Colvin Run Mill Furnishing Plan

Colvin Run Mill Historic Site
Great Falls, Virginia

Fairfax County Park Authority
November 2007

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by

Dawn Kehrer

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Acknowledgements

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Purpose of the Furnishing Plan

The purpose of this plan is to guide the acquisition of furnishings and fittings in order to present a more accurate and consistent interpretation of Colvin Run Mill. While the mill structure and fixtures have been in place since its restoration by the Fairfax County Park Authority in the early 1970s, this is the first interior furnishing plan.

The time period chosen to furnish the mill is 1810 – 1850. The mill was built circa 1810 and restored to its presumed earliest appearance, which included wooden gears. Wooden gears were typical until the 1850s. Therefore, research focused on the 1810 to 1850 time period, and the findings are presented in this plan. Because no original furnishings or documentation survive from the early period of the mill, artifacts and reproduction objects appropriate to this period will be installed in the mill as they become available.

On the whole, this plan is based on Oliver Evans' descriptions of what constituted an efficient working mill system. The plan is intended to be a flexible working document and any new information will be incorporated as it is discovered.

Dawn Kehrer
2007

Methodology

Original documentation specific to the furnishings of Colvin Run Mill at its earliest period is unknown. The following resources were consulted in an effort to gather appropriate information and develop as accurate and complete a presentation as possible.

- A number of professional museum staff members from other early 19th century operating gristmills were contacted to determine whether their sites had a written furnishing plan that could serve as a model for Colvin Run Mill. While staff members were interested in the results of this report, their sites did not have a furnishing plan or similar material to send to me for reference.

- Notices requesting information about mill furnishing plans were placed in *Old Mill News,* the publication of the Society for the Preservation of Old Mills (SPOOM), and on the organization's online bulletin board, but very little response was received. Back issues of *Old Mill News* were reviewed for information about furnishings, such as tools and mill furniture.

- The Fairfax County Government Librarian consulted special resources to find furnishing plans for the mill and/or the miller's office.

- Reports from many nearby mills were read searching for furnishing plans or related information.

- The primary resource for furnishings has been Oliver Evans' book, *The Young Mill-wright and Miller's Guide.* Not only does the book outline the plan of a mill using his equipment, but it also gives clues to other necessary but conventional objects that would have been found in a gristmill, such as brooms and candlesticks.

- Other 19th century mill books by David Craik and William Carter Hughes were consulted to increase knowledge and understanding of milling history and technology. Twentieth century books about milling by authors such as Felicity Leung, Charles Howell and Allan Keller, Charles Kuhlmann, and B. W. Dedrick increased understanding of milling history and technology and provided information about furnishings. A book about Oliver Evans by Dorothy and Greville Bathe provided a great deal of information about Evans and his milling technology.

- *Colvin Run Mill* by Ross D. Netherton provided much information on the history of Colvin Run Mill. Several unpublished interviews that took place between author Ross Netherton and restoration millwright Clifford Currie were consulted for information.

- Catalogs from Sprout-Waldron Manufacturing Company, a prominent mill furniture manufacturing company, were reviewed on-site at the Muncy (PA) Historical Society for clues to possible furnishings.

- Members of the Fairfax County Park Authority administration and the Site Administrator of Colvin Run Mill were consulted in order to understand early decisions that were made about the renovation of Colvin Run Mill.

- Millers and professional museum staff members at a variety of historic sites, including Stratford Hall (VA), Washington's Gristmill (VA) and Old Sturbridge Village (MA), were contacted to ascertain the business attire of an early 19th century miller.

- Dawn Kehrer, Colvin Run Mill Historian and author of this report, attended annual conferences sponsored by the Society for the Preservation of Old Mills, where she toured working mills and mill museums to understand how milling machinery was placed in a mill and to discuss this project with other mill professionals. She also made personal visits to other mills.

- Colvin Run Mill's miller, Mason Maddox, was invaluable in promoting understanding of the major points and myriad details of the workings of a 19th century mill from a modern miller's practical experience and viewpoint.

- Shortly before publication, this manuscript was submitted for peer review to Martha Katz-Hyman, Independent Curator and former curator of the Colonial Williamsburg Foundation, who offered valuable suggestions for the final draft.

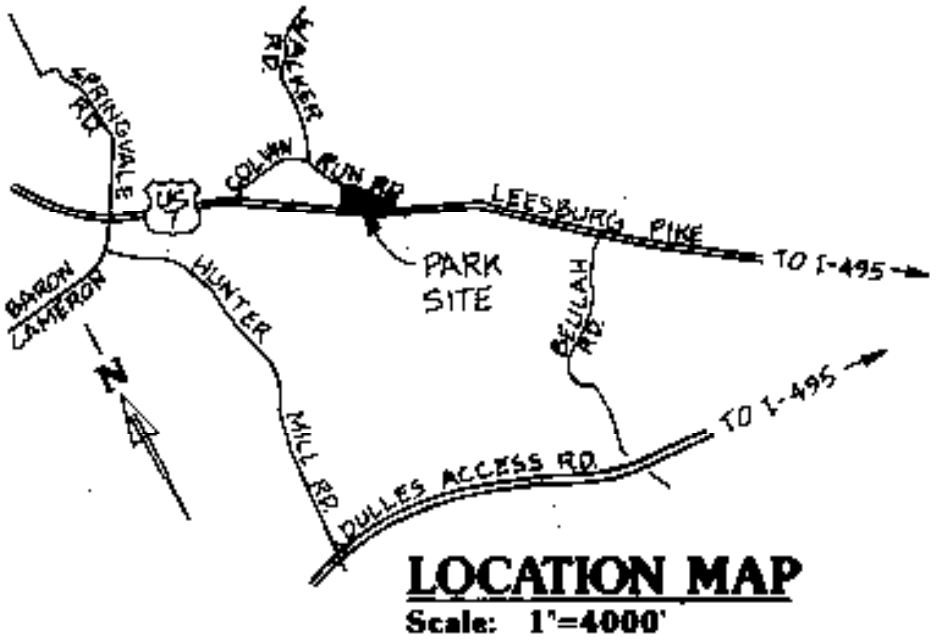
- Quantities of objects are not specified where there is no supporting documentation.

- Technical terms that are defined in the Glossary appear in italics the first time they appear in the text.

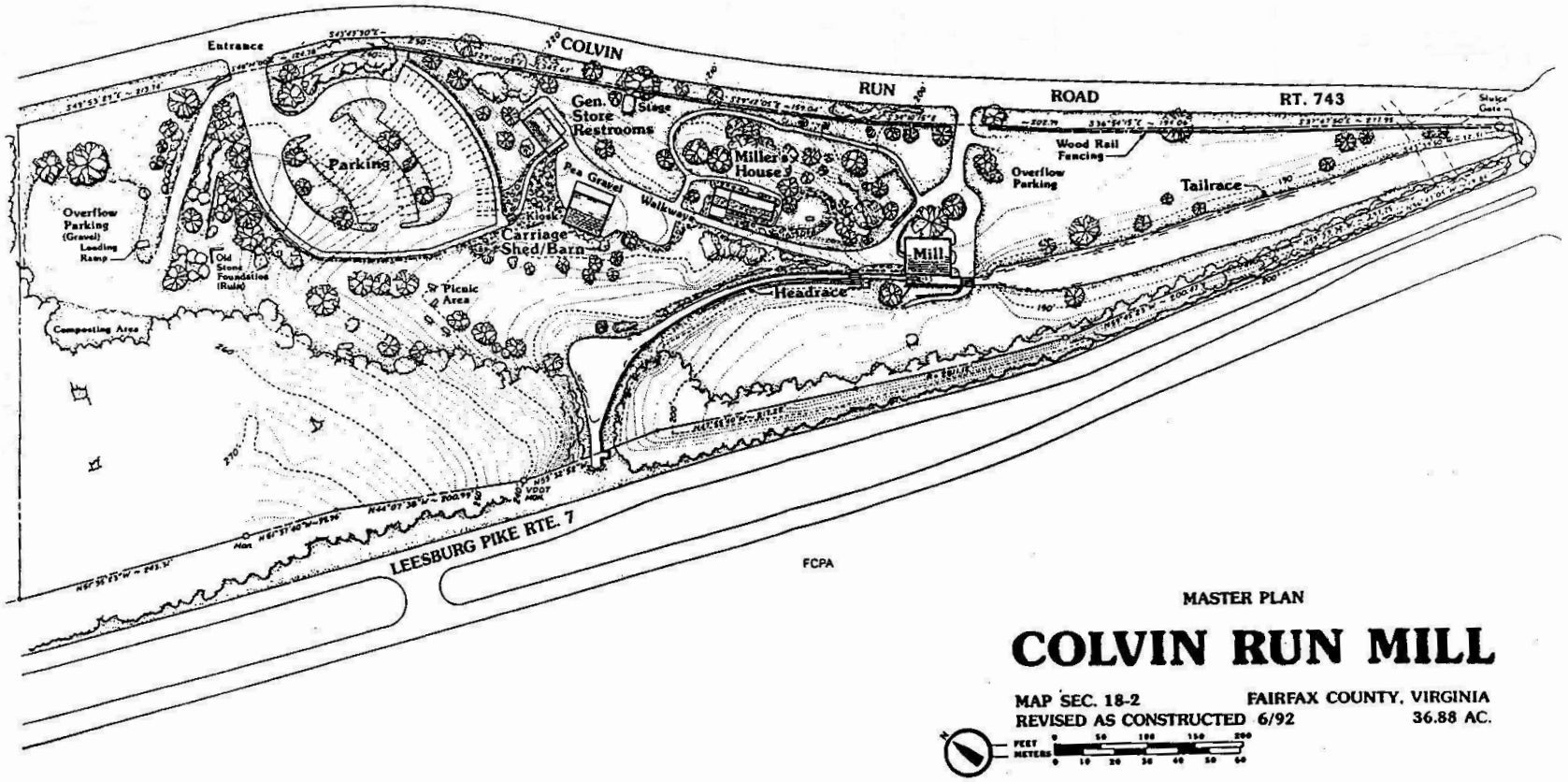
Site Description

Colvin Run Mill Historic Site is located at the intersection of Colvin Run Road (VA Route 743) and Leesburg Pike (VA Route 7) in Great Falls, Virginia, approximately six miles west of the Capital Beltway (I-495). The mill is owned and operated by the Fairfax County Park Authority. The 33-acre site includes land on both sides of Leesburg Pike.[1]

The site includes the mill, the millrace, the early 19th century miller's house, a c. 1900 general store, a barn with an outdoor blacksmith shop, a parking lot and a maintenance building. The millrace begins at Colvin Run stream on the south side of Leesburg Pike and runs under the pike. It then flows in a southeasterly direction to the mill and finally empties into Difficult Run at the eastern end of the site.



[1] Office of Comprehensive Planning, *Colvin Run Mill Historic District*, (Fairfax, Virginia: Office of Comprehensive Planning, 1972).



MASTER PLAN

COLVIN RUN MILL

MAP SEC. 18-2 FAIRFAX COUNTY, VIRGINIA

REVISED AS CONSTRUCTED 6/92 36.88 AC.

General Information

Colvin Run Mill is a circa 1810 operational, water-powered *gristmill* in Great Falls, Virginia. The mill is an example of Oliver Evans' automated milling technology outlined in his 1795 book, *The Young Mill-wright and Miller's Guide,*[1] which revolutionized the milling industry. Evans' machinery linked all the processes of grinding into one continuous flow operation by using gravity and mechanical devices that eliminated manual handling of grain, meal and flour.

The mill was acquired by the Fairfax County Park Authority in 1965 and opened to the public in 1972 after extensive renovation. Several factors guided the plan to restore the mill's presumed early 19th century appearance. One factor was the discovery of components of a *hopper-boy*, one of Evans' automatic machines, on the top level of the mill.[2] In 1968, by examining the mill's architectural style, quality of brick and type of nails found in the building, preservationist E. Blaine Cliver concluded that the mill may have been built between 1815 and 1825.[3]

The Park Authority hired Clifford Currie, a Canadian millwright-engineer, and J. B. Campbell, owner and waterwheel consultant of Campbell Hydraulics/Waterwheel Company, Philadelphia, Pennsylvania**,** to restore the mill. Walter Macomber, a designer with experience rehabilitating old houses, was also retained as a consultant. Renovation began in 1968 under the direction of Currie.[4] Lowell Hott, master cabinetmaker of Arlington, Virginia, fabricated the waterwheel, *bolting chest* and other wooden equipment in the mill. Some mill furniture from other mills was obtained to replace worn milling equipment.

While the reconstruction plans were based on the spirit of Oliver Evans' directions and specifications, the mill does not contain all five of the milling improvements designed by Evans. The mill does have an operational hopper-boy, which cooled and dried the freshly ground flour, and it has *grain elevators*, which lifted the grain or flour to upper floors. The conveyer, the drill and the descender, also invented by Evans, were not included in the restoration.

Guided tours of the first floor and basement of the mill are available. After touring the mill, the visitors view exhibits in two rooms of the Miller's House, including a hands-on

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[1] Oliver Evans, *The Young Mill-wright and Miller's Guide*, 13th ed. with additions and corrections by Thomas P. Jones, Philadelphia, Lea & Blanchard 1850; reprint, New York: Arno Press, 1972.
[2] Michael Rierson to Dawn Kehrer, October 20, 2004, "Furnishing Plan for Colvin Run Mill," personal e-mail.
[3] E. Blaine Cliver, "Preliminary Investigation of the Colvin Run Mill - - Fairfax County, Virginia." June, 1968, 2.
[4] Ross D. Netherton, *Colvin Run Mill* (Fairfax, Virginia: Fairfax County Office of Comprehensive Planning, 1976), 32.

demonstration of a grain elevator. Corn and wheat are still ground at the mill, and products are available on site from the Colvin Run General Store.

Note: Interpretation of the milling machinery and its part in grain processing could be accomplished by means of an exhibit featuring these pieces of equipment, likewise an exhibit of later milling equipment.

Ownership Periods of Colvin Run Mill

The following information was taken from the book *Colvin Run Mill* by Ross D. Netherton, from the report, "The Colvin Run Mill Tract, A Study of Ownership in the Seventeenth, Eighteenth & Nineteenth Centuries," by Sam Swartz and from the "Colvin Run Mill Docent Manual" by Mary Allen and Ann Korzeniewski.

The Colvin Run Mill property changed owners several times before the 19th century mill structure was built. The first owner, John Colville, received the land in 1739 from William Lord Fairfax. A stream on the property and the mill eventually became known as "Colvin," a corruption of his name. Colville deeded his property to William Fairfax, who devised it by will to his son, Bryan Fairfax. George Washington purchased the property from Bryan Fairfax in 1763 and owned it until his death on December 14, 1799. It then became the property of Washington's heirs.

Recent research indicates that the mill was probably built by William Sheppard, after Washington's death. In 1809, Sheppard advertised in the *Alexandria Gazette* his desire to rent "a valuable mill, which is in good order for manufacturing wheat into flour, and also calculated for country work…." (In the 1960s, architectural historians who examined the existing building style, materials and hardware agreed that the unrestored Colvin Run Mill was probably built in the early 19th century.)

On August 22, 1811, the mill site "with appurtenances there unto belonging" sold at auction to William Sheppard and Lawrence Lewis, but only William Sheppard's name appeared on the deed. On the same day, Sheppard conveyed the mill, a canal and milldam to Philip Carper of Frederick County, Maryland. (A detailed account of land transactions is outlined in the Colvin Run Mill Timeline chapter of this plan.)

Philip Carper owned the mill from 1811 to 1842. Research has not uncovered any personal documents relating to his activities as owner of Colvin Run Mill. Carper owned slaves during the time period that he owned the mill, but there is no information that they were in the mill. Carper sold the mill in 1842 to John Powell, who hired professional millers to operate the mill. When Civil War action came to Fairfax County, Powell's mill stood outside the perimeter of the forts surrounding Washington. Unfortunately, it was not far enough to be beyond the reach of patrols and foraging parties from both Union and Confederate armies. Milling operations became sporadic and eventually ceased altogether. No description of the mill immediately after the Civil War has been found.

Powell filed for bankruptcy in October 1872. An advertisement in the *Alexandria Gazette* described Powell's mill property as consisting of a "brick dwelling and usual outbuildings and a valuable brick gristmill and *merchant mill*, is wall (sic) wooded and watered and the land is of good quality." In 1883 the mill was sold to Joseph House. Preparations for reconstruction of the milldam appear to have been underway at the time

House negotiated his purchase of the mill property. Prior to receiving title, in April 1883, House filed a settlement of possible claims against him in the county land records, fearing action by neighbors whose lands were flooded as a result of work done on the milldam. Four days after buying the mill, he sold it to Addison Millard of Frederick County, Maryland. The Millard family continued to repair and restore the property-- the *millpond* and *millrace* were rebuilt, the mill and existing machinery were rehabilitated and progressively modernized.

Milling equipment and methods changed drastically during the years of the Millard ownership. *Roller milling* was first introduced to millers in the mid-Atlantic region in the summer of 1876 and by the 1880s had become popular. Exactly when Addison Millard installed roller milling equipment in Colvin Run Mill is uncertain; however, Millard's 1895 business letterhead read "Colvin Run Roller Mills."

Even though Addison Millard referred to his mill as the "Colvin Run Roller Mills," he continued to use *buhr stones* for at least part of the grinding process. In December, 1930, Sam and Alfred Millard were interviewed for an article in the trade journal *National Miller and American Miller.* They recalled that one pair of buhr stones, perhaps the oldest, was reserved for grinding cornmeal. Other buhr stones were used for grinding whole wheat or "health" flour. Buhr stones were used to crack wheat, and rollers were used to process this cracked wheat into finer flour. Using buhr stones in combination with rollers, the Millards produced about 35 barrels of white flour per day. By 1930, they estimated that their stones had ground over a million barrels of grain.[1]

Bernard Bailey purchased the mill from Samuel Millard in 1934. The deed conveyed 32 acres of land and a mill, millrace and milldam. In 1935 and 1939 photos, the mill is called "Old Mill." Bailey intended to remodel the mill and resume production of stone-ground flour and cornmeal. Because he believed that the roller milling equipment in the mill caused vibrations that endangered the old building and that flour ground by rollers was less nutritious than stone-ground flour, Bailey intended to remove the modern equipment installed by the Millards and return to the days when grain was milled solely on grinding stones.

However, in 1941, the Virginia Department of Highways relocated Route 7 from the north side of the mill to the south side. The realigned route straightened the highway, but ran between the mill and the milldam through a deep cut excavated through the hill north and west of the mill site. Engineers proposed to carry the old millrace under this section of the new highway for a distance of approximately 100 feet via a corrugated pipe.

Bailey objected to the Department of Highway's plans. He argued that the contour of the land made it likely that the pipes would frequently clog with dirt and debris and that it would be very difficult to clean them. He was unable to convince the highway department of the seriousness of these risks or persuade it to accept his suggestions for alternative routes. When construction became imminent, Bailey took legal action in an

[1] Ross D. Netherton, *Colvin Run Mill & Miller's House, Revised Draft,* (1972), 69.

effort to prevent the taking of his land. The state courts ruled against Bailey and an appeal to the United States Supreme Court was denied.

As World War II approached, rationing of machinery and building supplies made it impossible for Bailey to obtain the kinds and quantities of materials he needed to strengthen the structure and restore the machinery of the mill. He felt that little could be salvaged or renovated from the equipment that had been used by the Millards. Bailey removed the heavy cast-iron fittings and frames of the roller milling machinery from the mill, broke them up and sold them for scrap iron for wartime steel-making.

After the end of World War II in 1945, Bailey resumed his efforts to restore the mill. Major repairs, replacement of equipment and strengthening of structural weaknesses progressed slowly. The wooden waterwheel, warped and rotten, was replaced by a wood and steel waterwheel. A photograph taken during the Bailey period suggests that the grinding stations on the first floor may have been in different positions than they are today. The floor may have also been at a different height. However, no other documentation survives to substantiate the difference in the locations of the grinding stations or the floor level.

As Bailey had predicted years earlier, the pipe installed beneath the new Route 7 to convey water to the millrace did not work in practice as it had in theory. Consequently, the flow of water was insufficient to turn the waterwheel. Repairs were not made quickly enough to reverse the mill's gradual deterioration. The building stood silent and unused, except as a storehouse for its machinery and an accumulation of unused articles belonging to Bailey and his neighbors, until it was acquired by the Fairfax County Park Authority in 1965.

Colvin Run Mill Timeline

The information in this section originally appeared in the book *Colvin Run Mill* by Ross D. Netherton, in the report, "History Notes: Old and New Thoughts on the Early History of Colvin Run Mill," by Dr. Christine Jirikowic, Fairfax County Park Authority and in the report, "The Colvin Run Mill Tract, A Study of Ownership in the Seventeenth, Eighteenth & Nineteenth Centuries," by Sam Swartz.

The first owner of the Colvin Run Mill tract of land was England's King Charles I in the early 1600s. At that time, the Colvin Run Mill property was part of a much larger tract of land known as the Northern Neck Proprietary. The Northern Neck Proprietary was described as "…beginning at the first headsprings of the Rappahannock and Potomac Rivers, including the courses of these rivers to the Chesapeake Bay, with all lands and islands in between, including the opposite river banks. The western boundary was a line drawn between the headspring of the south branch of the Potomac River and the headspring of the Conway River, a branch of the Rapidan. The total acreage of the Northern Neck Proprietary ultimately was in excess of 5,282,000 acres."

In 1649, Oliver Cromwell executed Charles I and exiled his son, Charles II, to France. Charles I's supporters joined Charles II in France, leaving all their earthly goods in England. To reward these supporters, Charles II created a land patent (an instrument by which unappropriated land is conveyed by a proprietor to an individual) from the Proprietary and divided it among seven of his and his father's friends and supporters. Through four decades, the land passed through the control of a number of proprietors until it eventually became the property of Thomas, Fifth Lord Fairfax, when he married Catherine Culpeper, whose father owned the entire Northern Neck at the time. William Fairfax, son of Thomas, became his father's agent for the Northern Neck Proprietary.

August 17, 1739	William Fairfax grants Colonel John Colville a total of 9,823 acres of land including 5,568 acres around Difficult Run. Of the 5,568 acres, 275 acres were the Colvin Run Mill tract.
January 23, 1740	Colonel John Colville deeded back to William Fairfax 7,272 acres of land from the original 9,823 acres.
June 19, 1742	Fairfax County is created by legislation. John Colville and William Fairfax are appointed justices to the County Court.
1757	Loudoun County is created and encompasses the land west of Difficult Run including William Fairfax's tract.

1757	William Fairfax dies. The 275-acre Colville tract is devised by his will to Fairfax's son, Bryan Fairfax.
April, 1763	Bryan Fairfax sells this property to his friend and former commander in the Virginia Militia, George Washington, for £82.10.
1769	The Virginia House of Burgesses sends George Washington and Richard Henry Lee to the Great Falls area to explore the possibility of building a canal. The Patowmack Canal Company is established and local property values increase.
1769-1785	Two *mill seats* are established on Washington's land.
1781	The American Revolution ends.
June, 1783	Washington writes to Bryan Fairfax, mentioning the land he purchased from Fairfax on Difficult Run where he plans to build a mill.
January, 1785	George Washington rents his Difficult Run tract to "Mr. Douglass" (probably Hugh Douglass) for £50 per year.
1787	Oliver Evans designs the revolutionary automated mill for flour milling.
May, 1793	William Sheppard tries to gain control of Washington's 275-acre tract by petitioning to have it condemned. He fails.
August, 1793	Washington writes to Robert Lewis, referring to his 300-acre Difficult Run property, which now includes a mill seat.
1795	Oliver Evans publishes *The Young Mill-wright and Miller's Guide.*
May 17, 1795	Washington sells his Difficult Run tract to John Gill for £2,000.
1798	The boundary between Fairfax and Loudoun counties is redrawn to its present alignment. The Colvin Run Mill tract is now in Fairfax County.
October 13, 1799	Washington repossesses his land from Gill for non-payment.
November 7, 1799	On a surveying trip, Washington finds that William Sheppard has "discovered" a vacancy on Washington's Difficult Run tract. He sets out to block Sheppard's claim.

December 12, 1799	Washington meets with Bryan Fairfax to discuss the Difficult Run dispute.
December 14, 1799	George Washington dies.
September 8, 1800	William Sheppard is granted 4 ¾ acres of land south of Difficult Run.
May 1801	William Sheppard is granted 49 ¼ acres on the north side of Difficult Run.
1801 – 1811	During these years there were negotiations and legal actions between Sheppard and Washington's heirs with the eventual ownership of the land belonging to Sheppard.
1802	Martha Washington dies. .
July 22, 1809	Sheppard advertises in the *Alexandria Gazette* (in 1809 the newspaper was named *Alexandria Daily Gazette, Commercial & Political)* to rent out "a valuable mill, which is in good order for manufacturing wheat into flour, and also calculated for country work."
April 23, 1811	Sheppard advertises in the *Alexandria Gazette* to rent or sell the mill with 70 acres. The advertisement also mentions a dwelling house, kitchen, cooper's shop, other buildings and a peach orchard.
August 22, 1811	William Sheppard and Lawrence Lewis (one of Washington's heirs) buy the advertised property for $5,230. Sheppard receives title to the land.
August 22, 1811	In the next recorded deed, Sheppard sells 90 acres including the mill, mill house, dam, race, etc., to Philip Carper.
October, 1813	Carper purchases 37 acres from Sheppard adjoining the 90-acre mill tract and east of the Leesburg Road.
1818	Leesburg-Alexandria Turnpike Company is chartered to build a more direct connection with the Shenandoah Valley.
1820	Carper family first appears in the census for Fairfax County.
1835	Philip Carper petitions for a change in the location of the road leading from the Turnpike "near Gunnell's shop to Carper's Mill" to benefit traffic to and from the mill. Petition is denied.

1840	Leesburg-Alexandria Turnpike is completed.
1842	Carper sells the mill to John Powell of Fairfax County. Powell initiates a new petition for a road connecting the mill with the turnpike. The petition is denied. Powell hires professional millers to operate the mill while he holds various public offices and speculates in real estate ventures.
1840-1860	New trades and services move near Colvin Run Mill including a sawmill, blacksmith shop and general store. Settlers from the north introduce new farming techniques. Grain becomes a leading crop in Fairfax County.
1861-1865	Union and Confederate troops foraging for food deplete area harvests and bring the merchant milling business to a standstill.
1870-1880	John Powell is listed on the Fairfax County census as a farmer during the depression following the Civil War.
1872	John Powell files for bankruptcy. His property, including the mill, is assigned to be sold.
1883	Joseph House buys the mill and sells it three days later to Addison Millard of Frederick County, Maryland.
1883-1895	Addison Millard installs roller milling equipment at Colvin Run Mill.
1897	Two steam turbines are installed in the mill.
April 5, 1898	Addison Millard dies. His widow Emma, along with their sons Samuel and Alfred, continues to operate the mill.
1900	Mark Cockrill owns a general store across the road from the mill.
April 23, 1919	Emma Millard dies. Sons Sam and Alfred continue to run the mill as partners.
1920	The Millards buy two motor trucks. Flour is taken to Hunter Mill Station (near present day Vienna) and shipped to Washington, D.C., Richmond and neighboring states.
1930	Electrical service is installed from the Leesburg-Alexandria Turnpike to the Georgetown-Leesburg Turnpike.
1934	The Millard family sells the mill to Bernard Bailey.

1941	The Leesburg Turnpike (Virginia State Route 7) is relocated to south side of the mill.
1965	Fairfax County Park Authority acquires the mill site of approximately 35 acres.
1968-1972	The Fairfax County Park Authority works to restore the mill and miller's house. Mark Cockrill's general store is moved from its original location across the road from the mill to its present site.
1972	Colvin Run Mill Historic Site opens to the public.

Exterior Architecture

Colvin Run Mill is an example of vernacular industrial architecture. The four story mill is built of plain red brick laid in a three-course common (or American) bond pattern on a stone foundation. The chief characteristic of the original brickwork was its uneven quality**.** During reconstruction of the mill, a large portion of the original bricks were replaced with new bricks specially treated to match the color, size and texture of those used in the early 1800s. The craftsmen, masons and woodworkers who built the original mill are unknown.[1]

About 1900, the west wall of the mill collapsed and was replaced with a *clapboard* wall.[2] Several factors probably contributed to the collapse of this wall. The foundation on the west side of the building was built on unstable ground, and the *hurst frame*, a heavy open framework that encloses the gears, had originally been attached to the brick wall. It is likely that the instability of the ground and the vibrations from the gears seriously weakened the wall.[3] During the restoration of the mill in the late 1960s, a new foundation was built and a freestanding wooden hurst frame was built to enclose the gears and absorb any vibration.

On the exterior walls, at intervals of approximately five feet vertically and horizontally, are a series of holes about four inches square and several inches deep. These *putlog holes* mark places where the beams of the bricklayers' scaffolding were inserted in the wall as the building was erected. On completion of the work, the scaffolding was removed and the holes remained in the brickwork. These holes were reproduced in their proper places in the reconstructed portions of the mill wall.

In cool weather**,** heat inside the mill was provided by two fireplaces, one in the basement and the other in the miller's office on the first floor. The chimney, constructed of brick and incorporated into the interior wall, has two flues and serves both fireplaces. At the top of the chimney, four courses of brick form a *corbelled cap* (one that extends outward and upward). To conform to the county building code, the chimney built during reconstruction is taller than the one it replaced.[4]

Each floor of the mill has exterior *batten* doors. On the basement level, a *Dutch door* is located in the south wall. (Most visitors leave the mill through this doorway.) On the first floor, another Dutch door is located in the north wall. (This is the door most visitors use to enter the mill.) A second exterior door is visible in the east wall of the basement in photographs taken in the early 20th century. When the mill was reconstructed, this doorway was converted to a window to achieve what was thought to have been its

[1] Netherton, *Colvin Run Mill*, 35.
[2] Clifford Currie, interview by Ross D. Netherton, January 22, 1972, Fairfax County, VA, written.
[3] Netherton, *Colvin Run Mill,* 40.
[4] *Building Officials Conference of America, Inc.,Basic Building Code, 1965. Section 1008.61., 252.*

original appearance.[5] Grain products were transferred to wagons in the mill yard through double doors in the east wall. A Dutch door is located in the west wall of the first floor near the northeast corner of the building where the flume reaches the waterwheel. Here a person standing inside the mill can overlook the wheel and control the rate of water flowing from the *flume* (or sluice) over the waterwheel. Doorways in the north wall of the second and third floors provided a means of moving grain and grain products or bulky equipment in and out of the storage areas. A pulley would have been suspended just outside the north gable end to raise and lower loads from the ground level to the upper stories.[6] Although old photographs of the mill show a patched area where a pulley may have been, no architectural evidence was found during the renovation of the mill to verify the existence of one, and Netherton notes that confirming documentation is not available.[7] A *rafter* may have extended above the gable door at the rafter tie level to support a pulley.

All of the existing doors were badly deteriorated and were thus replaced during reconstruction. In several instances, Clifford Currie, the Park Authority millwright-engineer, hand forged hinges, latches and nails with bar steel similar to that used by millers and blacksmiths of the early 19th century. The doors made during the reconstruction were distressed by using wire brushes and chains to give them an aged appearance. Most of the doorways of the mill are constructed with *flat jack arches*, a feature carried over from the mill's original design. In 1996, the bottom halves of the basement and first floor Dutch doors were replaced.[8] These new doors were not distressed to match the upper half.

The window sashes are new construction made of oak. The window frames are oak timber mortised into oak sills with wooden pegs. All windows are double-hung wooden sash, with 12-over-12 *lights* in the basement and first floor windows and 12-over-8 lights in the second and third floor windows. Most of the windows in the mill have flat jack arches. The window panes in the reconstructed mill were manufactured with irregular texture to simulate the appearance of original early 19th century window glass.

The mill has a gable roof. The exterior of the gable ends is clapboard painted red. Inside, the roof is framed with half-lapped rafters fastened with wooden pegs at the ridge board. The north gable end has two windows and a loading door of batten construction; the south gable end has three windows. Before reconstruction of the mill, each gable end had one small window near the peak of the roof and two larger windows beneath it. During reconstruction, the small windows were removed on the south wall and replaced with three windows in a row.

Three different types of earlier roofing materials were found during reconstruction. Hand-split cedar shakes appear to have been the earliest material. The presence of other

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[5] Netherton, *Colvin Run Mill & Miller's House, Revised Draft*, 123.
[6] Felicity Leung, *Grist and Flour Mills in Ontario: From Millstones to Rollers, 1780s—1880s.* (Quebec, National Historic Parks and Sites Branch. 1981), 83.
[7] Netherton, *Colvin Run Mill and Miller's House, Revised Draft*, 124.
[8] Mike Henry, informal interview, October 2004, Fairfax County, VA.

cedar shakes with saw marks suggests that these were used in later repairs or replacements. Still later, the mill was covered with corrugated sheet tin roofing. For the mill reconstruction, hand-made cedar shakes were laid on wooden slats fastened across the rafters. Roman numerals cut into the wooden rafters indicate they were part of earlier or original timbers.[9] The present-day mill roof is made of cedar shakes laid circa 1993.[10]

Water to turn the waterwheel that powers the milling machinery comes from Colvin Run stream. A pumping system pumps water into the *headrace* on the south side of Route 7. The headrace channels water under Route 7 in a corrugated metal pipe. On the north side of the highway, the headrace is formed by rock walls built by the Park Authority to replace earlier earthen walls. These walls are concrete block, faced with local rock, and set upon a concrete base. In 2003, the headrace and the rock wall portion of the *tailrace* were sealed with shotcrete, a waterproofing mortar sprayed onto the walls.

The headrace ends at the flume, which carries water to the waterwheel. The flume is a long wooden box constructed of oak planks and sealed with varnish. (Varnish was applied in a 21st century effort to extend the life of the wood.) The flume is supported by a series of posts, braces and beams set on rock bases which, in turn, stand on concrete footings. Two wood gates, one at each end of the flume, are raised or lowered with metal flywheels. Photographic evidence shows that the pre-restoration flume did not use the flywheels. In the early 1800s, wooden levers were typically used to lift the gates. A lever at the waterwheel would have extended through the wall and probably went through the floor to the basement so adjustments could be made from there. A head gate allows water into the flume and a wheel gate allows water over the waterwheel. On the outside of the flume a *sluice gate* can be raised to let water flow out of the flume without going over the waterwheel. The present flume was built in 2002 by the restoration carpentry team of the Park Authority. The tailrace begins at the waterwheel and extends to a point where the water empties into Difficult Run.

The *overshot waterwheel* is 20 feet in diameter and constructed of 20 wooden spokes extending outward from a wooden axle two feet thick and 20 feet long. Sixty 15-gallon capacity *buckets* catch water from the flume above. The axle on which the wheel turns is fitted into wooden headblocks in the outer wall of the raceway and in the basement of the mill. The waterwheel from the reconstruction of the late 1960s was replaced in 2003 because it had deteriorated**.** Except for some minor changes, the new wheel was built to those specifications.[11]

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[9] Netherton, *Colvin Run Mill & Miller's House*, *Revised Draft*, 126. It was the practice of 18th and 19th century builders to mark rafters in this way when they were cut, joined at the peak and drilled for insertion of the wooden pegs. After being formed and fitted on the ground, marked pairs of rafters were disjoined and hoisted to the top of the building separately. Here they were matched up by their markings, reassembled, raised and fastened in place.

[10] Mike Henry, informal interview, October 2004, Fairfax County, VA.

[11] Mason Maddox, informal interview, October 2004, Fairfax County, VA.

Basement

Interior Architecture

Access to the basement from the outside is through a Dutch door located in the south end of the mill or down a centrally located stairway from the first floor interior. A small, steep set of stairs against the north wall from the basement to the first floor was removed during reconstruction because it was unsafe.[1]

The principal feature in the basement is the *gear pit* which extends the length of the building on its west side. It is excavated four feet below the basement floor and is nine feet wide. (A wooden railing in front of the gear pit protects visitors.) The walls and floor of the pit are made of the same stone used to build the foundation of the mill. The concrete floor in the rest of the basement was added in 1998. Windows are capped by wood *lintels.*

When the Park Authority purchased the mill, a door of unknown date stood in the east wall. During the restoration, this door was removed and a window was installed in its approximate place.[2] Also, there is evidence that at one time a trap door was located in the ceiling of the basement. The door was not replaced by the renovation team. This door would have allowed access for the rope hoist that is at the top of the mill to reach the basement.

Wooden posts support the massive wooden beams that support the first floor. Some posts have been brushed with wire to help integrate old and new pieces of wood.[3] The fireplace in the northeast corner was reconstructed during the renovation of the mill. An existing cast iron lintel was replaced with a wooden lintel, but the new wooden lintel burned soon after it was installed. The burned wooden lintel was covered with a metal sheet and another wooden lintel was placed over the metal. [4]

Oliver Evans' plan called for a grain storage area to be located directly beneath the first floor beam scale, which weighed the grain .[5] An inclined floor in the storage room guided the grain to a grain elevator so it could be delivered to an upper floor for cleaning. During the reconstruction a room was built beneath the beam scale for this purpose. One part of the room houses modern electrical equipment and the other part is the grain storage area, although it is not currently used for storage.

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[1] Netherton, *Colvin Run Mill & Miller's House, Revised Draft*, 138.
[2] Ibid., 123.
[3] Netherton, *Colvin Run Mill*, 40.
[4] Maddox, informal interview, 2005, Fairfax County, VA.
[5] Evans, Plate VIII.

Functions

The gear pit contains the hurst frame. This heavy open framework of white oak posts and beams sits on the foundations of the building, but is not attached to the walls in order to protect them from vibrations caused by the movement of the machinery. The gear pit provides space for the gears to turn, the source of energy for operating the mill machinery. The remainder of the basement space could have been used in various ways. Grain or other materials and mill equipment may have been stored there. The miller may have used this space for woodworking and equipment maintenance and storage. Besides serving as a source of heat, the fireplace may have been used to heat the iron brands that were applied to flour barrels.[6]

Today, this basement space is used to exhibit historic milling objects from a later time period and to store modern cleaning supplies and modern tools.

Fixtures and Furnishings

Shaking sieve, lighter staff, bray iron, bray and bridgetree

[6] Charles B. Kuhlmann, *The Development of the Flour Milling Industry in the United States.* (Boston and New York, Houghton Mifflin Company, 1929; reprint, Clifton, NJ: Augustus M. Kelley Publishers, 1973), 32.

Hurst frame, gears and shafts, meal bin, shaking sieve, elevators, stone spindle
During reconstruction, either Clifford Currie or others under his direction made the wooden machinery in the basement.[7] The gears and milling equipment in the basement are made of white oak, with the exception of the gear teeth, which are made of *rock maple.*

The *hurst frame* is divided into two sections, one covering roughly two-thirds of the gear pit and the other covering the remaining third. The interior *head block* for the waterwheel's main shaft is set into the larger of these two gear pit sections. The main shaft is 19 feet six inches long and two feet in diameter. The arms of the waterwheel fit into pockets in the shaft outside the mill. The arms of the 10-foot greater *face gear* are mortised through the shaft on the inside. The greater face gear turns on the shaft as the waterwheel turns. A series of rock maple teeth are set into the rim of the greater face gear to engage several other gears. One of these gears is attached to a vertical power shaft that extends to the top floor of the mill and transmits power from the waterwheel to the machinery on the upper floors and to the grain elevators that extend to all floors.

The greater face gear also moves two *wallower* gears that are on shafts at right angles to the main shaft. The wallowers have *rounds* (rather than teeth) formed of wooden pins sheathed in metal and set between wooden disks.[8] Two lesser, or smaller, face gears are on the opposite ends of the same shafts as the wallowers. When the wallower turns, the shaft turns and moves the lesser face gear. The teeth of the lesser face gear engage with the rounds of the *stone nut*. The stone nut turns the *stone spindle*, which supports the runner stone on the first floor. An iron bar called a *driver* turns the runner stone and fits over the top of the stone spindle. To begin the motion of the machinery, and prior to starting the waterwheel, the miller engages the greater face gear with the wallower by moving a lever on the gear shift block. When the lever is moved, the shaft moves the wallower to mesh with the greater face gear. There is a third lesser face gear in the smaller section of the gear pit. It takes its power from the shaft in the larger section of the gear pit by means of a simple metal joint coupling called a dog clutch.

Stone spindle, stone nut, bridgetree, lesser face gear

The stone spindle rests in the *footstep bearing* in the middle of a beam called the *bridgetree*. Below the stone nut on the stone spindle is a wooden cam that rotates as the spindle turns. When the cam rotates, it hits a long wooden arm attached to a shallow wooden tray called a shaking sieve that is suspended from its wooden frame by a pair of leather straps. According to Evans,

[7] Netherton, *Colvin Run Mill*, 35.
[8] The rods are covered in metal for longer wear. This was not a 19th century practice.

> "Shaking sieves are of considerable use in country mills, to sift Indian meal, separating it, if required, into several degrees of fineness; and to take the hulls out of buckwheat meal, which are apt to cut the bolting cloth; also to take the dust out of the grain, if rubbed before ground: they are sometimes used to clean wheat, or screenings, instead of rolling screens." [9]

Ground grain falls through a wooden spout from the grinding station located on the first floor directly above onto the shaking sieve. The sieve is inclined downward so that the grain will gradually fall and be sifted as it is shaken. A shaking sieve located in the basement sifts all grain produced in the reconstructed mill. In the Evans automatic milling system of two centuries ago, the ground flour was lifted to the top floor of the mill from the basement by grain elevators. There it was cooled and dried in the hopper-boy and then sifted in the bolting chest on the floor below.

Lighter-staff, bray, bray iron, bridgetree, weight with leather strap

The *lighter-staff*, *bray*, bray iron, bridgetree, and weight work together to support and adjust the *runner stone* on the first floor. The bray and bridgetree are horizontal beams incorporated within the hurst framing. The bray supports one end of the bridgetree which, in turn, supports the footstep bearing. The other end of the bridgetree is supported by the bridgepost. The stone nut is positioned above the bridgetree. The stone spindle goes through the center of the stone nut and bedstone and supports the runner stone. The lighter-staff is a lever that moves the bray, thus raising or lowering the bridgetree which moves the stone spindle to adjust the runner stone. The bray iron connects the lighter-staff to the bray. The miller sets the lighter staff in position and secures it by the leather strap that is wrapped around the lighter-staff. The weight is made of iron and is attached to the leather strap; earlier weights may have been made of wood and were conical or bottle shaped.[10] As Thomas Ellicott notes in Evans':

Weight

> "This lighter (staff) is fixed in front of the mill-beam, at such a height as to be handy to raise and lower at pleasure; a weight of 4 lbs. is hung to the end of it by a strap, which laps two or three times round, and the other end is fastened to the post below, that keeps it in its place."[11]

Note: If a lever were in place in the mill to control the gate at the waterwheel, it would be near the bray post at the first grinding station.

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[9] Evans, 327 – 328.
[10] Maddox, informal interview, 2005, Fairfax County, VA.
[11] Evans, 318.

Grain elevators

Grain elevators were an innovative feature of Evans' system that revolutionized the milling industry in the late 1700s. These elevators move grain and meal vertically throughout a mill by means of a continuous belt to which a series of evenly spaced metal cups are attached. The reconstruction team placed three grain elevators in the mill but none of them actually transport grain or meal. The elevator boots or bottoms are located in the basement and the elevator heads or tops are on one of the upper floors of the mill. The belts pass over pulleys in the head and the boot and are driven by the pulley in the head. The belts are enclosed in square wooden cases that help contain spilled grain or meal.[12]

Grain elevator

In the 19th century the belts were made of leather and the cups were made of either metal or wood.[13] In Colvin Run Mill, the grain elevator belts are made of a man-made material and the cups are metal.

Grease and grease container

One of the miller's duties that Oliver Evans listed was to remember to grease the gears and the spindle foot, located in the basement, and also to "…review all the moving *gudgeons* of the mill, to see whether any of them want grease…"[14] Gudgeons are metal extensions mounted in the end of shafts that run in bearings and are found at the ends of shafts on all floors of the mill. According to the late Charles Howell, former miller at Philipsburg Manor, New York, in the 18th century millers used rendered animal fats as lubrication for gudgeons.[15] The need for a lubricant suggests that a grease container could have been kept in the basement close to the gears and carried to wherever it was needed to lubricate moving parts.

Lighting device

Although natural daylight enters the basement by windows and a door, artificial lighting would have been needed as darkness fell. Candles were a source of artificial light in the 19th century. Evans cautioned that mill fires were sometimes started by careless millers sticking a candle to a cask or by candles left burning in a wooden candlestick.[16] Lanterns were another lighting device used in this time period, although Evans does not mention them.

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[12] The cases have small openings at eye level with doors that can be easily removed so that visitors can see the elevators move. These openings would have also been in the original cases to monitor elevator movement.

[13] Evans, 230 – 231.

[14] Ibid., 281.

[15] Charles Howell and Allan Keller, *The Mill At Philipsburg Manor Upper Mills and a Brief History of Milling*, (Sleepy Hollow Restorations, Inc., 1977) 35.

[16] Evans, 282.

Fireplace equipment, wood, tools for repairs
The fireplace provided a source of heat for the miller. Fireplaces in the first half of the 19th century were typically furnished with andirons to support burning logs placed on them.[17] A shovel, poker and tongs would be needed to tend the fire.

Branding iron
By 1772, flour for export had to be branded with the owner's name or the name of the mill and the brands had to be recorded in the County Court.[18] Evans states that among other duties of the miller early in the morning, the casks (or barrels) should be branded.[19] Evans also states that millers sometimes started a fire in the mill by carelessly laying down a hot branding iron and forgetting about it.[20] Because a fireplace is in the basement, the branding iron may have been heated here and applied to the barrels.

Although no documentation exists for the use of this space, the miller might have done woodworking in the basement, for which he would have needed appropriate tools. Among them would have been a shaving horse and drawknives, spiral augers, saws, hammers, planes, extra leather straps for the elevators, a hole punch for the straps and a workbench and vise. Evans said, "…then the miller may keep by him a quantity of cogs ready turned to a gauge, to suit the auger; and when any fail, he can put in new ones, without much loss of time."[21]

Guided Tour Interpretation
Visitors may come to the basement down a flight of stairs from the first floor or through a Dutch door at the basement level in the south end of the building. A railing separates the visitors from the gear pit. In the basement, the tour guide will explain the functions of the various gears and the operation of the shaking sieve. Visitors will also view the waterwheel outside the mill. From the waterwheel the guide takes the visitors to the Miller's House to interpret exhibits in two rooms and then ends the tour.

[17] Note: Treat wood for pests before placing in the fireplace exhibit.
[18] Kuhlman, 32.
[19] Evans, 281.
[20] Ibid., 282.
[21] Ibid., 198.

First Floor

Interior Architecture

Entry to the first floor from the basement is by a wooden stairway located in the center of the building. This stairway has a plain wooden rail, which extends to form a railing on three sides of the stairwell on the first floor. The first floor may also be entered through a Dutch door at ground level on the north side of the mill. Grain could be unloaded into the mill for weighing through this door. Drawings in Evans' book show a person pouring grain from a sack through a spout in the wall,[1] but it is not known whether this mill had such a spout.

Directly inside the north door is a stairway that leads to the second floor. This stairway came from the Kinsley Mill in Prince William County, Virginia, and replaces the stairway that was in the same location before reconstruction. The stairway that was taken out was built in two flights with a landing midway between the floors.[2] A grate just inside the door where grain flowed to a storage area in the basement was also removed from the floor.[3] Barrels of meal and flour left the mill through a doorway with double wooden doors on the east side of the mill.

Brick arches and wooden lintels crown the tops of several windows on the first floor. Similar brick arches over the basement windows on the east side of the mill are visible near the floor. The floor was replaced during renovation and stained a dark color in 1996. The miller's office is in the northeast corner of the first floor. A fireplace with a brick hearth is built into the northeast corner of the room. The fireplace was reconstructed with its presumed original design.[4] The office is partitioned from the milling area with wooden walls and the only interior (Dutch) door inside the mill. It appears that the open spaces between the top of the walls and the ceiling were once blocked so that grain dust would not drift into the office from the milling area.[5] Two windows in the miller's office let in natural light.

Functions

The reconstructed first floor shows the weighing, grinding and packing operations. Thomas Ellicott's plan of a mill in Occoquan, Virginia, shows weighing, grinding and packing activities on the first floor.[6] The miller's office provided space for activities, such as meeting with customers and keeping records, correspondence and books. Grain

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[1] Evans, Plates VIII, IX, XXII.
[2] Netherton, *Colvin Run Mill & Miller's House, Revised Draft,* 138.
[3] Clifford Currie, interview by Ross D. Netherton, 22 January 1972, Fairfax County, VA, written.
[4] Netherton, *Colvin Run Mill & Miller's House, Revised Draft,* 123.
[5] Maddox, informal interview, 2005, Fairfax County, VA.
[6] Evans, Plate XXII. Chapter XIX of Evans' book was written by Thomas Ellicott, millwright. This chapter includes Ellicott's prefatory remarks and practical instructions, with drawings, for building a mill.

milling was done at the grinding stations. There are three stations in Colvin Run Mill located along the west wall, although only the middle station is currently used for grinding.

Note: In addition to interpreting exhibits and tours, present day use of this space is for special programs as well.

Fixtures and Furnishings

Miller's Office

Desk, chair, account books and papers, trade books and catalogues
In an 1850 printing of Evans' book, millwright Thomas Ellicott provided instructions, material lists and floor plans for a mill. On his drawing for the first floor, Ellicott planned for "a room for the miller to keep his books in."[7] Leung states that "A small room was partitioned off as a mill office where a desk, chair, shelves for catalogues, business correspondence and mill accounts were filed."[8] Books and catalogues on milling may have been kept in the mill office for easy reference. Many extant 19th century mills have a room that fulfilled this purpose. Like most 19th century farmers, merchants and tradesmen, the miller might have also kept an almanac on hand.

Fireplace equipment and wood
The presence of a fireplace denotes the need for wood, lighting materials and fireplace tools, such as andirons, a shovel, poker and tongs.

Pegs and miller's clothing
Illustrations of the miller depicted in Evans' mill drawings suggest he wore a broad-brimmed felt hat, jacket and trousers. The miller may have hung his hat, apron or perhaps his waistcoat on pegs in his office when not in use.

Miller's office

Note: Garments a miller might have worn in the period from 1810 to 1850 include: waistcoat, trousers, shirt, straw or wool hat, neckerchief, white apron and braces.

[7] Evans, Plate XIX.
[8] Leung, 81.

Document box
Daily business operations suggest the need for a document box in which the miller could securely keep money and important papers. A portable document box could be picked up and removed to the miller's house at the end of the day.

Writing materials
To keep accounts and conduct correspondence, the miller required writing materials, such as quill pens, inkwells, paper, blotter, sealing wax and a seal.

Lighting device
Although this space is generally well lit by natural daylight, on dark days or in the evening a lighting device may have been required, such as a candle and candle holder or a lantern.

Grinding Stations

Grain is ground at a grinding station where wooden mill furniture surrounds, and is supported above, two millstones. The furniture holds and guides grain to the millstones. There are three stations in Colvin Run Mill located along the west wall, although only one station is currently used for grinding.

Note: The station near the door does not have millstones so visitors can see the gearing below. The station in the middle is for grinding. The third station is not used for grinding at this time.

Grinding station

Millstones
Two grinding stations have millstones. The upper stone is called the runner stone, and the lower stone is called the *bed stone*. The grinding station used for grinding wheat and corn today at Colvin Run Mill has buhr stones. The buhr stone is the best and most popular stone for grinding wheat into white flour,[9] which was the preferred flour during the mill's early period. The stone is a freshwater quartz quarried principally in northern France. French stones produced whiter flour because their extremely hard surfaces were less abrasive than other stones. Abrasive stone tended to shred bran (the

[9] Howell, 71.

outer part of the wheat kernel) into powder so it could not be separated out in the sifting process.[10] Also, buhr stones may require less sharpening because of their hardness. The other grinding station has millstones made from river aggregate and could be used for grinding grains other than wheat.

Hoop and curb

A circular wooden *hoop* surrounds each set of millstones. The hoop prevents dirt from falling into the grain and keeps meal from spilling onto the floor as it is pushed out from the stones. The hoop sits on a rounded wooden framework called the *curb*.

Hopper, chair, damsel, shoe, rynd, stone spindle, driver, hackle plate, metal pin

Each set of millstones has several pieces of wooden furniture above it that hold and distribute grain. The hoop surrounds the stones and a *chair*, or horse, with attached *shoe* rests on top of the hoop. A *hopper* with tapered sides and a hole in the bottom sits on the chair. The hopper holds a supply of grain, and the feed shoe below it regulates the flow of grain from the hopper to the eye of the millstone. In many mills of the period, the shoe was controlled from the basement with a string that was attached to it and ran through the floor to the basement. To keep the grain constantly flowing into the millstones, a cylindrical wooden *damsel* with metal ridges sits on top of the *rynd* and taps the shoe as it rotates. A metal pin helps hold the damsel onto the top of the rynd. The rynd is a metal crosspiece that is fitted into slots in the *eye* of the runner stone. In the center of the rynd is a socket, called the *cockeye*, which rests on the *cockhead* at the top of the stone spindle.

This photo shows the bed stone, runner stone, rynd, stone spindle, driver, hackle plate, curb, jackscrew, bails and stone crane.

The stone spindle is a metal pole that sits on the bridgetree in the basement and comes up through a hole in the middle of the bed stone. The driver fits over the spindle and into the runner stone. The spindle supports the runner stone and the driver turns the stone. A square piece of leather with a hole in it, called a *hackle plate*, is placed over the spindle covering the gap between the stone spindle and bed stone to keep grain from going

[10] Ibid., 73.

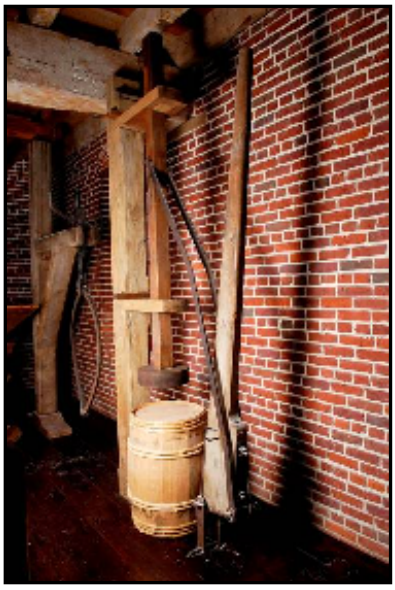
through the spindle neck bearing. Although Evans describes the use of a hackle plate, he does not refer to it by name.[11]

Stone crane, bails, jackscrew, pins

A *stone crane* stands at each grinding station. The crane raises the runner stone and swings it to one side, making it possible for one person to raise and turn the stone over so its grinding surface can be cleaned and sharpened. The stone cranes are heavy wooden structures made of white oak, with a base, post and braced arm mounted on pivot points. Steel arms, called *bails*, are attached to the millstone with metal pins. The bails are connected to the bottom of a *jackscrew* that is positioned into the crane. A turn of the wrench on the screw moves the stone up or down. None of the current stone cranes are original to the period of the mill's construction. Plate XI from Evans' book shows the stone crane.

Flour packer and barrels

The flour packer stands between the second and third grinding station in the mill. Similar to the flour packer patented in 1803 by Evan Evans and Thomas Clark, this machine was designed to fill flour barrels without any handling. A round wooden stamper worked by levers exerted pressure on the flour as it filled the barrel. An advertisement for the packer claims that a barrel could be packed in half a minute, with ease.[12] Evans claimed that more flour could be put into barrels than by hand filling.[13] It is unknown what type of packer was in the original mill. Flour for packing would have been stored in bins above the flour packer as shown in Evans' plates VIII, X, and XXII. There should be one bin for each grade of flour. These bins were not built during the restoration. Evans Plate XXVII shows a flour press under the bolting chest.



Flour packer

Ground flour for export left the merchant mill in barrels. Packed and unpacked barrels would be on the first floor near the packing area. In 1787, Virginia regulations stated that only standard-sized barrels that held 196 pounds of flour could be used for export trade.[14] Kuhlmann states that

[11] Evans, 320.
[12] Bathe, 84.
[13] Ibid., 83.
[14] Directions for making a flour barrel: William Waller Hening, *The Statutes at Large, Being A Collection Of All The Laws Of Virginia From The First Session Of The Legislature In The Year1619* (New York: Printed for the editor, 1819-23; reprint; Charlottesville, Virginia. University Press of Virginia, 1969), Volume 7, 516. An act to regulate the inspection of flour and bread (Passed the 23rd of November, 1787) "…shall be well made of good seasoned materials, tightened with ten hoops sufficiently nailed with four nails in each chine (sic) hoop, and three nails in each upper bilge hoop; and the flour barrels shall be of the following dimensions, to wit, the staves shall be twenty-seven inches in length, and the head seventeen inches and a half in diameter."

merchant mills seemed to have been interested mainly in the export trade, although in every town they must have sold at retail to consumers.[15] From Virginia, barrels of flour were shipped to New England, the Carolinas and Georgia, as well as to European markets. In 1792, a Virginia law prohibited packing meal or flour in used barrels. If uninspected flour was packed in a barrel already marked merchantable by flour inspectors, the meal might be "injured," or spoiled, by the time it reached foreign markets.[16]

Grain bags or sacks

Farmers brought grain to the mill in sacks. A drawing in Evans' book shows a man emptying grain from a sack into the beam scale on the first floor of the mill.[17] These bags may have been gunny sacks – bags made from jute exported to America from India. Oliver Evans imported these bags from Calcutta and sold them at his company in Philadelphia, Pennsylvania.[18] A sack or bag was easier to throw over the back of a horse than a barrel.[19]

The bags may also have had a stamp design on them. From 1820 to 1840, farmers used a bag stamp mold. Carved wooden blocks with farmers' names or initials on them were stamped on bags so the miller would know who owned the grain.[20]

Likewise, grain products may have left the mill by sack. Evans notes that if a mill is grinding small parcels, the grain may be put in bags.[21] Where sacks would have been placed inside the mill is not documented.

Millstone Tools

Continual grinding eventually dulls the sharp *furrows* of the millstones. According to Oliver Evans, the grinding surfaces of the millstones needed to be sharpened, or dressed, as often as twice a week so that the grain would be ground properly.[22] Stone *dressing* was a tedious job: it took a good workman about 14 hours to *dress* each stone.

Mill picks and facing tools

The face of a millstone is maintained by sharpening or dressing the *furrows* with *mill picks*. Robert Grassi, millwright, describes mill picks:

> "Usually composed of cast steel with hardened tips, the mill picks were shaped not with a point but with a flat broad cutting edge like a chisel. Both ends were formed into a cutting edge approximately 1½" wide. The picks were about 8" to

[15] Kuhlmann, 34.
[16] Ibid., 32
[17] Evans – Plate VIII.
[18] Bathe, 74.
[19] Anna Lue Cook, *Textile Bags (The Feeding & Clothing of America)* (Florence, Alabama: Books *Americana,* 1990), 3.
[20] Ibid.
[21] Evans, 223.
[22] Ibid., 269.

> 10" in length and weighed from three to six pounds. Mill picks came in two forms. One type had an eye in the center for an inserted wooden handle similar to a hammer handle. The other type, without an eye, (traditionally called a *mill bill)* was inserted into a tapered mortise inside the head of a *thrift*. The thrift was turned out of hardwood and has been described as being similar in form to a wooden sculptor's mallet."[23]

Evans suggested that the picks should be quite sharp and not less than 12 in number, although he does not specify the type of pick that millers should have.[24] Some kind of mill pick storage would be helpful for the miller. Storage might be a cabinet, or shelf or leather loops attached to the stone crane.[25]

Mill pick

Bushing hammer

Evans stated that a "smooth, rough-faced hammer" should be used to roughen the hard, smooth places on a stone.[26] Evans does not identify that hammer by name. However, another millstone tool used in the 19th century, although less utilized by the stone dresser, is the *bushing hammer*, a tool that had multiple points on the cutting end that took material off the face of the stone and smoothed it before it was dressed.[27] Miller Charlie Howell described a hammer of this type but he referred to it as a *facing hammer* and he stated that it was used to face off the area around the eye of the stones. Another type of facing hammer described by Howell had several blades set together almost in the form of a suspension spring.

Bag of wheat (bist)

Another item used by the stone dresser was the *bist*. Howell defines a bist as a cushion,

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[23] Robert Grassi, "The Miller and Millstones -- Part II," Old Mill News, Vol. XXXII, No. 2 (Spring 2004): 16.
[24] Evans, 281.
[25] Maddox, informal interview, 2007, Fairfax County, VA.
[26] Evans, 269.
[27] Robert Grassi, "The Miller and Millstones – Part II," Old Mill News, Vol. XXXII, No. 2 (Spring 2004): 16.

commonly made of a partly-filled sack of meal or *bran*, used by a worker when dressing millstones.[28] The dresser, usually half reclining, holds the pick handle against the bist and, with the other hand, raised the tool and allowed it to drop on the millstone. The bist also steadied hands so that the lines or cracks could be cut reasonably straight in the stone.

Piece of leather

A small square of leather protected the stone dresser's hand from the slivers of metal from the mill pick as the stone was dressed. Evans advised:

> "To prevent the steel (from the pick) from striking your fingers, take a piece of leather about 5 by 6 inches square; make a hole through the middle, and put the handle of the pick through it, keeping it between your hands and the pick, making a loop in the lower edge, through which put one of your fingers, to keep up the lower part from the stone."[29]

Calibration and Measuring Tools

Paint staff, proof staff, and paint and sweet oil pots, piece of glass or steel

The *paint staff* is a piece of wood about four feet long by four inches wide that was used to determine if the face of the millstone was level. To test the stone, the staff was first painted with red paint, a composition of red oxide powder and water.[30] Then it was rotated around the face of the grinding surface to identify any high spots that needed to be dressed. Paint staffs were made of a solid piece of hardwood, often oak, walnut or mahogany.

Proof staff and case

In his book, Evans noted the size and use of the paint staff:

> "The red (or paint) staff is made longer than the diameter of the stones, and three inches thick on the edge, which is made perfectly straight; on this is rubbed red clay, mixed with water, which shows the highest parts of the faces of the stones, when rubbed over them, by leaving the red on those high parts."[31]

To test the accuracy of the paint staff, a small amount of sweet (olive) oil was smeared on the *proof staff*, possibly with a woolen cloth,[32] and the paint staff was then lightly rubbed along the surface of the proof staff. The high spots on the paint staff were marked by the

[28] Ibid.
[29] Evans, 268.
[30] Howell, 85.
[31] Evans, 262.
[32] Hughes, 99.

oil and then scraped off with a steel scraper or a piece of glass.[33] When not in use, the proof staff was kept in the mill in a wooden case.

Jack stick, quill

To grind properly, the stone spindle must be upright. To test the spindle for true running, a flat piece of wood with a square hole in the end is placed over the spindle just above the bed stone. The other end of the wood extends to the outer edge of the bed stone. This end has a hole into which a quill is inserted. The quill is placed so that it barely scratches the surface of the bed stone. Sometimes the quill is painted with red oxide to highlight the scratch marks. The spindle is turned and if the quill scratches the surface of the bed stone evenly for the whole circle, the spindle is upright. If the quill doesn't scratch evenly all around the stone, the footstep bearing (the bearing upon which the bottom of the spindle rests) must be adjusted.

Jack stick

Quill stick

Some of the terms for this balancing tool are *jack stick*, tram stick, or quill stick[34] and the designs vary. Some jack sticks are several inches thick near the spindle end but then step down near the end of the arm. A wood or metal thumbscrew near the end of the thick section adjusts the height of the thinner section so the quill just touches the bed stone.[35] Other jack sticks are flat pieces of wood with similar holes in each end. The length of the jack stick should be half the diameter of the stone.

Evans notes that the material in the small hole of the stick should be "…a piece of elastic material, such as of whalebone or quill…"[36] He referred to the use of a quill in another chapter, also, when giving directions for making a "tram" (tram stick).[37]

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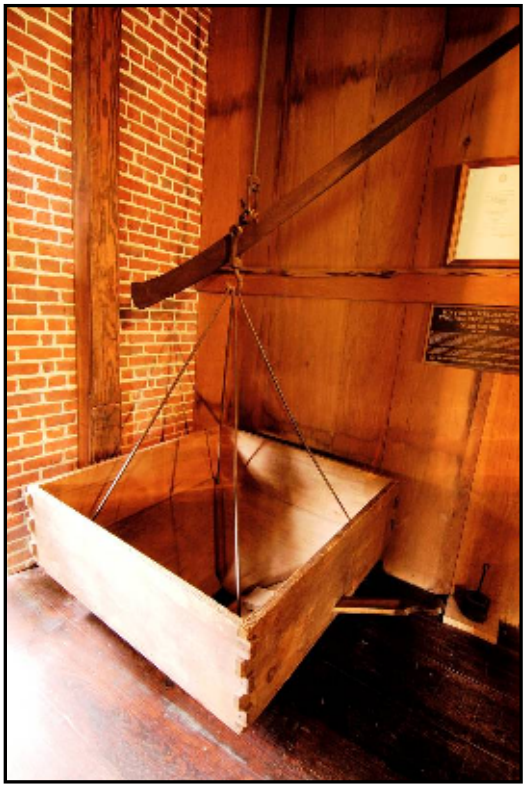
[33] Ibid., 86.
[34] Howell, 59.
[35] Ibid.
[36] Evans, 264.
[37] Evans, 316 and 317. Evans gives directions for making a jack stick (or tram) on these pages.

Grain Measures

Small wooden grain measures were used to measure grain in bushels, half-bushels, pecks and half-pecks. Although Evans does not mention them specifically in his book, several 18th century Virginia laws stipulated that the miller should have grain measures in certain sizes, that they should be "sealed" or inspected for accuracy, and that the miller should have a toll dish.[38] The toll dish was used in custom mills to measure the portion of a farmer's grain that a miller kept in payment for grinding the grain. A Virginia law of 1772 states that, "weights and measures used at merchant mills were to be examined yearly."[39] These measures were not specified, nor were their use in merchant mills, or exactly how they were used, except to note the percentage of grain that a custom miller could claim for grinding a farmer's grain. Colvin Run Mill was a merchant mill in which the miller paid the farmer outright for his grain but it is possible that the miller may have done custom work as well, in which case several grain measures and a toll dish would have been useful furnishings.



Beam scale

Beam scale and additional weights

Colvin Run Mill was a merchant mill – a business that bought grain outright from farmers and made a profit by selling grain products. The miller paid the farmer for his grain according to weight. A beam scale to weigh grain is inside the north door and hangs from floor joists. The scale is a large suspended hopper. A hole in the bottom of the scale sits above a hole in the floor. A wooden gate is pulled out on the hopper to allow grain to fall down through the hole in the beam scale and the floor to a storage area directly below in the basement. A beam above the hopper has markings that show increments of weight. At one end of the beam there is a hole through which a weight could be hung to calibrate the scale and on which additional weights could be added. Originally, some sort of slide would have been on the beam to show the weight indicated by the markings. In Evans' book, Plate VIII shows a man emptying the contents of a sack through a hole in the mill wall into a beam scale similar to the one at Colvin Run Mill.

Evans' Plate XXII depicts another type of scale that could also be in a 19th century mill. The drawing shows a spring balance hanging from the ceiling with a barrel on the platform of the balance. This type of scale was necessary to weigh barrels of product

[38] Hening, Vol. 3, 402 and 403; Vol. 4, 406 and 407; Vol. 6, 58 and 59; Vol. 8, 513; Vol. 12, 187.
[39] Ibid, Vol. 8, 511.

before shipment.

Miscellaneous Items

Nails, brushes, shovels, brooms

Several miscellaneous items are mentioned in Evans's chapter on the duty of a miller:

> "The mill is supposed to be completely finished for merchant work, on the new plan; supplied with a stock of grain, flour casks, nails, brushes, picks, shovels, beam scales, weights, &c., when the millers enter on their duty."[40]

Evans also recommends that the floors be swept and the flour dust collected…..[41]

Stoneware crocks

Stoneware crocks with a glazed interior were used to contain all manner of liquids during the 19th century. These crocks may have been used to hold sweet oil and paint.

Guided Tour Interpretation

Most often visitors are shown only the first floor and the basement of the mill. Visitors enter the first floor of the mill through the Dutch door on the north side of the building. The miller's office is open for viewing and the milling equipment is behind a railing for safety. The first grinding station is not behind a railing and does not have millstones so visitors can view the gearing in the basement beneath the millstones. A tour guide explains the function of the milling equipment and then takes the visitors down a stairway to the basement or outside to the south entrance of the basement at ground level.

[40] Evans, 280.
[41] Ibid., 281.

Second Floor

Interior Architecture

Access to the second floor is by a stairway located along the north wall. The restoration crew installed a stairway from the Kinsley Mill to replace the stairs in the same location. The stairway that was replaced was built in two flights with a landing midway between the floors and was in poor condition at the time of the reconstruction.[1] A trap door with a safety railing around it is located in the middle of the floor. A loading door is in the north wall of the mill. On this level of the mill there are windows on all four walls.

Functions

The 19th century activities on the second floor of Colvin Run Mill are not documented, but the main activities conducted on the second floor of a 19th century merchant mill were most likely sifting flour in a bolting chest and storing grain.[2] Leung states that the upper floors of a merchant mill were open and arranged with machinery according to the plan of the millwright.[3] Mills may have been different from each other according to equipment placement, but certain pieces needed to be strategically located, such as positioning the bolting machine under the spout from the hopper boy.

Millwright engineer Clifford Currie found a shaft from an old bolting (sifting) chest in Colvin Run Mill before the restoration but it is unknown whether it is an original part or where it was located.[4] Several drawings in Evans' book show bolting machines on the floor above the millstones.[5]

Grain would have been stored on the second floor before it was sent below to the millstones for grinding. The restoration crew tried to determine the location of grain storage areas called *garners* on the second floor by examining the floors and walls but they were unsuccessful.[6] Grain cleaning may also have taken place on the second floor as shown in Evans' Plates VIII and IX. This floor may have also been used for woodworking and maintenance. Pre-restoration photos show a workbench and cabinets for woodworking tools on this floor.

Currently, one half of the second floor is used for maintenance activities and contains modern woodworking equipment, tools and supplies. On the other half of the floor there

[1] Netherton *Colvin Run Mill and Miller's House, Revised Draft,* 138.
[2] Evans, Plate VIII.
[3] Leung, 81.
[4] Clifford Currie, interview by Ross Netherton, 22 January1972, Colvin Run Mill, VA, written.
[5] Evans, Plates VIII, IX, XXII.
[6] Netherton, *Colvin Run Mill and Miller's House, Revised Draft*, 138.

are garners to store grain above each of the first floor's three grinding stations and a bolting chest to sift ground grain. The bolting chest operates with water power but grain is not sifted.

Note: The second floor of the mill is not usually open to the public except during special events.

Fixtures and Furnishings

Garners

Prior to grinding, grain is stored in garners where it can flow from the garners through spouts to the hoppers at the grinding stations on the first floor. It is unclear from Evans' book how garners were made, but drawings show garners and grain storage in various places on the mill floors.[7] The three garners in Colvin Run Mill are wooden box-like structures that were built by the restoration team. Two garners are built into corners of the building, and one is in the middle of the floor. They are located above the three first-floor grinding stations. The garners are not used for storage in current operations.

Bolting chest

The bolting chest sifts flour through wire or fabric cloth of varying meshes into different degrees of fineness. The chest must have as many varying meshes as is intended to make varying grades of flour. The bolting chest in Colvin Run Mill houses two hexagonal reels two feet in diameter. The upper reel is nine feet long and the lower reel is 13 feet long. The reels are placed one above the other so flour can be sifted through one or both reels depending on the grade of flour. The upper reel would be covered with superfine *bolting cloth* that could be made of metal or silk. All grades of flour flowed down to the packing floor through spouts from inside the bolting chest.

Flour was graded according to its degree of fineness. A Virginia law of 1787 specified the following grades: superfine, fine, middling and shipstuff.[8] Bolting cloth was manufactured and labeled with numbers to designate the different mesh sizes. These numbers seemed to vary according to the manufacturer and material.[9]

The bolting chest was placed along the west wall of the mill where it could be conveniently connected by gears to the main power shaft running vertically through the

[7] Evans, Plates VIII, IX, XXII.
[8] Hening, Vol. 12, 518.
[9] Leung, 127.

mill.[10] Drawings of bolting chests are shown on the second floor (or below the hopper boy) in mill drawings in Evans' book.[11]

Bolting chest supplies
The miller would have had extra bolting silk in two grades on hand to sift superfine and fine flour and wire mesh to sift shipstuff, cornmeal and middlings. Ticking was also needed to tack the silk and wire cloth to the wood frame of the bolting reel. Hammers and tacks were also needed.[12]

Gears and the vertical shaft
The lower half of the vertical shaft connects with the upper half with a metal coupling on the second floor. Gears to run the bolting chest are connected to the shaft and must be engaged with the gears on the shaft in order for the bolting chest to operate.

[10] Netherton, *Colvin Run Mill*, 32.
[11] Evans, Plates VIII, IX, X, XXII, and XXVII.
[12] Maddox, informal interview, January, 2006, Fairfax County, VA.

Third Floor

Interior Architecture

Entry to the third floor is by a flight of stairs located against the north wall of the mill. These stairs were constructed during the renovation.[1] The north gable end has two windows and a loading door of batten construction; the south gable end has three windows. Before reconstruction, the north and south gable ends had one small window near the roof ridge and two larger windows beneath it. Both these small windows were removed with the reconstruction. Netherton notes that the door and doorway in the north gable end were not original to the structure, although a date for this addition is not known.[2] A pulley was probably suspended outside the north gable door.[3]

Post and beam supports for the rafter ties were built on the third floor by the reconstruction crew. This framework supports the decking for the loft and helps to support the roof rafters and the floor joists of the fourth floor/loft. A pulley is attached to a floor joist on the third floor. A trap door with a railing around it is located in the middle of the floor directly above the second floor trap door. It is likely that a rope hoist would have been in the peak of the roof above the trap doors at the mill's earliest time period.[4]

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[1] Netherton, *Colvin Run Mill and Miller's House, Revised Draft*, 141.
[2] Ibid., 107.
[3] Ibid., 124.
[4] Maddox, informal interview, April, 2007, Fairfax County, VA.

Because components of a hopper boy were found on the third floor of the mill, the restoration crew built a replacement. The hopper boy and the gearing that is attached to the top of the vertical shaft dominate one side of the floor.

Functions

The main flour processing activity on the third floor was cooling and drying the ground flour with an invention Evans called a hopper boy.[5] He noted several advantages in using the hopper boy. One was that the hopper boy took up less space to do its work than the former method of cooling and drying flour. Previously, the flour was spread as thinly as possible on the floor and then raked until it cooled. Evans said that the hopper boy affords, "…more room than they take up, because the whole of the meal loft that heretofore was little enough to cool the meal on, may be spared for other uses…"[6] Therefore it appears that other activities could take place on the third floor that could not have taken place before, such as grain storage.

Note: Visitors are not taken to the third floor except during special events. Railings on either side of the floor near the eaves create safety barriers.

Fixtures and Furnishings

Hopper boy

The hopper boy is a mechanical raking machine invented by Oliver Evans to cool and dry flour as it came from the millstones, prior to being sifted through the bolting chest. Meal

Hopper boy

[5] Evans, Plates VIII and XXII.
[6] Ibid., 246.

elevators carried the warm, moist flour from the basement to the top floor of the mill where it was deposited in the ring of the hopper boy. Colvin Run Mill's hopper boy is a circular wooden tub, eight feet in diameter, with low side walls and an open top. Evans' drawings do not show a tub built around the hopper boy, although his description of this machine implies that a tub could surround the rake.[7] A long counter-balanced arm mounted on a center post extends across the enclosure and rotates when power from the waterwheel is transmitted to it by the vertical shaft. Inclined wooden paddles, called flights, on the underside of the arm, stirred and spread the flour evenly until cooled. The flour would then be pushed to the center of the ring where it would fall through a hole into a spout leading to the bolting chest on the floor below.

[7] Ibid., 245.

Fourth Floor/Loft

Interior Architecture

A loft area above the third floor is accessible by a ladder. It is not known whether a fourth floor existed in Colvin Run Mill in the 19th century. The small windows near the ridge of the roof in each gable end that were removed during reconstruction would have provided light to the top floor.

Function

This floor could have been used for grain cleaning. Evans' Plate XXII shows a grain cleaner on the fourth level.

Furnishings

Grain cleaner and spouts
Early 19th century merchant mills cleaned grain before it was ground. Millers thought that the better the grain was cleaned, the better the flour and the less grain wasted. "It became the practice of the progressive millers to use a number of grain machines, each designed to do a different job. The choice of cleaners depended on the aims and resources of the proprietor and his miller and the type of grain, as well as the weeds and dirt harvested, threshed and accumulated in the grain."[1]

In his book, Evans described cleaning grain with a *rolling screen* and provided a drawing of a rolling screen on Plate V. The screen consisted of two cylinders of wire mesh, one inside the other, and set with one end higher than the other:

> "…the inmost one has the meshes so open as to pass all the wheat through it to the outer one, retaining only the white caps, large garlic, and every thing larger than the grain of the wheat, which falls out at the tail… The outer cylinder is so close in the meshes, as to retain all good wheat, but to sift out the cheat, cockle, small wheat, garlic, and every thing less than good grains of wheat…."[2]

[1] Leung, 115.
[2] Evans, 203.

A fan positioned near the screen blew out some of the chaff through a hole in the wall of the mill. A second cleaner for corn used screens of appropriate sizes to sort out all but the corn kernels.

A grain cleaner would be appropriate on the fourth floor because the head of the grain elevator is on this level. In the operation of a grain cleaner, the grain falls from the elevator buckets into the cleaner. Spouts from the cleaner then deliver clean grain to appropriate garners.

Other Grain Cleaners

Smutter

Another type of grain cleaner that a mill of this time period may have used is a *smutter*. According to Leung, smut became a serious problem in the United States about the 1830s.[3] Smut is a plant disease that produces soot-like masses of black spores on the host. Between 1830 and 1870 hundreds of smutters were devised, some running horizontally and some vertically.[4] A smutter breaks smut accretions and blows away the dust and particles before they mix with the good grain falling to the bottom of the machine. "The action took place in a revolving cylinder which by various means battered and broke the brittle smut fragments while a fan quickly blew away the powder with the husks."[5] Assuming that the operators of Colvin Run Mill faced this same issue, a smutter may have been installed in the mill; the fourth floor would have been a likely location.

Fanning Mill

Fanning mills, especially those made in the early part of the 19th century, were intended to rid grain of most foreign material, including the troublesome cockle weed. In this machine, grain is sifted through screens of various sizes adapted for different kinds of grain. As it falls through the screens, a fan operated by a crank on the side of the machine blows away chaff and refuse materials. Each screen also has an opportunity to take out some refuse.[6]

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[3] Leung, 118.
[4] David Craik, *Practical American Millwright and Miller*: cited by Felicity L. Leung, *Grist and Flour Mills in Ontario: From Millstones to Rollers, 1780s – 1880s*, National Historic Parks and Sites Branch, Quebec, Canada, 1981, 342.
[5] Leung, 118.
[6] B. W. Dedrick, *Practical Milling (*Chicago, Illinois: National Miller, 1924), 46.

Glossary

Note: Italicized words found in the definitions are defined elsewhere and alphabetically in the Glossary. Some words in the glossary may be known by other terms.

Bails – large iron tongs suspended from a *jack screw* on a *stone crane,* used to lift the upper millstone for dressing or other adjustments

Batten door – a wood door constructed of vertical planks or boards held together by horizontal battens (boards) that are usually nailed to the interior side of the door

Bed stone – stationary stone in a pair of millstones

Bist – cushion, usually made of a partially filled sack of meal or grain, used by a worker when *dressing* millstones

Bolting chest – machine used to sift flour into various differing textures or degrees of fineness

Bolting cloth – mesh cloth woven from wire, horse hair, wool, cotton, or silk et al., covering the frame of the bolting reel through which flour was graded

Bran – outer covering of a grain of wheat

Bray – the beam that supports the *bridgetree*

Bridgetree – adjustable beam that supports the millstone *stone spindle*; may be raised or lowered to alter the distance between the grinding surfaces of the stones in order to produce a finer or coarser meal

Buckets – blades or enclosures formed by wood or iron around the rim of a waterwheel, against which, or into which, water flows in order to turn the wheel

Buhr stones – millstones made of freshwater quartz quarried primarily in France

Bushing hammer – millstone tool that took off material from the face of the stone

Chair (horse) – wooden framework supporting the hopper above the millstones

Clapboard – wood siding commonly used as an exterior covering on a building of frame construction; applied horizontally and overlapped, with the grain running lengthwise, and thicker along the lower edge than along the upper

Cockeye – the socket in the center of the *rynd* that allows freedom of movement for the *runner stone* while balanced on the *cockhead*

Cockhead – the rounded tip of the *stone spindle* on which the *runner stone* is balanced

Corbel – in masonry, a projection or one of a series of projections, each stepped progressively farther forward in height; anchored in a wall, story, column, or chimney

Curb – the wooden circular base around the *bed stone* upon which the *hoop* rests

Damsel – a rod placed on the *rynd* which taps the *shoe* to move grain in a steady stream to the millstones

Dress – the layout or pattern of *furrows* on a millstone, also, to sharpen the furrows of a millstone

Dressing – the process of cutting grooves (*furrows*) into the face of a millstone in order to provide a shearing action in grinding, or sharpening the existing *dress*

Driver – cast iron bar fitted onto the millstone spindle; the ends of the driver fit into slots in the eye of the runner stone

Dutch door – door consisting of two separate parts, one above the other; the leaves may operate independently or together

Eye – central hole of a runner stone

Face gear – wheel with teeth mortised into its face

Facing – trimming or shaping a millstone before making the furrows or dressing around the *eye* section of millstone

Facing hammer – a hammer used for taking down a lot of stone material

Flat jack arches – an arch with a horizontal top

Footstep bearing – supports the millstone *stone spindle* on the *bridgetree*

Flume (sluice) – trough or channel that carries water from the *headrace* to the point where the water strikes or enters the water wheel

Furrow – groove cut into the grinding surface of a millstone

Garners – storage containers for grain

Gear pit – open area under the gears below the *hurst* framework that allows space for the gears to turn and a work area for maintenance

Grain elevator – a device consisting of a casing, two wheels and axles, and an endless belt with cups used to raise grain or ground grain

Gristmill – a mill that grinds grain

Gudgeon – metal journal mounted in the end of a shaft to run in bearings

Hackle plate – covering that prevents grain or dirt from entering the neck bearing of the *stone spindle*

Head block – the timber that holds a bearing for the end of a horizontal shaft

Headrace – channel that conveys water from the dam or millpond to the *flume*

Hoop – circular wooden enclosure around a pair of millstones

Hopper – open-topped container tapered to feed grain to millstones

Hopper-boy – a machine for cooling and drying flour after it has been ground

Hurst frame (husk) – timber framework that surrounds the main gearing and supports the stone bearers on which the millstones sit; separate structure in the mill building

Jackscrew – screw assembly that raises and lowers the *runner stone*

Jack stick – flat piece of wood with hole to accommodate a quill in one end, used to test the millstone *spindle* for true, upright running; also called quill stick, trammel, tram stick; may be of two levels of board with a thumbscrew for adjustments

Light – in architecture, a window pane

Lighter-staff – lever, connected to the *bray,* permitting the *bridgetree* to be raised or lowered, therefore adjusting the distance between the upper and lower millstones

Lintel – horizontal structural member (such as a beam) over an opening that carries the weight of the wall above it; usually of steel, stone or wood

Merchant mill – a commercial business for grinding and shipping grain products

Mill bill – traditionally a chisel-edged tool that is inserted into a wooden handle (thrift) to sharpen millstone furrows

Mill pick – a double ended wedge with a hole in the middle, mounted on a wooden handle for sharpening the furrows in a millstone

Mill seat – a tract of land containing waterpower capable of driving a mill

Millpond – body of water that serves as a source of water for the waterwheel

Millrace – the channel through which water flows

Overshot waterwheel – water wheel powered by water delivered to the highest point of the wheel, causing the wheel to revolve

Paint staff – straight wooden staff to which a marking paint is applied; used to test for level surface on millstones

Proof staff – cast iron plate used to test the accuracy of the *paint staff*

Putlog hole – hole left in a masonry or concrete wall to provide support for a horizontal framing member of scaffolding (putlog) and sometimes filled to match the wall after the scaffolding has been removed

Rafter – one of a series of inclined members to which a roof covering is fixed

Rock maple – a hard wood from the sugar maple tree

Roller mill – machine that milled grain using metal rollers rather than millstones

Rolling screen – in the early 19th century, used for cleaning grain

Rounds – the rods of a *wallower* gear

Runner stone – moving stone in a pair of millstones

Rynd – an iron bearer set across the eye of the runner stone

Shoe – tapering trough vibrated to feed grain into the stones for grinding

Sluice gate – the gate that is raised or lowered to allow water to flow out of the flume without going over the waterwheel

Smutter – a specific type of grain cleaner that separated smut from wheat

Stone crane – wooden structure that pivots at the top and bottom and supports the *jackscrew*

Stone nut – the gear attached to the *stone spindle* for driving the *runner stone*

Stone spindle – shaft on which *runner stone* rotates

Tailrace – channel that conveys water from the waterwheel back to a stream

Thrift – wooden handle for a mill pick

Wallower – a type of gear with round pins

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