other counties (Lancaster, Lebanon, Lehigh and Northampton). The main change for Berks was that the markets for its grain, instead of being across the sea, lay just up and down the Schuylkill River. From 1820 to 1850 the Philadelphia region (defined by economic historian Diane Lindstrom as more or less the eastern

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half of Pennsylvania, western half of New Jersey, and all of Delaware) urbanized and industrialized at a rapid rate. Transportation improved phenomenally with the opening of the canals and later the onset of the railroads. The anthracite coal fields in the eastern Pennsylvania mountains above Berks began production. The effect that this regional transformation had in the agricultural sector was that a new form of farming emerged. The new Pennsylvania husbandry was much more commercially oriented, more locally specialized, and aimed at a strictly regional market. The great specialties in Berks were wheat, rye and livestock. Wheat, rye and feed crops all increased. The county's income derived from grain (and that of the other four "grainbelt" counties) rose to 150% the average of all counties in the Philadelphia region. (Lindstrom, 141.) Consequently milling in Berks underwent its own expansion.

The further growth and revitalization of the mill business in Berks from circa 1818 to 1865 is perhaps the single most important reason why the county today is home to a superb collection of nineteenth-century gristmills for study and appreciation. The number of mills in the county, 117 in 1784, increased to 167 in 1850. This simple statistic does not convey the whole picture, however. The number of mill buildings present in 1850 which had not been standing in 1784 was far more than fifty. Judging from information gathered to date, something of a "great rebuilding" of Berks County gristmills took place between 1818 and 1862. Colonial-period mills were pulled down and

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replaced with new structures. The Bertolet Mill (Oley, 1841), built over the foundations of an earlier mill, plainly visible in the present building's cellar, is an example of this widespread phenomenon. The site had first been employed by miller John Henry Kersten, circa 1725. Of 63 mill buildings for which firm dates have been determined, 31 date from this period. The timing of this wave of mill building and rebuilding is ample evidence of the great success with which Berks grain farmers and millers weathered the post-1815 transformation of the regional agricultural economy.

Notable improvements in farming methods gained wide acceptance in Berks during the second quarter of the nineteenth century, such as fertilization with lime, and six-field crop rotation with clover planting. It was in these years that the great Pennsylvania bank barn, that model of agricultural-architectural efficiency in its time, became a ubiquitous feature of the Berks County landscape. These advances in agricultural technology among the farming population at large were matched by widespread improvements in mills. Better dams and races increased the available power. Metal gears and leather belts enabled a more efficient use of that energy than wooden shafts and cogwheels had. Most important was Oliver Evans's system of automated conveyors to carry grain and flour through the mill, which cut the workforce necessary for the typical gristmill from five to two. By 1850 acceptance of Evans's automated-milling concept appears to have been virtually universal among Berks

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millers. The Census of Manufactures records only three mills (of 167) with more than two employees which do not have capitalization and production figures suggesting a particularly large scale of operation.

Additional innovations in mill technology were introduced into Berks as the century proceeded, especially in the field of motivating power. The gradual supplanting of the vertical waterwheel by the turbine where conditions allowed from about 1850 onward enabled some mills to derive still more power from the same flow of water. In 1850 federal censustakers working in eight Berks townships (with 31 mills) identified the type of waterwheel employed in a given mill. Among these 31 millers one exploratory character, John Sweitzer of Marion Township, had a turbine in place in 1850. Successful application of steampower to milling, achieved in the United States in the 1840s, meant that not even the traditional streamside location was essential any longer. In 1850 there were already three Berks mills employing steam engines, and in 1860 there were at least eight. Of these steam-powered mills, two in 1850 and three in 1860 were new, large scale (3,000-7,250 barrels per annum) flour mills in the railroad towns of Reading and Hamburg which employed steam-power exclusively. The remainder were rural mills supplementing waterpower with steampower, a common arrangement in the late nineteenth century. By 1890 many if not most mills would have alternative mechanisms for producing power. The United States Census for that year showed that, of 2,219 Pennsylvania flour and

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gristmills reporting, 743 had steam engines.

Pastry Flour and Prosperous Self-Sufficiency 1870-1900 .

The years immediately following the Civil War, circa 1865-1875, saw yet another transition in Berks County's system of wheat husbandry and flour marketing. Farmers in the Upper Midwest region of the nation (Minnesota, Wisconsin, Iowa and the Dakotas) had begun growing a strain of hard spring wheat. This type of wheat provided flour for a whiter, lighter, fluffier bread than could be derived from the winter wheat suited to Pennsylvania. Consumers soon showed a preference for the spring-wheat bread. In 1870 Upper Midwest farmers produced 74 million bushels of wheat, as opposed to the 6 million bushels they had raised in 1850. For the first time in 1870 the United States Census divided wheat production statistics into separate columns for winter and spring wheats. The rapid expansion of the national railway system in the 1860s opened northeastern markets to Upper Midwest flour.

This did not spell the end for wheat farming in Berks County, however. Winter-wheat flour was preferable for use as a pastry flour. According to census figures, the Berks wheat crop actually increased during this period, growing from 623,000 bushels in 1860 to 943,000 bushels in 1890. (Berks wheat production would remain high throughout the years covered in this essay, peaking at 1,183,000 bushels in 1910 and remaining sizable, 900,000 bushels, in 1939.) Berks milling remained a

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highly diversified business, as millers continued to process rye, corn and oats into flour, meal and feed for regional consumption. The county seat of Reading, also a rapidly growing industrial center, was an increasingly important market for Berks mill products.

Berks County millers did not respond to the postbellum transformation of the wheat market with any significant change in the way they conducted their business. Gradual improvements in waterworks, waterwheels, transmissions and gearing continued apace. It was a great improvement in American milling technology which brought a transformation of the Berks grain-milling business a decade or so later. The appearance of the roller mill on the Berks County milling scene, circa 1884, ushered in some fifteen years of technological innovation and rebuilding. Also appearing would be a degree of commercial specialization among Berks millers which had not heretofore been seen. More millers concentrated more exclusively on flour production, employing the new roller system on a large scale, and a few on the production of animal feed, building a whole new type of feedmill complex. Some of these flour or feed millers did limited local "custom" business, others not at all. A third group of millers opted to concentrate on local custom business, eschewing production for distant markets to grind cornmeal, feed and limited amounts of flour for a solid neighborhood clientele.

In the new milling system grain was fed through pairs of pulverizing porcelain or metal rollers instead of through pairs

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of millstones. Though greeted with skepticism by the more conservative minded among millers, the roller system eventually proved to be far more efficient than the traditional method. Those millers who resisted the new method, but attempted to continue refining flour as their main livelihood, came to regret their reluctance to change. The roller had the greatest impact in Berks County of any nineteenth-century milling innovation, certainly in terms of the impetus it gave toward an increasingly centralized, larger-scale flour-milling business.

The decade or so from the mid-1880s through the early-1890s could be considered the last great period of Berks flour mill construction. This greatness, however is derived from the large size of the buildings put up and not from their numbers. Mills such as the oldest section of the Brown Mill (Fleetwood, 1885), the Latshaw Mill (Washington, greatly enlarged 1885), the Spannuth Mill (Bethel, rebuilt and enlarged 1891), and the Wertz Mill (Wernersville, 1892) were designed to house sizable roller-milling operations. Their large dimensions (60 feet long by 58 feet wide, Wertz Mill) and lofty ceilings lend these buildings some of the feel of factories. Mansard roofs (some with cupolas) and Victorian decorative detail make these mills all the more imposing. In addition to these new flour mill buildings, a number of millers altered the interior of relatively large early- or mid-nineteenth-century mills and installed roller machinery. Particularly good examples of such installations are the Guldin Mill (Maiden Creek), the Dreibeibis Mill (Perry), the Sunday Mill

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(North Heidelberg) and the Braun Mill (Womelsdorf). At all of these mills the roller machinery can be seen in situ and intact today. These converted mills commonly retained a pair of millstones for feed production.

The suddenness of the roller system's impact in Berks County appears to have been dramatic. To date research and survey has identified four mills built or expanded to house rollers and an additional fourteen mills in which rollers were installed. Of these the four buildings and eight of the installations have been dated. Two of the buildings and four of the installations were done in the years 1884-1885, two of the buildings and two of the installations during 1890-1892, and two installations in 1898-1900. From this preliminary data (50% in 1884-1885) it looks like the assertion of business and technological historians that the roller system "swept" the American milling world in the mid-1880s cannot be far off the mark.

A smaller number of Berks millers, contemporaries of the roller innovators, embraced a different but also novel approach. These entrepreneurs specialized in the production and shipping of animal feed. They built feedmills such as the Walbert Mill (Longswamp) and the Dreibelbis Mill (Richmond), locating their businesses directly beside railroad lines to facilitate shipment of the feed. As the situations of these mills precluded the employment of waterpower, the Walbert and Dreibelbis mills were both outfitted with steam engines from the first (later converting to other sources of power). These buildings lacked the

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large wheelpits essential to waterpowered mills, and they were accompanied by separate structures for storage, hence they were smaller than the traditional mill building. Such feedmills continued to be built in Berks, albeit only a handful, some as late as the 1920s. The Dieffenderfer Mill (Bechtelsville, 1922) and the Brown Mill (Birdsboro, 1927) are later specimens.

A few flour millers who resisted conversion to the roller milling system also built mills in the final fifteen years or so of the nineteenth century. These were designed on the typical pattern of the early-1800s mill, with two-and-a-half stories plus basement, vertical waterwheel or turbine, and front gable end featuring a bag hoist with hood roof and doors on each level. But these late-period mills tended to be on the small side compared to most of their antecedent mills. The Mill at Lobachsville (Pike, 1887), with ground dimensions of just 41 feet by 32 feet, is an especially well preserved specimen of a late combination merchant-custom type and represents lingering hesitancy to embrace the roller system.

The close of the nineteenth century is an appropriate point at which to discuss the phenomenon of the farm mill, as those few Berks specimens which have been discovered to date were built in the late 1800s. These were small structures, complete with modest-sized waterwheels, set on streams running through the farmsteads. The Melcher Mill (moved from Washington Township to the Berks County Heritage Center, Bern Township, built 1889) is just 20 feet by 18 feet, one-and-a-half stories plus basement,

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and appears to be a typical example. Farm mills were built by farmers to meet their own feed requirements as well as to provide power for the variety of mechanical aids to farming which were then becoming increasingly widespread. In addition they were used as general auxiliary work buildings. The Borneman Mill (Washington) served as a workshop and butchering house, and its basement as a springhouse. As of this writing, only a handful of farm mills have been found in Berks, all from the Goshenhoppen region in the eastern corner of the county, but their existence in other areas cannot be ruled out. Whether or not farm mills were built in Berks before the late 1800s is unknown. The subject of the farm mill is an intriguing one for future research.

Competition and Centralization 1900-1939

The transformation of the Berks County grain-milling industry in the late nineteenth century did not have its full impact on Berks millers' business conditions until early in the next century. But the effect was profound. The innovations of the late 1800s had created considerable economies of scale for those millers with access to the necessary capital. The milling business became increasingly competitive. As the early 1900s progressed it became increasingly centralized as more and more millers were forced to stop operating. Successful mills like the Brown Mill in Fleetwood grew ever larger, transformed by subsequent additions into sprawling industrial complexes. The

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centralizing trend took place even among custom mills, as the spread of automobile ownership (including farm trucks) expanded the size of a mill's neighborhood.

As of this writing we must rely on published census statistics presented at a state instead of a county level. Still the Pennsylvania figures show such a dramatic decrease in the number of mills between 1900 and 1939 that we can clearly see what the effect in Berks of the increased intensity in competition must have been. In 1900 there were 2,719 mills in Pennsylvania (up from 2,512 in 1850), in 1919 1,283, and in 1939 only 352. Surely the Great Depression was an element in the decrease. Yet a tremendous plunge in the number of Pennsylvania mills occurred between 1900 and 1920, well before the Depression. This suggests that the intense competition among millers arising after the innovations of the late nineteenth century, along with ever-increasing mill efficiency, was the main cause of the overall contraction of the early twentieth century. Census figures for production of grain in Berks County from 1900 to 1939 do not show a decline anywhere near proportionate to that in the number of mills: 5,330,000 bushels in 1900, 5,174,000 bushels in 1920, and 4,304,000 bushels in 1939. There was still plenty of work for mills to do.

Today, in 1989, there are only five mills operating in Berks county. But there are an additional hundred or so still standing, a few of these converted to other uses, many deteriorating into ruins, all mute reminders of a bygone world.

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Gristmills are industrial buildings defined by their function: the processing of grain to produce flour, meal, or feed. The name for this type of mill is derived from the term, "grist", a batch of grain for grinding. Although technically a "gristmill" is a custom milling facility where the grist is returned to its owner after processing, the term "gristmill" is commonly attributed to all grain processing mills, and is so listed in historical records. The property type "gristmills" in this nomination refers to all grain mills whether producing flour, feed, or meal for sale, trade, or family use.

In Berks County, gristmills have housed the milling industry from the settlement period to recent decades. All gristmills have a power source. For most Berks mills this power source was water. Mills were sited in relation to the water source and the topography of the area, so that water could be brought from a stream to the exact level necessary for the operation of the water wheel. Water courses usually consisted of head and tail races and gates to control the flow of water. Often dams or ponds were constructed to impound an adequate supply to meet the mill's needs. Before 1850, vertical wheels were most common. After 1850, vertical waterwheels were gradually replaced by turbines which were in many cases more efficient and required less maintenance. Progress in technology during the mid 19th century, and later, brought new power sources that were applied to the milling of grain. Steam, deisel, and gas engines and eventually electric motors both supplemented and supplanted waterpower in mills. Mills not dependent on water power could be built anywhere, and often their siting was determined by factors such as transportation or market advantages. Many Berks mills built in the late 19th and early 20th centuries were located along railroad sidings.

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Gristmills are agriculturally-related buildings. Because Berks has always been one of the leading agricultural counties in Pennsylvania, the milling industry has been prominent here. The temperate climate, abundant rainfall, and fertile soils have favored the growing of grain crops, while the dedication and skills of the Pennsylvania German farmer, in particular, developed a very strong agricultural tradition. Gristmills served a community need in taking the farm products of wheat, rye, oats, barley, and corn, and processing them into essential food staples for both human and livestock consumption. A preponderance of Berks County mills are found in the best farming areas--the rich limestone soils of the Perkiomen, Tulpehocken, and Oley valleys.

Mills were built in this county from c.1713 to the 1920's, with the great majority of standing mill buildings dating from the 19th century. As would be expected, these buildings display many variations in size, scale, materials, spatial arrangement, workmanship, and style. The period of construction is reflected in both the architecture and the technology found in individual mills. However, all mills had certain features necessary to carry out their functions.

Mills built for water power are usually banked structures with arched openings at the upper grade level where the water enters the mill and at a considerably lower level for exit to the tail race. The head race which brings water to the mill is typically a dug waterway with earthen sides, approximately ten to fifteen feet wide, constructed along a level contour, extending from the upstream inlet to the upper level of the wheel pit. There may be a dam across the creek with a gate that will direct water into the race channel. There may also be a mill pond at the end of the race to impound the water closer to the mill building. This pond also would have a control gate. To carry the water from the race or pond to the water wheel a flume was used. Most commonly found in Berks County mills is a large cast iron pipe called a pennstock. The vertical drop from the entry level to the tail race exit may measure from 10 to 20 feet.

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The excavated water wheel pit may have contained one or more water wheels. Although these large water wheels were in most cases removed in favor of turbines, evidence of their use can be seen in the structure of the wheel pit area. Occasionally mills had exterior water wheels protected by a shed roof.

All mills had power transmission equipment--shafts, gears, pulleys and belts--which connected each milling machine to the power source, along with the necessary controls to operate these machines. The early mills had wooden works, whereas metal shafts and gearing were commonly used after the mid-19th century.

All mills had grinding equipment. Before 1880, millstones were used both for flour and for feed. Specialized stones that can be seen in many Berks mills are the French burr stones which produced high quality flour. After 1880 steel or porcelain roller mills were installed in many of the county's more progressive flour milling businesses. This development replaced the 2,000 year old tradition of stone grinding by a more efficient system. In later decades some Berks mills favored the "complete flour milling system" of the Midget Marvel which had rollers and sifters in one machine.

Other machines were used for cleaning the wheat, sifting the flour, and separating it into grades in flour mills, and still others for processing and mixing animal feed. To move the grain from one process to another, conveyors and elevators were used; and to lift bags of grain to upper stories, a bag hoist was employed. Storage bins of many types were found in mills as were hoppers that fed grain into the various machines.

Structurally, mills were substantial buildings that could bear heavy loads and withstand the forces of vibrating machinery. Berks mills typically had stone foundations, with the basement area having additional interior stone walls in the wheel pit and gear pit areas. The hurst frame which held the

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millstones--bed stone on the bottom and runner stone on the top--as well as their power drives, had massive timber framing. The upper floors had an open floor plan accommodating the mill machinery and storage bins. This open plan was supported by heavy posts and large summer beams with all joists and rafters securely fitted. Most mills were built with great skill and precision to carry out their function.

Architecturally, mills conformed in many instances to period styles and proportions. Early mills of the 18th century were built of log or stone, as were houses and barns in this region. Examples have been found of at least one log mill and another stone mill with a Germanic "kicked" roof. These early mills were relatively small in size because they were often used as custom mills, serving the local community.

Another type of mill dating from the 18th century is the "house-mill", a multi-use building with mill and adjoining dwelling under one roof. These buildings could have been all stone, or a combination of materials such as stone and frame or stone and log or half-timber. A surprisingly large number of this type of building, including both intact examples or partial "house-half" buildings, have been discovered in the Berks mill survey. Based on this sample, it is possible that as high as 40% of the pre-1790's known mills may have been house-mill combinations.

After c.1790, the "classic" merchant mill became the most important Berks mill type. Measuring 30 to 45 feet wide and 40 feet long, with a height of two and one-half stories plus basement, this mill was considerably larger than its earlier counterparts. Typically constructed of stone, or sometimes with brick after 1850, this mill was a banked building with a moderately steep gable roof and a hoist hood at the front gable. Three Dutch doors were vertically aligned at the front gable facade, which usually faced the road or lane. The wheel pit area with arches for head and tail race was in the rear basement section. A corner chimney rose from the mill office on the first floor. The fenestration pattern could have

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horizontally aligned windows at each floor level, or could have staggered windows reflecting a multi-level floor plan in the two lower stories. The interior of these mills commonly had nicely finished components: chamfered beams and joists, beaded floor boards, paneled doors, and plastered walls. These mills follow the designs set forth by Oliver Evans in his book on millwrighting published in 1795 in Philadelphia. The size, scale, and internal spatial arrangement in this classic mill building accommodated both the storage and the processing of grain in an efficient way, enabling a one or two man operation.

During the 1880's, the new technology of roller milling brought change to Berks County's mills. Progressive millers opted to convert their millstone mills to this new grinding system, while more conservative millers stayed with their traditional operations. Many Berks mills illustrate this conversion. In these mills, evidence of the stone operation can still be seen, and frequently one pair of stones was retained for grinding cornmeal and feed.

Conversion mills are architecturally the same as the classic mills. However another type of mill, constructed between the mid 1880's and the mid 1890's, was the Victorian roller mill, built strictly for flour production on a large scale. Several Berks mills of this type are four stories high with Mansard roofs and nearly square dimensions. These mills often depended on steam or internal combustion engines for their power source and a majority of them were built along railroad sidings.

Another type of mill of this period was the multi-purpose or farm mill. In this mill, water power was used to perform a variety of jobs: grinding feed or cornmeal, sharpening blades, grinding meat, washing clothes, threshing grain, or turning handles. Several farm mills were located in the eastern section of the county. The two that remain are small one and one-half story frame structures on stone foundations, with wooden gear pit areas in the basement. One larger traditionally constructed stone mill in Eastern

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Berks has been used commercially as a wooden handle/ wooden rake manufacturer, combining this enterprise with farm mill chores such as grinding feed and supplying power to the barn for thrashing.

During the 20th century, modern milling operations grew out of earlier businesses. Most large scale feed and flour mills have at their core an earlier gristmill building. These mills use the same basic technology, the roller milling process, now updated in efficiency, volume, and automation with electric power and bulk handling and storing of grain.

Mill properties usually included closely associated buildings or structures in addition to the water courses. These were the houses near the mill used as the millers' dwellings, and outbuildings such as weigh houses which contained the scales used to weigh wagons and their loads. Other buildings and structures in the mill complex often included agricultural buildings and outbuildings in a rural setting, or residential and commercial buildings in a village setting. Transportation adjuncts included roadways or rail lines which provided access to the mill loading area.

Archival research, using primary sources including maps, tax lists, and manufacturers census data has identified at least 180 gristmills in Berks County history. A field survey of these sites conducted in 1988-89 revealed that about 100 of these mill buildings survive in one form or another. Thirty-six of the surveyed mills have been converted to other uses with varying degrees of loss of integrity. Five mills have expanded and modernized operations and are actively producing flour and feed for commercial and agricultural uses. Three mills are considered ruins, including two former house-mills with the house part intact. Other ruins exist but were not listed in the survey because of its emphasis on standing buildings. Six mills are considered "preserved" because their owners are making a conscious effort to restore their works and use them as museums of milling. Two mills are still being operated in a limited but traditional

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way by uncommon men, aged 92 and 94. The remaining fifty-three mill buildings are either vacant or used for storage. The condition and integrity of these vacant mills vary greatly. Many are deteriorating or dilapidated and must be considered endangered. Others are in good condition or in need of minor repair. Overall, the prospect for their preservation is dim as they are an economic drain on their owners.

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Under Criterion A, mill buildings are significant in the area of Industry. In Berks County, milling was the most important agriculturally-related industry for two centuries when wheat was the most valuable cash crop and flour and grain products were principal commodities in the region's economy. Grain mills were built in Berks County as early as 1713 and as late as 1929. When compared with other early industrial buildings or structures which used water power, it becomes apparent that only gristmills survive in significant numbers. More importantly, many surviving mill buildings preserve to a remarkable degree physical evidence of their history, architecture, and technology. As a whole, they portray the development of the milling industry in Berks County, and show its relationship to settlement and growth patterns. In particular they illustrate their close association with farming by their concentration in the best agricultural areas of the county. The surviving grist mills are significant as being associated with a highly important industry in Berks County, and as illustrating the evolution of grist milling in the county from the early eighteenth century to 1939.

Under Criterion C, mill buildings and power systems are significant in the areas of Architecture and Engineering. Unlike most industries of the 18th and 19th centuries whose buildings and works were demolished when newer and better processes were instituted, the grain milling industry has undergone improvement without necessarily destroying its original components. Surviving gristmills provide insight into the use of power and the changes in technology that took place in the 18th, 19th, and 20th centuries. Occasionally, a complete new mill was built on the same site as an earlier more primitive structure, but in most of these cases the same water courses, dams, and races were retained. More often, new power

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generating equipment--turbines replacing wooden overshot water wheels, for instance--were installed in the same wheel pit and changes and adjustments made in only the places where they were required.

Aside from the emphasis on the engineering design or technological functions of mills in determining their significance under Criterion C, there are a number of mills important solely for their architectural merit. These are the mills that are considered exemplary or unique in construction techniques and materials, stylistic details, exceptional quality of workmanship, or sheer aesthetic expression of classic beauty.

Under Criterion D, mill buildings and sites may yield further information than heretofore assembled on the history of the milling industry. The evolution of milling technology and mill architecture in America from mid-eighteenth century to the present can be determined by reference to the several period millwright books and, after 1860, the numerous milling journals and, still later, catalogs of machinery manufacturers. Long lists of patents granted suggest the direction of development. Unfortunately, until the final quarter of the last century, millwrights only rarely created plans for their work so that detailed archival evidence prior to that time for the individual mills is practically non-existent. Given that each mill is unique due to the above mentioned factors, this creates a research dilemma which can be resolved only by study of the remaining artifacts.

The 1989 study of gristmills in Berks County points out very dramatically that the buildings themselves furnish the bulk of the information necessary in piecing together the history of the local milling industry. Archival and historical research provide merely an overview with fragmented data concerning location of mills, production figures, family ownership, and relationship to other industries. Although this information is essential in developing a context statement for the industry, there are many

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gaps in the information and nothing to show the dynamics of milling. The buildings and sites on the other hand reveal not only the details of architectural and technological changes that took place over time, but clearly point out the problems and challenges faced by a millwright in designing a working mill and fitting it precisely to a given site. The issues of reliable water power, suitable topography, protection from winter hazards and floods, and other physical requirements had to be met. Other associations can be observed on site, such as the relationship to the other buildings in the complex, the locale and scope of influence in relation to other mill businesses, the availability of transportation routes, and the association with industries other than milling. In interpreting a regional history of the milling industry in an area such as Berks County, the remaining buildings and sites become the most important resources for gaining new knowledge. Beyond this, a number of the county's exceptional mills could be considered nationally important as rare study artifacts in the field of Industrial Archeology.

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REGISTRATION REQUIREMENTS

- a. To meet Criterion A, a resource must be directly associated with the grain milling industry in Berks County between the early eighteenth century and 1939. The exterior appearance of the mill must exemplify its milling function in its architectural features and physical setting. Associated buildings in proximity to the mill will be included in the nomination boundary and classified as contributing resources if they are strongly associated with the mill through construction and history.

To meet Criterion C under Engineering, a grist mill must retain features such as power systems, transmission equipment, grinding or processing equipment and/or other machines which clearly represent good examples of engineering design or the technological function of mills. There is no specific requirement for the amount of machinery that has to remain in the mill in order for it to qualify under Engineering. Each mill from the time of its construction was unique and contained different machinery. In addition, each mill over the years evolved and removed or added machinery or both, so there can be no standard list of what must remain to be eligible. Adjuncts to the milling operation such as head and tail races, mill ponds and dams, and weigh houses will be nominated along with the eligible mill and contribute to Engineering significance if they retain integrity.

To meet Criterion C under Architecture, a grist mill must be a good representative or rare survivor of construction techniques and materials, stylistic details, quality of workmanship or other attributes representative of Berks County mills from the eighteenth century to 1939. The mill may be a good example of a type of mill building such as a house-mill, classic merchant mill, Victorian roller mill, or a twentieth century feed mill, to name a few examples. Fenestration patterns and door openings

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should typify the form and function of the building and should not be greatly altered or blocked in. Unless the mill's exterior is an exceptional or rare example, the interior architecture of the building should retain its original floor plan and open spaces.

To meet Criterion D, a mill must retain machinery, clear evidence of technology, or other information which will provide insight into local milling operations and the use of power and changes in technology which took place in the 18th, 19th, and 20th centuries. Because of the shortage of documentary evidence concerning many facets of mills and milling, most mills with high integrity will meet Criterion D in addition to other Criteria.

- b. Properties generally excluded from the National Register, such as properties less than 50 years old or properties that have been moved are not considered eligible but may contribute to historic districts. In most cases, properties that are already included in National Register Historic Districts, specifically the Oley Township Historic District or the Tulpehocken Creek Historic District, will not be individually nominated. Instead, additional documentation will be submitted that can be amended to the previous Historic District nomination forms.
- c. All buildings considered for nomination must possess integrity of location, and setting, showing clearly the siting of the mill in relation to power source, topography and relationship to the surrounding area, whether farm, crossroads, or village. All buildings must display integrity of design, workmanship and materials, essential attributes of these functional industrial buildings, built for a purpose that demanded a high degree of both engineering and construction skill. Each nominated mill must embody the associative characteristics that define it as a special or unique entity within the

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property type, and must reflect its period and its role in the history of Berks County grain milling. In its "feeling", a grain mill is like no other building. Its vast open floor plan, its massive post and beam interior construction, its deep wheel pit (with flowing water in most cases), its great gears and shafts and pulleys, its enormously heavy millstones, its intriguing and ingenious machinery - all contribute to its character, mood and essence. Some mills are primitive, others are elegant; some are neat and uncluttered, others are jammed with machines, bins and elevators; some are beautifully maintained, others are falling apart. Regardless, to have integrity, the interior of a mill building must exhibit the spaces, the structure, and the essential evidence of its function that give it the feeling of a mill.

G. Summary of Identification and Evaluation Methods

Discuss the methods used in developing the multiple property listing.

See continuation sheet

H. Major Bibliographical References

See continuation sheet

Primary location of additional documentation:

- State historic preservation office
- Other State agency
- Federal agency

- Local government
- University
- Other

Specify repository: _____

I. Form Prepared By

name/title Phoebe L. Hopkins, Historic Preservation Director
organization Berks County Conservancy date June 30, 1989
street & number 960 Old Mill Road telephone 215/372-4992
city or town Wyomissing, state PA zip code 19610

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Section number G Page 1**SUMMARY OF IDENTIFICATION AND EVALUATION METHODS****a. Mill Survey**

The Berks County Conservancy's Gristmill Survey and Multiple Property Nomination project was conducted under Historic Preservation grants from the Pennsylvania Historical and Museum Commission during the period July 1, 1988 to June 30, 1990. The project was selected by the Conservancy because of the realization that although gristmills are still numerous in Berks County, they are among the most endangered of all rural buildings. The opportunity to study and document these historic industrial buildings now, before they are gone, was made possible by the interest and involvement of the nationally known authority on milling technology, Stephen Kindig, who volunteered his professional services so that the study could be accomplished. Mr. Kindig has studied mills in the United States and abroad for over twenty-five years, has assembled an extensive archival collection of milling resource materials, has served as the technical editor for the Society for the Preservation of Old Mills, has acted as a consultant on HAER projects and on mill restorations, and has restored his own mill in Lobachville, Pa. Other survey personnel included the Conservancy's Project Director, two part-time research consultants, and twenty volunteers.

An initial list of county mills was gleaned from the Berks County Comprehensive Historical Site Survey, completed in 1987, which included a computer listing of over 10,000 buildings. The mills from this inventory were located on a working Mill Survey map (U.S.G.S. scale 1:50,000 for Berks County). Published county maps and atlases were studied (1770, 1816, 1854, 1862, 1876) and mill site locations were added to the working map. Also used was the 1976 Bicentennial Map of Historical Sites of Berks

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County, compiled by local historian George Meiser IX. These sites were field checked in the course of the survey and the original computer listing was updated after the field survey.

Files were compiled for each Township on general history and industrial development, including Pennsylvania Historical and Museum Commission Survey Forms for industrial resources and information from county histories and other secondary sources. This file was expanded during the course of the survey to include a separate file on each mill building and surveyed site.

A Mill Survey Field Form was designed by Technical Consultant, Stephen Kindig. Training sessions on the use of the form were led by Kindig in two area gristmills, attended by twenty volunteers. This form was used for an intensive survey of over 100 standing mill buildings, conducted primarily by teams of the trained volunteers.

Individual histories for each mill were prepared by research consultant, Louise Emery. These and the Berks County Conservancy Mill Survey Forms were used to complete the Pennsylvania Industrial Resource Survey Form. In addition to computer coded identification data, this form includes narrative description and history, photograph, site sketch, evaluation, and bibliography.

The file on each mill was used by the Conservancy to compile a computer summary of the mill survey. Mills were evaluated for significance in National Register criteria. The survey forms were reviewed initially by Conservancy staff and consultants in making these determinations. All mills considered significant under criteria C & D were scheduled for a site visit by Mr. Kindig.

The site visit to these selected mills included a very detailed description and analysis, tape recorded by Mr. Kindig. In addition, a site sketch of the mill and its water courses, and interior floor

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plan sketches for each floor were done by knowledgeable volunteers. Photographs were taken of exterior and interior views. A summary statement was prepared for each mill by Mr. Kindig in which he assessed the eligibility of the building for National Register listing. All completed survey forms were submitted to the Bureau for Historic Preservation for review of National Register eligibility. Meetings of Bureau and Conservancy staff resolved initial differences of opinion on the eligibility of individual properties.

Although the initial Mill Survey focussed on mill buildings, adjunct industrial buildings and watercourses, additional field survey was performed to briefly inventory other components of eligible mill complexes that could be included within nominated acreage and documented as contributing to the significance of the mills. These resources included domestic and agricultural buildings historically associated with the mills. However, the documentation of larger historic districts, such as villages which developed around a surveyed mill, was beyond the scope of the Mill Survey and Nomination project.

b. Historic Context Statement

Development of the historic context for "Grain Milling in Berks County" was the task of Research Consultant, Philip Pendleton, a PhD candidate in History at the University of North Carolina who, for the past three years, has been engaged in archival research on the Colonial Period in Berks County. A broad range of resources was used, including secondary sources, primary sources, the project's mill survey forms and summaries, and interviews with Stephen Kindig, Molinologist. (See Bibliography). In preparing the context statement, Mr. Pendleton followed the guidelines in National Register Bulletins #16 and #35, and consulted with Bureau for Historic Preservation staff in Harrisburg.

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Mr. Pendleton found valuable background information in secondary sources dealing with the economic history of the Southeastern Pennsylvania region, especially regarding early agricultural and industrial development, and commerce. Information concerning the types and numbers of mills was derived from tax lists and census statistics. Although these records are far from complete, documents such as the 1767 tax list and the 1850 census were especially informative when compared with county maps, land records, and local histories. By far the best source of information on the evolution of milling technology was the project's mill expert, Stephen Kindig. And the most helpful overall source was the Berks County mill study, including the analysis of field survey data and research findings for each individual mill, and the synthesis of this data into patterns of development.

c. Typology

The single property type, "gristmills" (grain mills, to be technically correct), was based upon function, as these were industrial buildings built for the purpose of processing grain into flour or feed. Included in the survey were multi-purpose mill buildings and other water powered mills such as sawmills and fulling mills which were often associated with grist mills. These latter buildings are few in number and these examples surveyed did not possess the degree of integrity that would make them eligible for National Register consideration. Domestic and agricultural buildings or outbuildings which were closely associated with eligible mill buildings were subsumed under the "gristmills" property type.

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d. Requirements for Integrity

Because the Berks County Mill Survey has made a determined attempt to examine every known mill in the county, as well as exploring known mill sites, this nomination is based on a knowledge of all identified properties and of their relative integrity. With the exception of a few mills which were not opened to the survey, each potentially eligible property was thoroughly evaluated by a well qualified expert on mill architecture and technology. Technical Consultant Stephen Kindig evaluated each mill in relationship to the other mills in Berks County (and beyond), considering the strengths of each and the extent to which it added substantial information or confirmation to existing knowledge concerning grain mills and milling technology. These evaluations were reviewed and discussed with the Bureau for Historic Preservation in making final determinations.

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