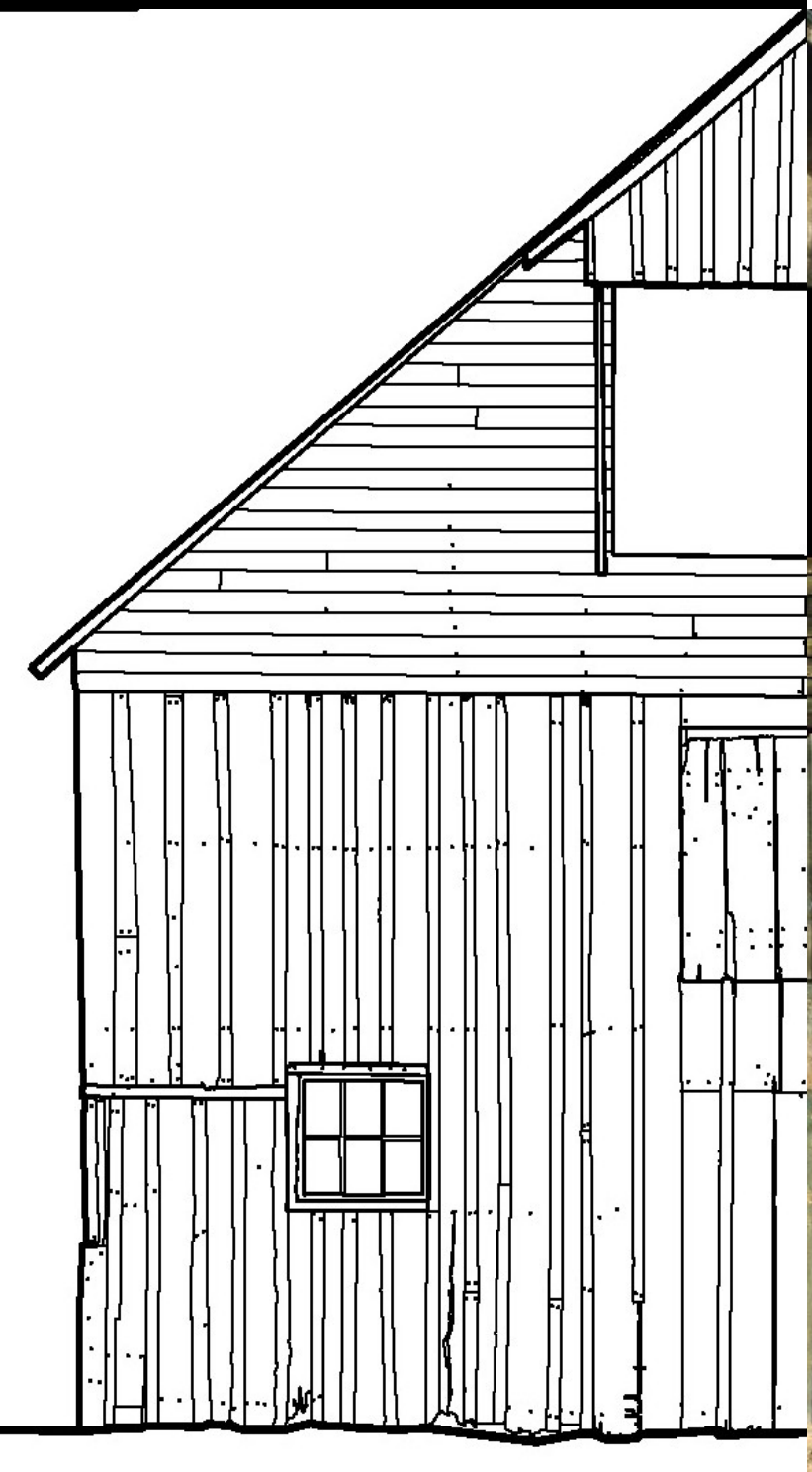
The National Barn Alliance
February 15-17th
2013 Winter Meeting

University of Mary Washington
Fredericksburg, Virginia



This publication was made possible by a generous donation from the Questers Robert E. Lee Chapter.

Welcome:

The University of Mary Washington, Department of Historic Preservation would like to welcome you to the 2013 National Barn Alliance winter meeting. Included within this publication is information regarding the town of Fredericksburg as well as a schedule of events. Additionally, three barn case-studies, conducted by University of Mary Washington students, from the Fredericksburg region, have been included. Should you have any questions please feel free to contact me and enjoy your stay.

Sincerely,

Michael Spencer
Assistant Professor
(540) 654-1311
mspen1bi@umw.edu

The artist rendering is of the carriage house at the Arlington farmstead, now part of the Montpelier Estate in Orange County, Virginia. (image drawn by Annie Lynch, 2012)

Cover: The cover image is of the Houseworth Barn (ca. 1870), Orange County, Virginia. Line drawing by Jessica O'Connell with graphic arrangement by Michael Spencer.

Contents:

Events and Schedule:

Friday **February 15, 2013**

6:00-8:00 Informal Gathering at Capital Ale House a restaurant in downtown Fredericksburg.
(917 Caroline Street, Fredericksburg, VA)
http://www.capitalalehouse.com/locations/fredericksburg.php

Saturday **February 16, 2013**

8:00-9:45 Board Meeting (Limited breakfast, Combs Hall #025)

Presentations, Public Welcome (Combs Hall #139)

10:00-10:45 "Barns of the Fredericksburg Region: Three Local Case Studies"
UMW student presentations (see publication)
Student Presenters: Catherine Brau, Jen Sustar, Jeremy Hockensmith, Sarah Sanders and Samantha Krenzer

11:00-12:00 "Understanding Adaptation and Evolution Through Delaware Barns"
Cate Morrissey, Center for Historic Architecture and Design
University of Delaware

"Surveying Maryland Tobacco Barns in Time and Space",
Rebecca Sheppard, Center for Historic Architecture and Design
University of Delaware

NBA Members Luncheon and Roundtable

12:15-1:15 "How'd You Do That? Cooperation and Collaboration"
(Lunch provided, Combs Hall #139)
RSVP required by Feb. 10th

1:30-4:30 Board Meeting (Combs Hall #025)

Sunday **February 17, 2013**

8:00-10:00 Board Meeting (Limited breakfast, Combs Hall #025)

Information and Fredericksburg Resources:

Meeting Locations:

All events with the exception of the Friday evening reception will be held at Combs Hall on the University of Mary Washington campus. Please use campus side entrance.

Address:
Combs Hall
1301 College Avenue
Fredericksburg, Virginia 22401

Combs Hall, campus side.

Directions:

The University of Mary Washington is located in Fredericksburg, Va., 50 miles south of Washington, D.C., and 50 miles north of Richmond, Va.

Directions from I-95 (Richmond and Washington D.C.):

To reach the campus from Interstate 95, take **Exit 130-A**. Follow **Route 3 East business** to the traffic light for William Street (bottom of large hill). **Make a left at the light**. Follow William Street to the next traffic light and make a **left onto College Avenue**. The Combs Hall parking lot will be the first right turn off of College Avenue.

Map showing the location of campus.

Information and Fredericksburg Resources:

The Combs Hall parking lot is circled with a dashed line. Combs Hall is building #10 on the map.

Parking:
Spaces will be reserved in the Combs Hall lot (see directions on previous page). Additional parking may be found on College Avenue. Please take special note of posted parking signs.

Hotels:

Please see **attachment for list of discounted hotels** in the area. For those looking to stay downtown and within a mile +/- of campus, the Courtyard by Marriot and the Kenmore Inn are recommended.

Helpful Links:

Fredericksburg Visitors Center	http://www.visitfred.com/
National Park Service	http://www.nps.gov/frsp/vc.htm
University of Mary Washington	http://www.umw.edu/
Washington Heritage Museums	http://ww.washingtonheritagemuseums.org/
George Washington Foundation	http://kenmore.org/

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Introduction to Student Work:

Introduction:

The University of Mary Washington student work included within this publication was a result of three group projects carried out during the fall 2012 semester for a Historic Preservation class entitled "Agricultural Preservation". Offered for the first time, the objective of the class was to expose students to an understudied area within the field of Historic Preservation. Emphasis was placed on research and documentation as these initial steps are imperative to the preservation process. As is the case with many Historic Preservation classes, the learning process moved beyond the classroom and into the field, with trips to Weston Farm (Fauquier County, VA), The Montpelier Estate (Orange County, VA), Belmont Mansion (Stafford County, VA) and Flintshire Farm (Caroline County, VA).

After visiting these locations students within the class divided into three groups and chose a particular structure which they felt warranted additional documentation and research. The three structures chosen included the Houseworth barn (ca. 1870s) located on the Montpelier Estate in Orange County, Virginia; the Arlington Farm carriage house (ca. 1920) also located on the Montpelier Estate; and the Flintshire corncrib and granary (early 20th century) located in Caroline County, Virginia. Students were encouraged to not only document the structures through archival research but also incorporate photographs and measured drawings. New documentation techniques and technologies, including photorectification were employed, increasing accuracy and efficiency. Wood samples were also taken from a variety of structural members in an effort to better understand material procurement and building practices in the region during these particular periods.

While only the "tip of the iceberg", the resulting projects have set the stage for future student research here at UMW as well as brought to light additional questions and concerns as far as understanding agricultural preservation is concerned. We hope that you enjoy the following case studies.

Michael Spencer
Assistant Professor
University of Mary Washington
Department of Historic Preservation

Houseworth Farmstead (Montpelier Estate), Orange County, Virginia:

By: Sarah Sanders, Jeremy Hockensmith, Amber Edmunds and Jessica O'Connell

History

The Houseworth or "Houseley" farmstead is located in Orange County, Virginia along the old Plank Road, today known as State Route 20. Presently, the farmstead, including the barn, is owned by James Madison's Montpelier, a National Trust for Historic Preservation organization. Although not considered significant in the interpretation of the estate during the Madison era, the Houseworth farmstead does aide in telling the agricultural history of Orange County and the surrounding region during the later part of the 19th century.

Incorporated into the Montpelier estate in 1854 by William MacFarland, the farmstead consisted of 108 acres at the time.[1] Following the Civil War, the property again changed hands before being purchased by Louis F. Detrick and William L. Bradley in 1881.[2] Sometime around this date the current barn was likely constructed as an 1894 insurance policy makes reference to "a cow barn" with a partial loft valued at $500.00 as well as a stable structure.[3] Physical evidence, particularly the use of timber framing in conjunction with circular sawn timber and wire nails, seems to verify a ca. 1870-1890 period of construction.

During the Detrick and Bradley ownership, the estate was used as a country retreat, a part-time residence, and a model farming operation. The two owners also appear to have been partners in the fertilizer business. That said, the Houseworth barn gives no indication of being used for the industrial scale production of manure as the size, roughly 40' x 30', would have allowed for a limited number of animals.

Context

Orange County is situated in the Piedmont region of Virginia, one of the most fertile sections of rural farmland found in the state. Located just north of Route 20, at the end of Houseworth Drive, the Houseworth farmstead is comprised of several structures including the large 1- ½ story barn or stable with addition, a possible corncrib and granary, a spring house, a tenant house and the farmhouse. While many of the structure likely date to the late 19th century, both the tenant house and the farmhouse are 20th -century additions to the farmstead as the older farmhouse burned in the 1930s.[4] At present the land adjacent to the farmstead is utilized for horse pasture.

Many of these same structures are noted in an insurance policy from 1894 which lists six structures in total including a railway warehouse, a main dwelling, corn house, granary, stable, and a cow barn.[5] Placement of these structures on the landscape will require additional investigation of the insurance map generated from this policy, however based upon observations it appears as though the large barn on the property likely served as either the cow barn or stable.

Such descriptions offered by sources like the insurance policy are invaluable to confirming the agricultural production of the farmstead at the time. As uses and agricultural practices change, it can often be difficult to discern historic patterns. Through the examination of the buildings in conjunction with the archival evidence it becomes evident that the farmstead was typical of the region growing many of the same crops such as hay and corn as well as raising livestock. Agricultural census information from 1890 for Orange County seems to verify the wide production of corn by noting that a total of

[1] Scott Meacham, *List of Buildings for Montpelier*, Orange County, Virginia: Montpelier Foundation, 1997, pg 12. (accessed November 16, 2012)
[2] Scott Meacham, *List of Buildings for Montpelier*, Orange County, Virginia: Montpelier Foundation, 1997, pg 12. (accessed November 16, 2012)
[3] Ann L. Miller, *Montpelier During the DuPont Ownership: Historic Context and Overview*, (Orange County, Virginia: Montpelier Foundation, 2008) pg 54. (accessed November 16, 2012)
[4] Ann L. Miller, *Montpelier During the DuPont Ownership: Historic Context and Overview*, (Orange County, Virginia: Montpelier Foundation, 2008) pg 133-34. (accessed November 16, 2012)
[5] Ann L. Miller, *Montpelier During the DuPont Ownership: Historic Context and Overview*, (Orange County, Virginia: Montpelier Foundation, 2008) pg 54. (accessed November 16, 2012)

346,035 bushels of corn were produced, averaging 357 bushels per farm, by far the primary crop.[6]

Design and Construction

The Houseworth or "cow barn", was constructed as a side-gabled, three-bay central aisle barn, reminiscent of the earlier English three-bay threshing barns found throughout Virginia. Located on the first floor, or ground floor of the structure is space for stalls and livestock while above is a large hay loft. The interior of the barn is accessed via a large sliding door, typical of the later 19th century, on the south elevation.[7] Evidence also suggests that the first floor was originally accessible through three small doors placed within both gable ends of the barn, possibly providing direct exterior access to stalls and possibly alluding to its use as a stable. Subsequent windows have been inserted into each elevation to provide for light. Extending from the east gable is a hay hood complete with intact hay fork and tack, another late-19th century agricultural innovation.[8] Additional ventilation for the hay loft can be found on the west gable in the form of a louvered opening.

Construction of the barn follows conventional timber-framing techniques with the various white oak posts and beams secured by mortise and tenon joints pegged with black locust tree nails. Lap joints are also present on both the purlins as well as at the peak of the common rafter system. The noted wood species are commonly found throughout the property and would have been in ready supply during the mid-to late-19th century. These members are arranged in a set of four bents spaced approximately 13'-4" apart. The bents themselves are set atop a wood sill which in turn is set upon a raised continuous stone foundation. Also in keeping with earlier construction methods is the variation on a queen post truss systems seen in the hay loft.

However, the structure diverges from ante-bellum timber framing in the Virginia region through its use of circular sawn wood rather than the earlier hand hewn, pit sawn or sash sawn methods. Although developed as early as the 1840s, circular sawn wood did not become widely used until the 1850s in the region.[9] Noted in a map from the Civil War is the presence of a steam powered saw mill in close proximity, along Poplar Run, to the farmstead.[10] The note of the mill being steam powered is significant in that the additional power that steam provided was necessary for cutting timber with circular saw blades indicating that the mill may indeed have been utilizing circular saw blades. While the connection between the barns timber and the nearby timber mill cannot be verified it seems logical.

The presence of wire nails used in securing down bracing as well as the vertical board-and-batten pine siding provides still further evidence of a post-bellum construction date or possible material replacement. Becoming popular in the 1870s, wire nails replaced earlier, type "B" cut nails manufactured until the 1830s.[11]

Added after 1908 to the north end of the barn, is a plank frame, 1-story, carriage house complete with horse stalls. Plank framing was developed around 1880 in the mid-west region by builders like John L. Shawver and appears to have increased in popularity by the early 1900s fitting the post-1908 construction date of the addition.[12] The interior finish of the addition is similar in many respects to the nearby Arlington House carriage house, built by the DuPont's in the early-20th century.

While interior details are scarce within the original portion of the barn, an opening from the hay loft into the carriage house addition is equipped with a wooden latch. Such vernacular latches were typical of early Virginia and lasted well into the 19th and early-20th centuries. Other, later 20th century, wrought iron and cast iron latches can also be found throughout the structure.

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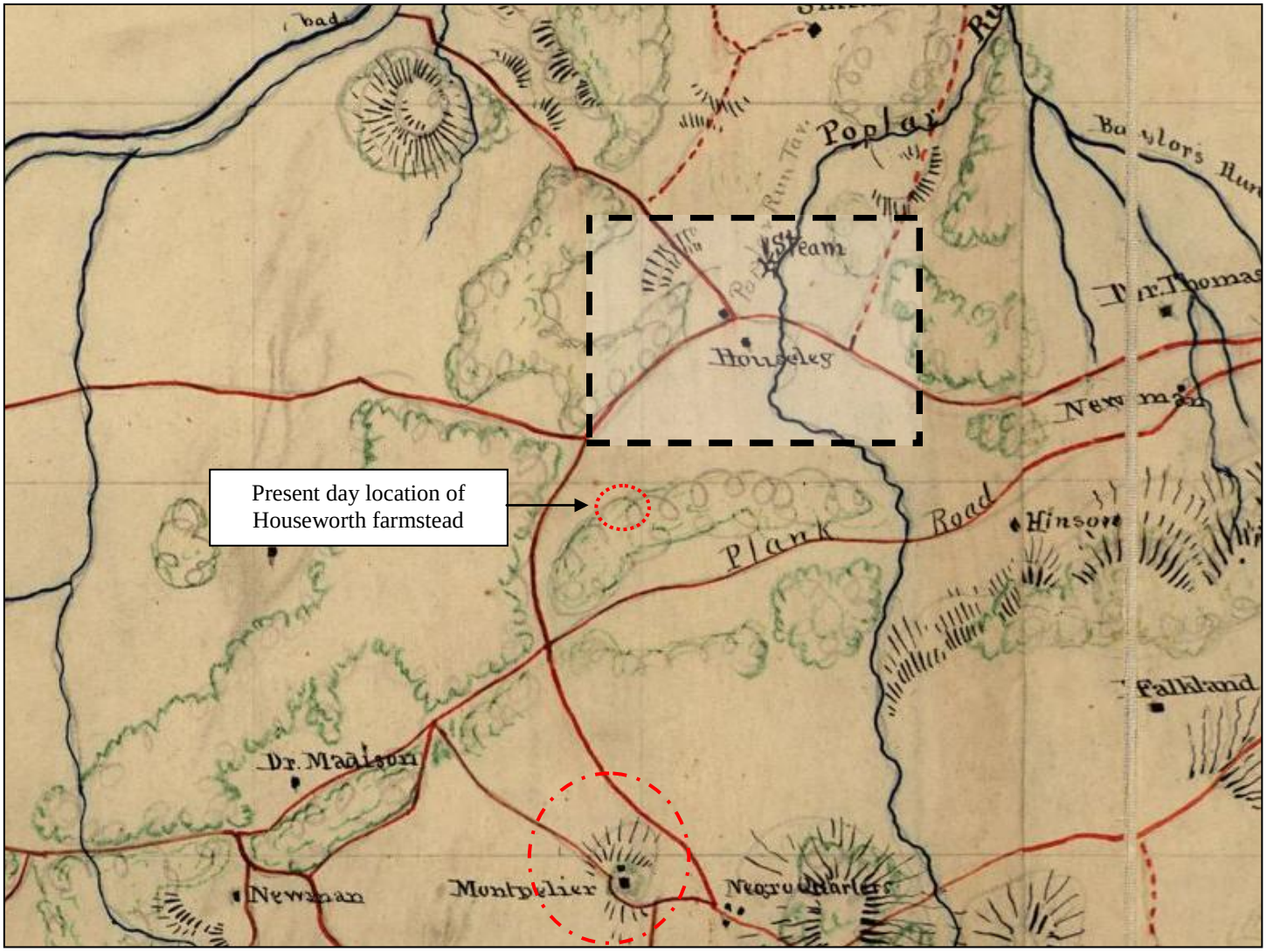
[6] University of Virginia, Historic Census Browser, 1890 Agricultural Census Data, Orange County, Virginia (http://mapserver.lib.virginia.edu/)
[7] Allen Noble, *The Old Barn Book*, pg 51.
[8] Jacob Ney, U.S. patent No. 261,562, "Hay-Fork", July 25, 1882
[9] John Richards. "A Treatise on the Construction and Operation of Wood-Working Machine." (1872): 8-10
[10] Walter Izard, *Survey of Orange County, Virginia*, 1863 (Library of Congress)
[11] Lee Nelson. "Nail Chronology as an Aid to Dating Old Buildings." pg 5.
[12] Shawver, "Plank Frame Construction", pg 5

Conclusion

Although the Houseworth farmstead is not vital to the interpretation of James Madison's Montpelier, the farmstead does provide a glimpse of a vernacular farming operation during the latter half of the 19th century. This period in agricultural development in the Orange County region was a time of transition and innovation. Such transition is clearly show in the construction methods used for the cow barn where both traditional timber framing techniques can be seen combined with wire nails and circular sawn timber. Such a transition is made clearer when juxtaposed against the early 20th century carriage house addition which showcases later plank frame construction. Presence of a hay track and fork also denote this period of innovation and are clearly expressed in the design of the barn through the hay hood.

Houseworth Farmstead (Montpelier Estate), Orange County, Virginia:

Fig. 1: 1863 map showing the old "Houseley" farmhouse. Nearby is a steam sawmill as well as the Poplar Run Tavern to the northwest. The presence of such a mill may help explain the combination of timber framing and circular sawn wood, atypical of other timber framed structures in the region. The larger image of the map shows the farmsteads location in relation to Montpelier (circled). (Map is located in the Library of Congress Digital Map Collection)



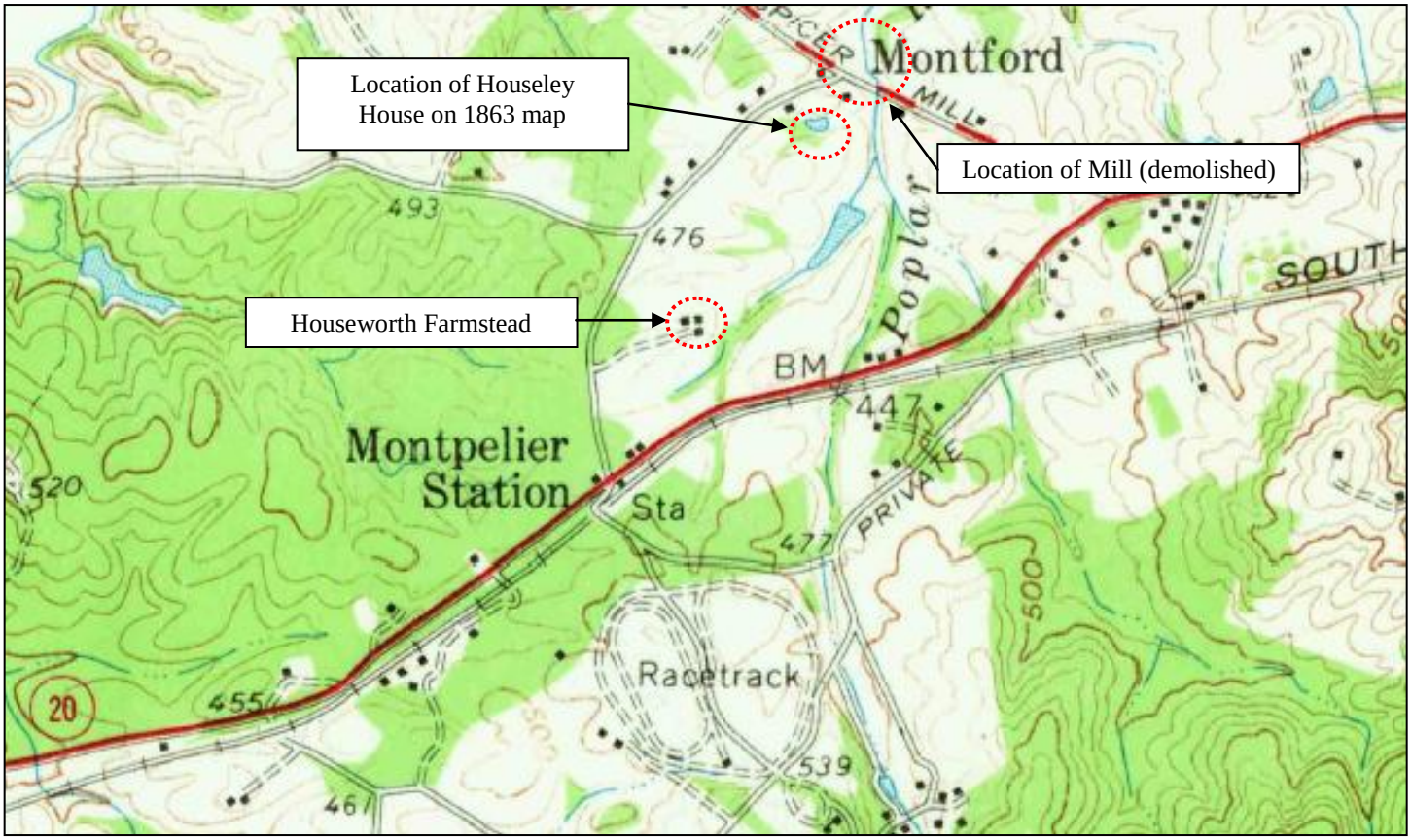


Fig. 2: 1961 USGS topographical map showing the Houseworth farmstead.

Fig. 3: The image shows the southwest perspective. At left is the rear ell. The hay hood is located on the other gable end (east elevation) of the barn, not visible in the image.

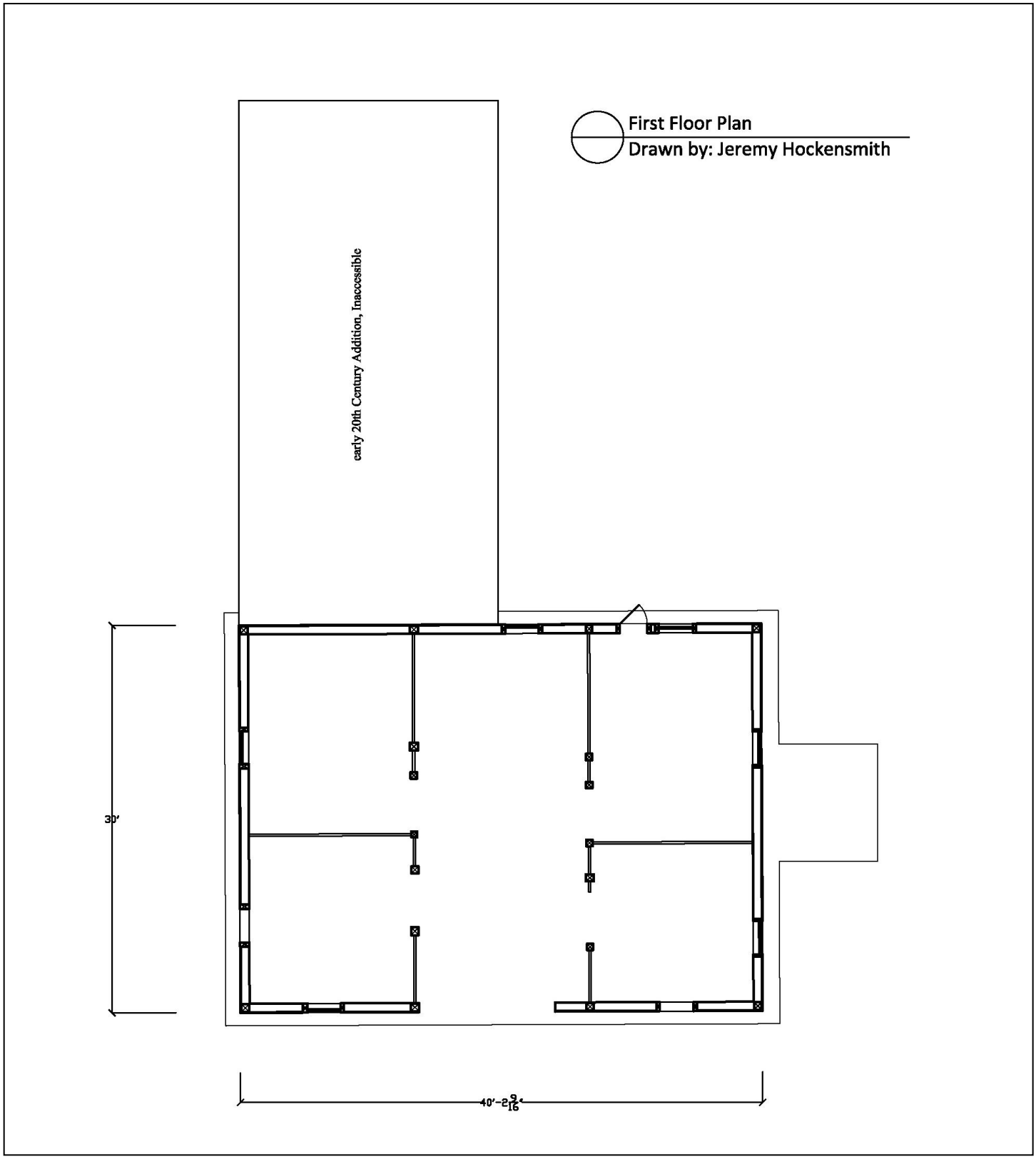


Fig. 4: First floor plan of the Houseworth barn. The rear "ell" was a later addition and was at the time of the 2012 documentation inaccessible due to its condition.

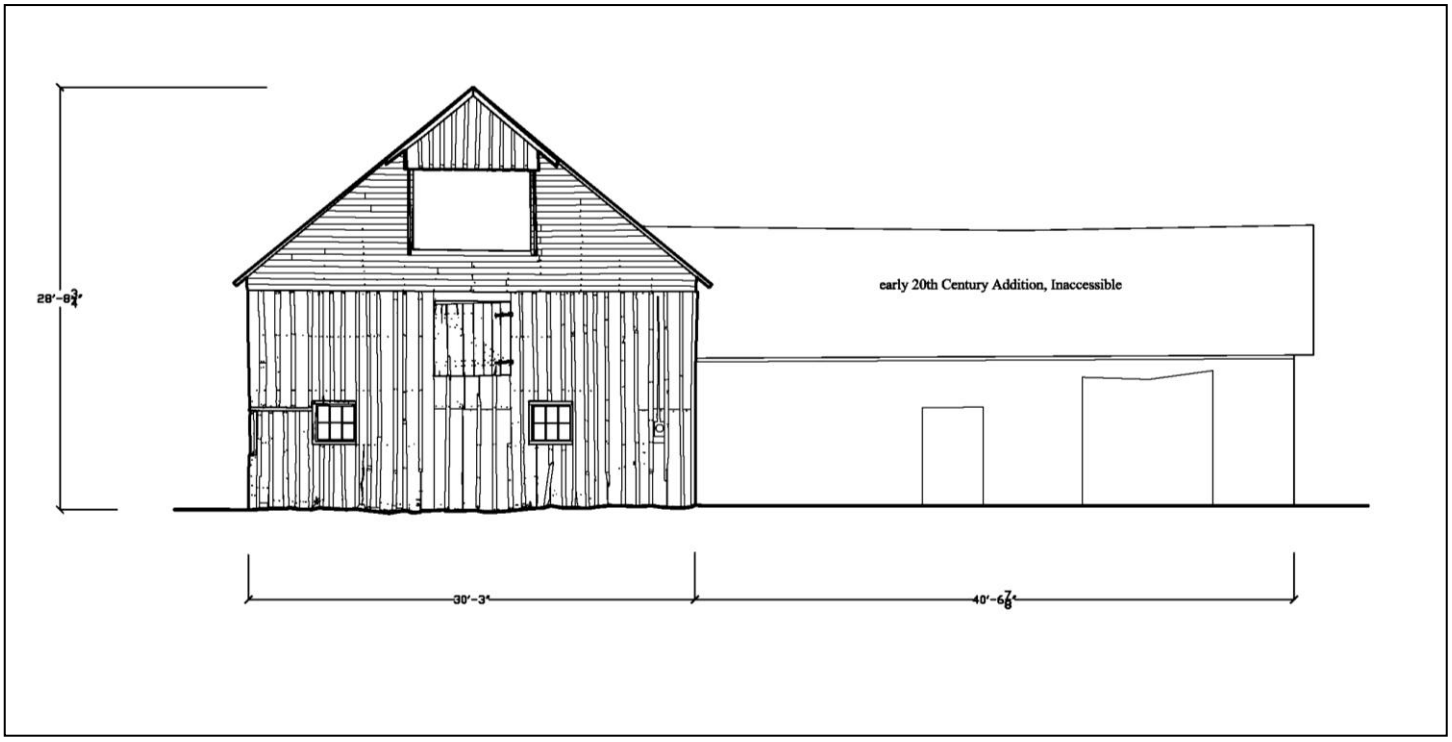


Fig. 5: The east elevation of the Houseworth barn. Upon closer inspection it appears that at one point there were three entryways on this elevation, one central and two to the side.

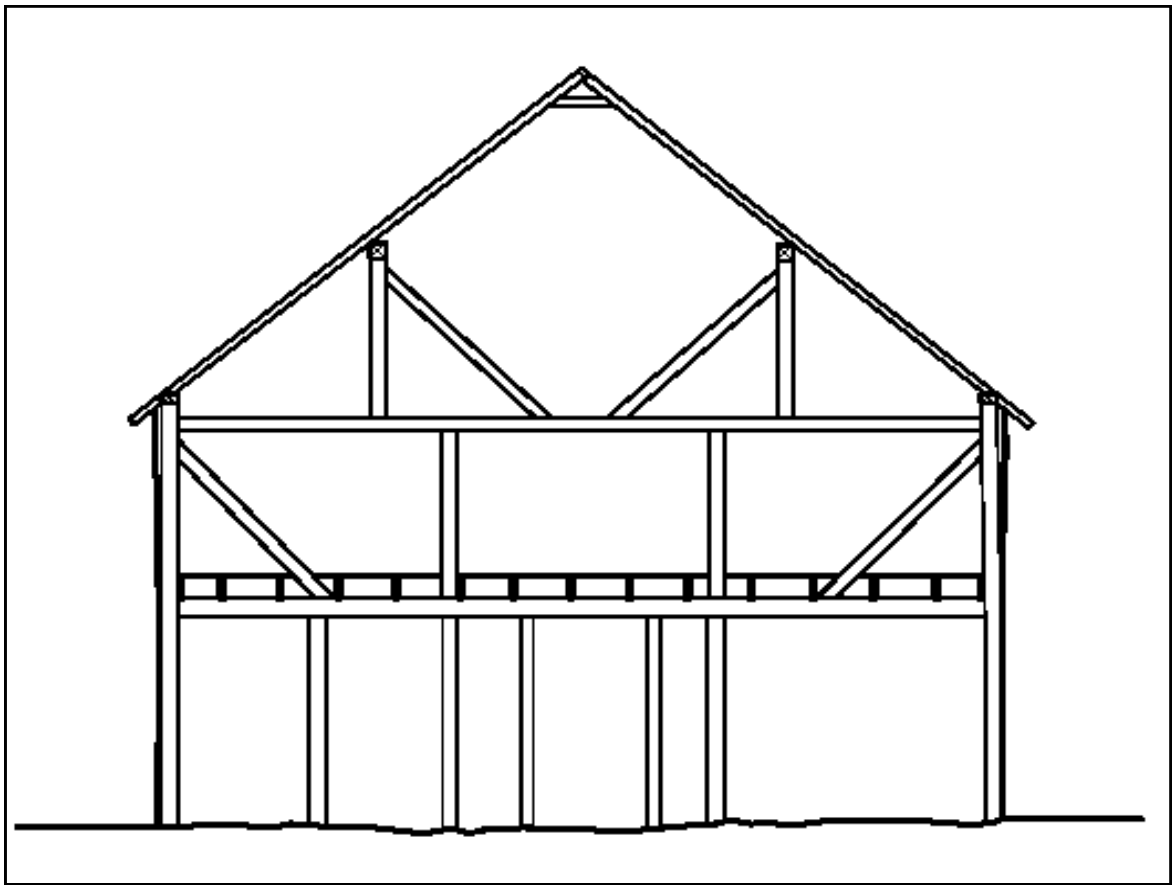


Fig. 6: West section of the barn. Some components of the frame are fastened using large wire nails whereas other components utilizing mortise and tenon as well as simple lap joints fastened with tree nails, such as the common rafters and purlins.

Fig. 7: The image above shows where a down brace intersects with a post and roof purlin. Note the lap joint placed directly above the vertical support and the tree nail protruding from the top and bottom of the joint.

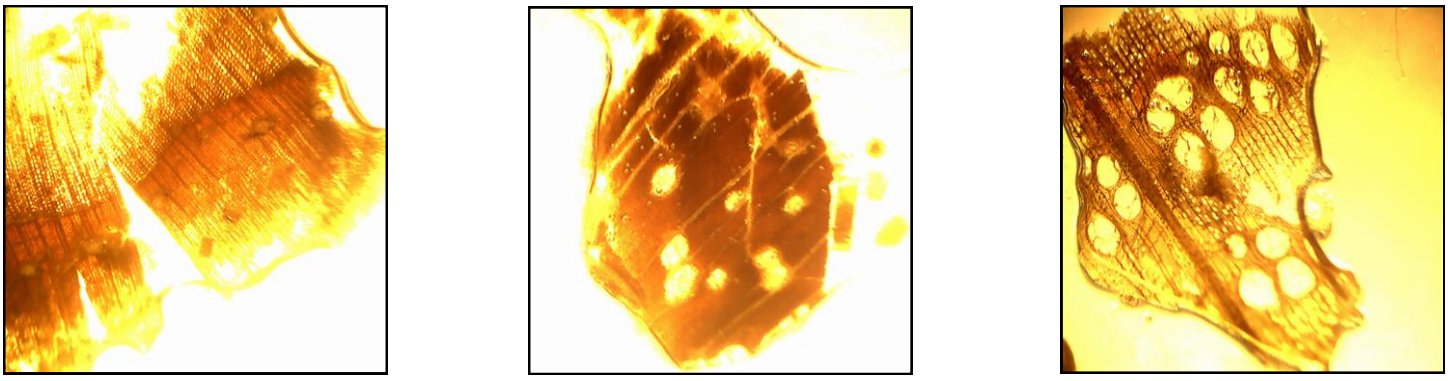


Fig. 8: Using a microscope three wood samples from the barn were analyzed. The far left image is from a sample of Southern Yellow Pine taken from the exterior siding, note the resin canals in the late wood. The center image is from a tree nail and is identified as Black Locust, a strong durable wood often used in the region for this purpose. The far right sample is of White Oak, a common wood type for the region and was used for the posts in the Houseworth barn.

Arlington Farmstead (Montpelier Estate), Orange County, Virginia:

By: Samantha Krenzer, Annie Lynch and Elizabeth Rival

Context

Carriage houses, like the one at the Arlington farmstead, began developing into a distinct building type around 1830.[1] Before this time, most farmers housed their horses and wagons in a variety of farm dependencies, particularly larger general agricultural barns.[2] By the late 1870s a separate carriage house had become a social necessity for every prosperous farm.[3] Nowhere was this need more strongly felt than on large country estates, such as those that began re-developing in Orange County, Virginia during the later part of the 19th century. Montpelier was such an estate, being purchased by William duPont around 1900.[4] Shortly after purchase of Montpelier, duPont acquired the Arlington House property and made it the farm manager's residence.

Farmstead Development and History

The Arlington farmstead was acquired by William duPont on February 7, 1901. The purchase price at the time was $1,470.00 and included a number of structures as well as 117 acres of farmland.[5] During this period the duPonts were not only acquiring acreage in the immediate vicinity of Montpelier but were also embarking on an extensive construction campaign to update the estate. Surviving construction records show that improvements were made at the Arlington site in the 1900s-1910s, a likely date for construction of the structure.[6] Physical evidence associated with the structure also seems to corroborate this date range as do oral histories of the property.

Plan and Construction

The carriage house consists of a first floor, divided into two sections, with a hay loft above. Situated within the hayloft is a separate room for the storage of grain and oats. Located below this area, on the first floor, is a concrete bin which would hold the oats as they were fed to the horses. One of the sections on the main floor is comprised of horse stalls complete with bead board and trim, with the opposite side open, likely for storing a carriage or wagon. This same basic layout, with some variation, is found in a number of floor plans compiled by William A. Radford in the book *Practical Barn Plans*, published in 1909.[7] Radford goes on to note that such plans are more suitable for urban settings where carriages were more prevalent. However the wealth of the duPonts combined with their distaste of automobiles on the property, likely provided the impetus for construction of the carriage house. Diverging slightly from Radford's plans is the south elevation lean-to. Open to the elements and supported with cedar posts it was likely used for additional equipment storage.

Materials and construction techniques, in addition to archival records and plans, also help to date the building to the early-20th century. Perhaps the most prevalent physical evidence is in the buildings use of a rudimentary plank framing technique. Made popular in the Mid-West during the late-19th century, plank framing consisted of many smaller pieces of dimensional lumber being used to support a load rather than large cumbersome timbers seen in traditional timber framing. Additionally, plank framing was "two thirds as costly" and required "less experienced carpenters" thus appealing to many farmers.[8] While cost was not an issue for William DuPont, experience of local carpenters may have played a role. Regardless, the use of this technique is clearly seen when examining the dimensional studs of the structure as well as the common rafter system, held together at the roof peak by a ridge board. The vast majority of the wood appears to be a southern yellow pine.

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[1] Thomas Hubka, *Big House, Little House, Back House, Barn*, pg 62.
[2] Donald Berg, *American Country Building Design: Rediscovered Plans for 19th-Century American Farmhouses, Cottages, Landscapes, Barns, Carriage Houses & Outbuildings*, pg. 12.
[3] Berg, pg 108-109.
[4] Ann L. Miller, *Montpelier During the DuPont Ownership: Historic Context and Overview*, pg 32.
[5] Deed from Herman and Sarah Fenner to William DuPont, Deed book 59 pg ?, Orange County Clerk's Office
[6] Ann L. Miller, *Montpelier During the DuPont Ownership: Historic Context and Overview*, pg 32.
[7] William A. Radford, *Practical Barn Plans* (Chicago: The Radford Architectural Company, 1909) pg. 200-220.
[8] William A. Radford, *Framing*, pg 225

The nails which join most of the framing together are another indication of the era of construction. Earlier timber framing utilized joinery held together by "tree nails," however the carriage house utilizes wire nails. Such nails were introduced in the later part of the 19th century replacing earlier cut nails and provide for a construction date no earlier than 1870.[9] While no longer serving a purpose, there was a white oak tree nail found in a ghost mortise of the southwest corner post, indicating re-use of some material within the structure.

Hardware, such as that found on the sliding doors of the carriage house still further narrow the date of construction. Original to the building the hardware is stamped with a patent date of 1901, indicating that the structure was built sometime after this date. Typically the patent date does not coincide directly with the built date, but used in conjunction with other materials and technologies can prove useful.

Protecting the structure from weather is vertical board-and-batten siding which has been painted a dark green, typical of other DuPont agricultural buildings. Other paint layers do not appear to exist indicating the green to be original, and therefore coinciding with the duPont's ownership. The structure also has a slate roof, another aesthetic found throughout the estate, but atypical of the region's farm buildings.

Conclusion

The Arlington farmstead carriage house is an excellent example of a turn of the 20th century carriage house and helps to illustrate the lifestyle on some of the grander country estates at the time. Additionally, the structure helps to confirm the shift in agricultural building techniques and technologies, primarily from timber framing to plank framing, first seen after the war but seemingly near complete by the early 20th century.

[9] Lee Nelson. "Nail Chronology as an Aid to Dating Old Buildings.",5.

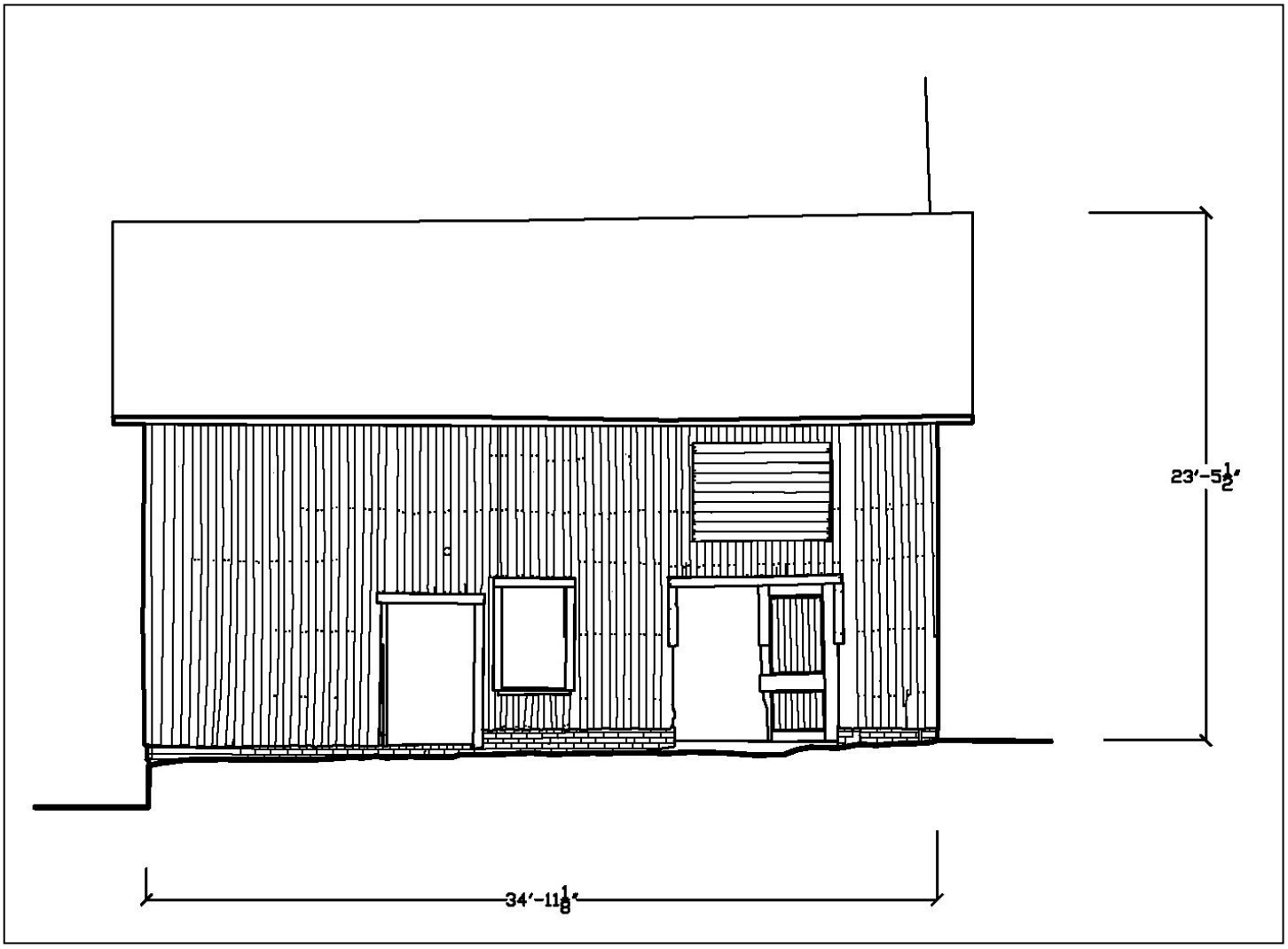

Fig. 9: The measured drawing of the east elevation notes the length of the building at approximately 35' and 23'-5" high when measured to the roof peak.

Fig. 10: The east elevation of the structure is clearly shown in this image. The two sliding doors, partially open indicate where the carriage would likely have been kept whereas the door and window lead into the stall area. On the north elevation the opening to the hay loft is discernible.

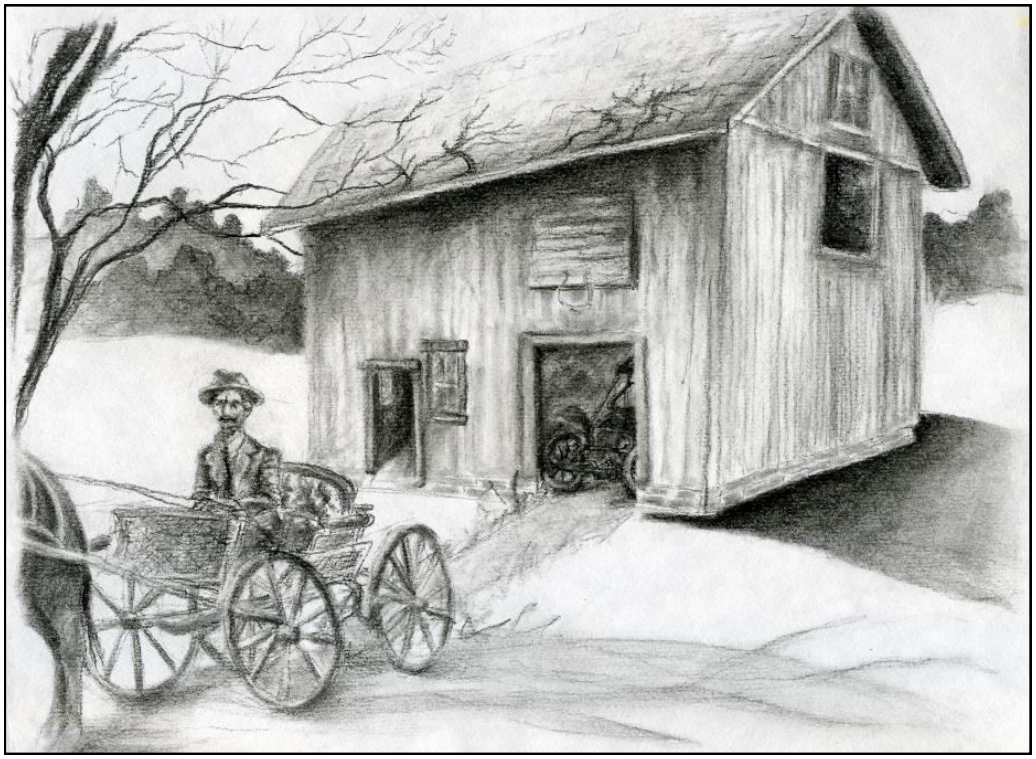

Fig. 11: The drawing to the left is an interpretive sketch of the carriage house showing a carriage being driven away after an automobile has been parked. Such an arrangement was supposedly something that William DuPont insisted upon when guests arrived at the estate in the early-20th century. (Annie Lynch, 2012)

Fig. 12: Interior details of the carriage house consist of bead board as well as door trim complete with corner "bull's eyes" or patera.

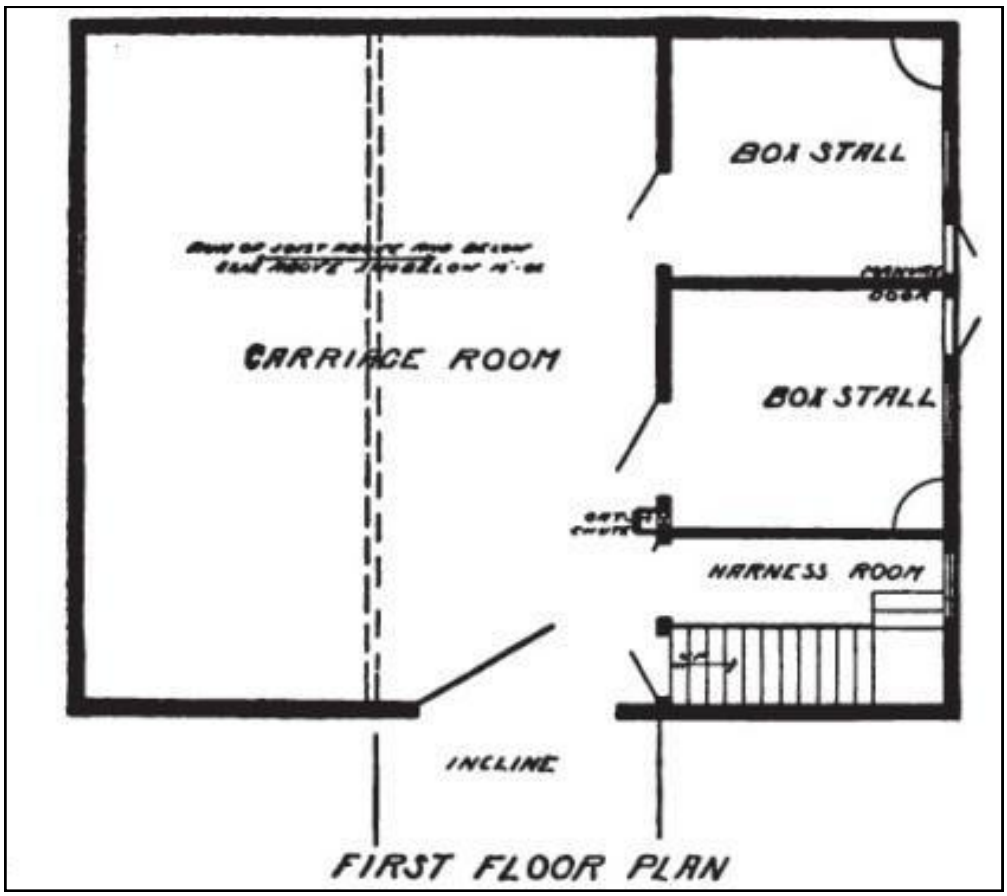

Fig. 13: A copy of a carriage house plan from William Radford's 1909 book, *Practical Barn Plans*. Note the location of the stalls in relation to the carriage room.

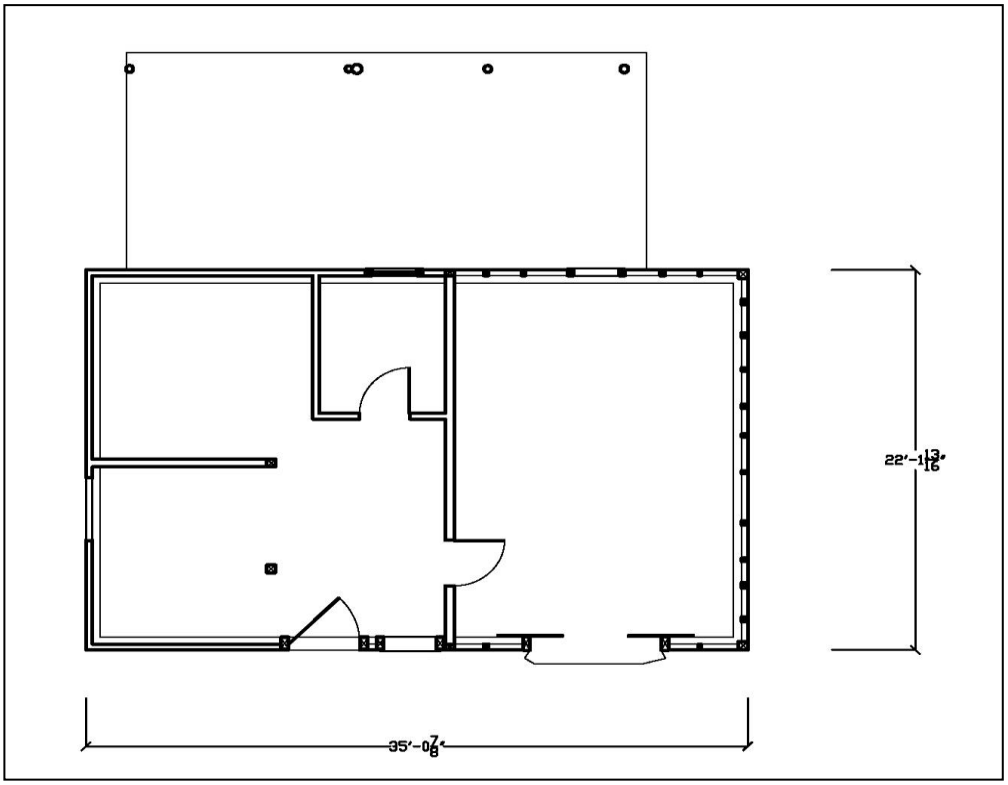

Fig. 14: A plan of the Arlington carriage house first or main floor. On the right side is where the carriage would have been kept. The left side is divided into two stalls. A small, raised, concrete arch is situated to the right of the entry door and is located directly under the oat/grain bin located in the lay loft. The small lean-to shed can be seen at the top of the image (Samantha Krenzer, 2012).

Fig.15: This image shows the down bracing used at the corners of the structure in the hay loft area. Note how the wall plate is two distinct pieces of lumber rather than a single large timer as often seen in timber framing. (2012)

Fig. 16: Above is the summer beam for the structure which runs through the stall area of the barn. This particular member illustrates well the plank framing techniques used throughout as "ganging" lumber together was a typical component to the technique.(2012)

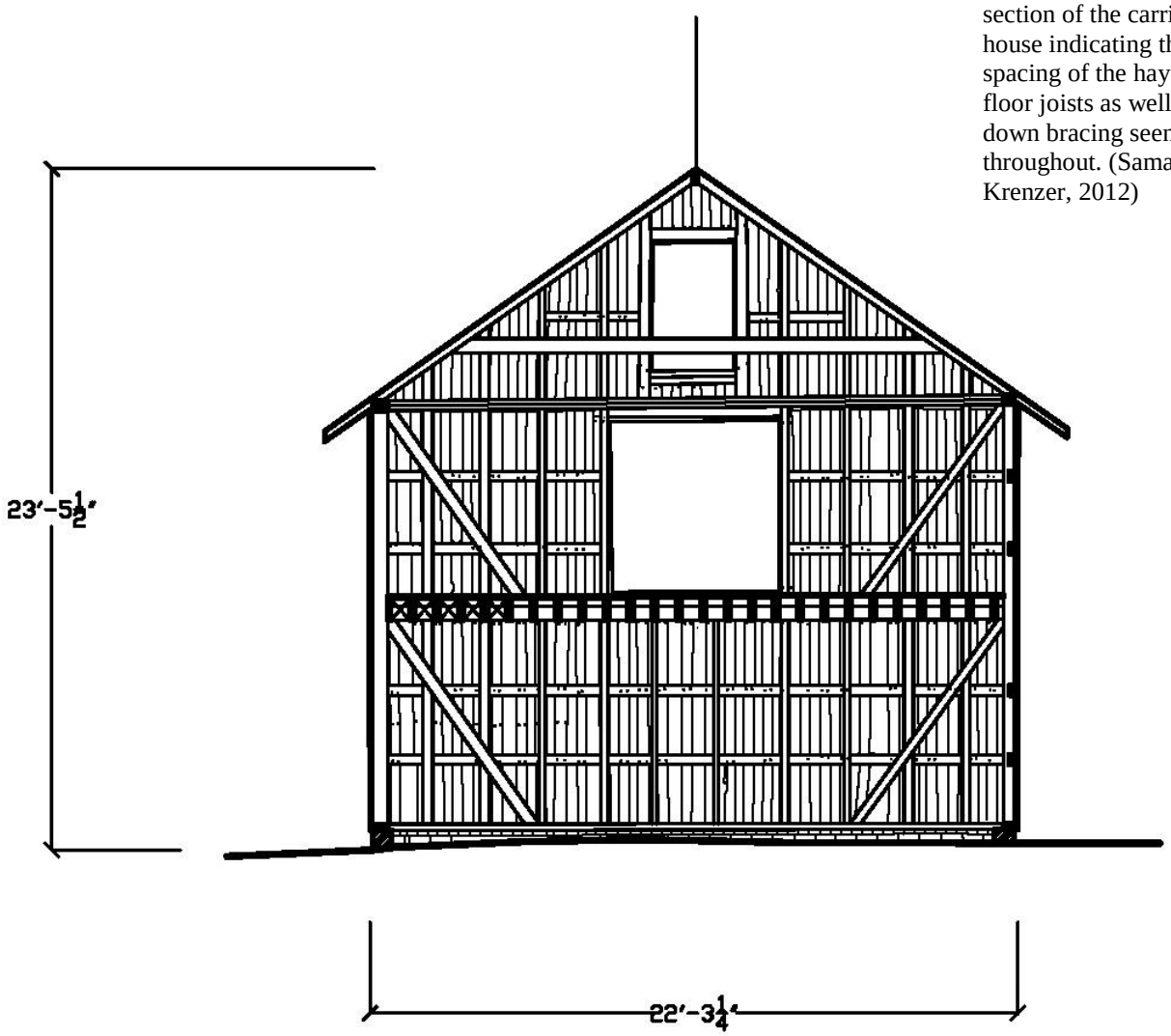

Fig. 17: A north facing section of the carriage house indicating the tight spacing of the hay lofts floor joists as well as the down bracing seen throughout. (Samantha Krenzer, 2012)

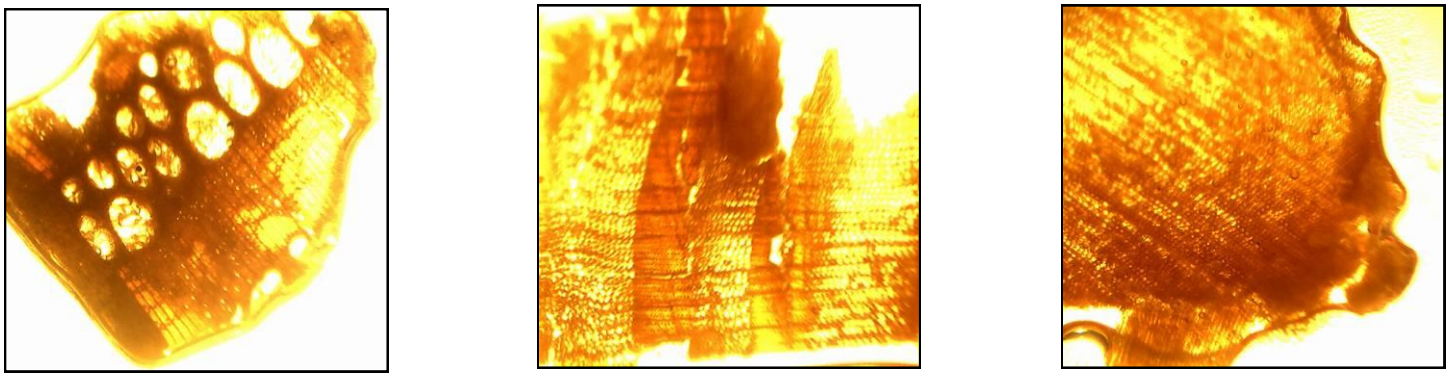

Fig. 18: Using a microscope wood sample were analyzed from various components of the carriage house. The left image shows white oak associated with a tree nail found in a re-used corner post. The middle image and the right image are both southern yellow pine and are associated with a corner post and stud respectively.

Flintshire Granary and Corncrib, Caroline County, Virginia:

By: Catherine Brau, Jennifer Sustar, Annie Grotophorst and Isabelle Eastham

Context:

Flintshire Farm is located along Route 17, also known as Tidewater Trail, in Caroline County, Virginia. Surrounding plantations include Prospect Hill, Hayfield, Moss Neck, and Santee. Through information gathered from oral history interviews it is believed that the farm was originally part of a 6,000 acre land grant given to Lawrence Smith and Robert Taliaferro in 1666.[1] While older structures, including an 18th - century farmhouse, were once present on the property, none remain today. Today the farm includes a 20th - century house set away from nine agricultural buildings that form a U-shaped yard. The majority of these nine structures appear to date from the first half of the 20th century, including the combination corncrib and granary.

Currently owned by the Holloway family, Flintshire has had a number of other owners, most with an ancestral connection to the present owners. The Gordon families' occupation, as well as J. Minor Holloway's, are perhaps the most relevant to interpreting and evaluating the existing agricultural structures as they were likely built during these periods. This includes construction of the combination corncrib and granary.

Construction and Materials:

The granary and corncrib sit side-by-side at the northeast end of the Flintshire farmyard. Wrapping around three-quarters of the structure, on the north, east and south elevations, is a post-in-ground, lean-to addition. Like many corncribs and granaries the Flintshire structure is raised on stone piers to assist with ventilation and to help deter rodents. Placed across these stone piers are hand-hewn, white oak sills. Typically found in older structures, the sills of the corncrib and granary were likely re-used from a previous building. Further evidence of re-use can be found in the large pine corner posts which show a number of "ghost" mortises. While such joinery indicates previous use, a number of mortise and tenon joints can still be found performing their intended function. This includes the corner posts and white oak studs which are all tenoned into the large sill. The sills themselves are connected with simple lap joints with the tenon of the corner posts securing their position. Down braces, mortised into each corner post and secured with black locust tree nails, provide additional structural rigidity and support.

When viewed as a whole such techniques are more reminiscent of timber framing in the 19th century rather than the early-20th century when this structure was likely built. Determination of the early 20th- century construction date was derived not only from historic topographical maps but also the presence of wire nails and circular sawn, dimensional wood. Such characteristics can be found when examining the down bracing and studs of the structure as well as the small slats used in the corn crib. Both technologies are 19th - century innovations with wire nails becoming prevalent in the region during the 1870s and circular sawn lumber about twenty years earlier.[2] Saw mills were prevalent across the area throughout the mid- to late 19th-century and on into the early 20th-century with Skinker's Mill, noted on an 1867 map, located less than a mile away.[3]

The hardware found on the corncrib and granary structure consists largely of hand-wrought strap and cross-garnet hinges in conjunction with more modern cast pieces. While some of the hardware may be re-used, Flintshire's on-site blacksmith would have provided some of the necessary items. The presence of a blacksmith living on the farm was not unusual as blacksmiths were still practicing locally throughout the early 20th century. Such practice is evidenced by a court case from 1908 which describes John Hayden's blacksmith shop "on the east side of Princess Anne St." in Fredericksburg.[4] Considering the agricultural nature of Caroline County, a blacksmith would have provided a much-needed service to

[1] F.Byrd Holloway, Interview conducted by Suzanne Willis, page 7 of interview transcription made July 3, 2007. (Library Point, Central Rappahannock Regional Library, http://history.librarypoint.org/oh_f_byrd_holloway).
[2] John Richards. "A Treatise on the Construction and Operation of Wood-Working Machine." (1872): 8-10; Lee Nelson. "Nail Chronology as an Aid to Dating Old Buildings.",5.
[3] Hotchkiss, Jedediah. *Caroline County, Virginia*, 1867 (Library of Congress)
[4] W.H. Rice ex. et. al. vs. Mills et. al., Fredericksburg, Virginia, 1908 (extracted October 20, 2005 by Barry L. McGhee, Fredericksburg Circuit Court Archives, Fredericksburg, Virginia)

farmers, not just in the creation of hand-wrought iron work, but also in the maintenance of farm machinery.

Like many agricultural structures, the corncrib and granary have seen a number of repairs and changes over the years including the addition of the surrounding lean-to. While the date of its addition is uncertain it is likely that only the west elevation had a shed roof as the building was originally constructed. Over time that original roof was replaced with the higher shed roof currently seen, however evidence of the previous roof was left behind. The evidence is in the form of "kicks", or wood wedges, that would have helped set the last piece of lapped horizontal siding at an angle to allow for the proper shedding of water. Additionally, the difference in weathering of original exterior studs on the granary denotes the original roof line in conjunction with the "kicks." Lack of nail holes further indicates that no siding was ever attached to the lower portions of the structure further confirming the notion that this area was originally covered.

Harvesting Corn and Wheat:

Methods in farming have changed dramatically over time especially as far as corn and wheat are concerned. The corn shock was used throughout the 19th century as a method of curing and drying the harvest. Creating a corn shock required that a number of corn stalks be cut by hand and collected into a bunch. About seven bunches would then be tied to an eighth uncut bunch that would hold the "shock" upright. This system ended around the late-19th and early-20th centuries; about the time when mechanical corn pickers became common and the Flintshire corncrib and granary were built.[5]

The use of a mechanical corn piker was described in an April 1907 issue of Popular Mechanics:

> *"…has guide chains with the usual prongs for straightening up the stalks. The chains for a stalk passage extending rearward through the machine. A rapidly moving chain provided with fingers is located at one side and between the guide chains in such a position that as the machine passes over the row the fingers engage the ears on the stalks and snap them off."*

Then the ears are deflected into a receptacle, carried to husking rollers and then the wagon. The cornstalks were discarded and a conveyer carried them and other debris to the ground. This method raised objections because these "modern pickers" assumed the stalks to have no value, when farmers often recycled them as feed: "…every economical farmer secures his fodder with as much care as he gives his hay, knowing that it is equally nutritious."[6]

Developments in processing corn continued and in 1930 the combine corn harvester was introduced. The advantages of the harvester were numerous as the machine "not only cuts the crop but shells, cleans and bins it and cuts the stalks so that they may more easily be plowed under." The combine allowed for more efficient and successful harvests cutting "two rows of stalks at a swath" gathering upwards of fifteen acres per day. As well as revolutionizing corn harvests, it was also built to be able to attach to a wheat combine. Popular Mechanics boasted of the machinery: "[it provides] in one machine and attachment an outfit that will harvest practically any crop that can be handled by this method."[7]

At the same time corn harvesting was undergoing a revolution, the process of threshing wheat, which is the act of separating grain from a plant, was also changing. During the 19th century wheat was separated from the chaff by flailing the wheat on a threshing floor and allowing the breeze, created by opposite openings in a barn, to remove the lighter chaff. Threshers in the 1930s greatly improved upon this earlier method by drawing the wheat into the front of the machine with a reel, and then a cutter unit, with a scythe, would chop them. After being cut, the thresher smashed them, and then the wheat was split from the chaff in the "separator". Not only was this process more efficient but it also meant that barn designs, like the three-bay threshing barn, so iconic on the 19th-century landscape, no longer needed to be designed with

[5] "Corn Farming in Loudon County, Virginia," (http://www.loudounhistory.org/history/agriculture-corn.htm, accessed December 9, 2012)
[6] "Picking Corn by Machinery," *Popular Mechanics*, April 1907, pg. 412. (http://books.google.com/books, accessed December 9, 2012)
[7] "Harvester Cuts Corn, Shells, Cleans and Bins It," *Popular Mechanics*, November 1930, pg. 762. (http://books.google.com/books, accessed December 9, 2012)

threshing wheat in mind. Rather, wheat could be placed directly into a granary or storage facility as seen at Flintshire.

Development – Corn and Corncribs:

A Fredericksburg court record from 1819 refers to a "corn house" measuring 20 x 12 feet, with a "barked logy body [and] slab roof."[8] While the Flintshire farm corncrib was built in the early 20th century the dimensions and materials display similarities to the earlier reference. Such commonalities between structures over such a long period of time is not unusual to find in agricultural buildings and helps to demonstrate vernacular traditions of which the builders of the Flintshire corncrib and granary were still using despite more modern techniques.

The traditional designs and construction techniques used in the combination granary and corncrib at Flintshire contrast starkly with the marketed ideal of the early 20th century. Published on September 11, 1912, the *Lexington Gazette* described the construction and function of just such a corncrib:

> *"The drawing shows a section of a 24-foot crib with a ten-foot driveway in the center and a grain bin over the drive. The length may be any size from 25 to 200 feet long. In building one of these cribs it must be remembered that the roof must have an angle of at least 45 degrees, that is, the slope of the same must be what is called half-pitch, measuring that the distance from the peak down to the plate must be half the width of the building. This steep roof is necessary to accommodate the corn conveyor and distributing spout, which is hung directly from the rafters. For this reason care must be used not to have any cross ties higher up on the rafters than shown in the drawing."*[9]

The above described corncrib also alludes to the changing nature of agricultural construction within the region, primarily the adaptation and incorporation of mechanization. Size of the structure described, also denotes the increased crop yields and productivity that farmers were experiencing at the time, something Flintshire was likely accounting for in their agricultural endeavors.

Harry E. Moore, a turn-of-the-century farmer in Rockbridge County, Virginia described just this process in his 1910 report on corn. Moore's report illustrated how mechanization as well as other planting practices has helped improve farm efficiency. Despite the traditional design of the Flintshire corncrib it is likely that many of the same advances in corn were making or would make their way to Flintshire farm. Such advances and best practices noted in the report included the preparations of the soil for corn planting. Moore describes how he begins by disking the field twice using a "cut away harrow" and a "spring tooth harrow." This process was followed by the use of a wheat drill to spread the one hundred and eight pounds of raw bone mean and three hundred pounds of Armour's Fertilizer, made from ammonia, phosphoric acid and potash. Moore planted his corn in mid April with a corn drill keeping the rows four feet wide, and the seeds twenty-eight inches apart. The seed is planted to a depth of about two and a half inches. In September he cut and shocked the corn gathering it by November. Such methods yielded thirty-four barrels or fifty-one bushels per acre. Cost of producing the crop was $21.52.[10]

Grain, like corn also experienced a boom during the end of the 19th century, about the time the granary at Flintshire was built. Throughout much of the antebellum period, grain was so labor intensive that it was not produced on the same scale as corn. Storage of the grain was often in small, secured structures, located within the domestic yard. Later in the 19th century some granaries were incorporated into larger general purpose barns.[11] Granaries, unlike corncribs, did not require the same ventilation and instead needed sealed floors and walls to prevent spillage and pests like birds and rodents from entering as noted in an 1893 publication, "every care should be taken to have no cracks or crevices in the bins, floors, or

[8] Pleasants &c vs. Brooke., Fredericksburg, Virginia, 1819 (extracted June 8, 2005 by Barry L. McGhee, Fredericksburg Circuit Court Archives, Fredericksburg, Virginia)
[9] Lexington Gazette, September 11, 1912, pg1 (Library of Congress, http://chroniclingamerica.loc.gov, accessed December 12, 2012)
[10] Lexington Gazette, November 30, 1910, pg1 col. 2 (Library of Congress, http://chroniclingamerica.loc.gov, accessed December 12, 2012)
[11] Matthew King, "Silos: Construction and Service", 1913, pg 25.; Byron Halstead, *Barn Plans and Outbuildings*, New York: Orange Judd Company, 1893 pg. 181 (http://books.google.com, accessed December 12, 2012)

building…windows should be covered with fine wire gauze."[12] The granary at Flintshire farm exhibits such characteristics as the structures interior walls as clad with horizontal tongue and groove boards.

Conclusion:

"A farm building should be first a property saver, second a labor saver. Farm buildings may be considered in a sense as a necessary expense, but on the other hand they should be considered in the light of an investment."[13] The Flintshire corncrib and granary is an example of a property saver and a light investment during a time when agricultural practices were beginning to change. Built in the early 20th century, the vernacular structure is an excellent example of this changing climate, combining both traditional techniques and practices with modern technologies and materials. As the functionality of such structures waned over the subsequent decades they were replaced by newer designs like the "drive through corncrib." Such developments left once common structures such as the corncrib and granary at Flintshire as lone beacons of an earlier time. The increasing rarity of such buildings continues today and underlines the need for their preservation in order that such an important component in our economy like agriculture can be appropriately interpreted over time.

[12] Byron Halstead, *Barn Plans and Outbuildings*, New York: Orange Judd Company, 1893 pg. 181 (http://books.google.com, accessed December 12, 2012)
[13] William A. Radford, *20th Century Practical Barn Plans*, Chicago: American Publishing Co., 1907 pg 3.

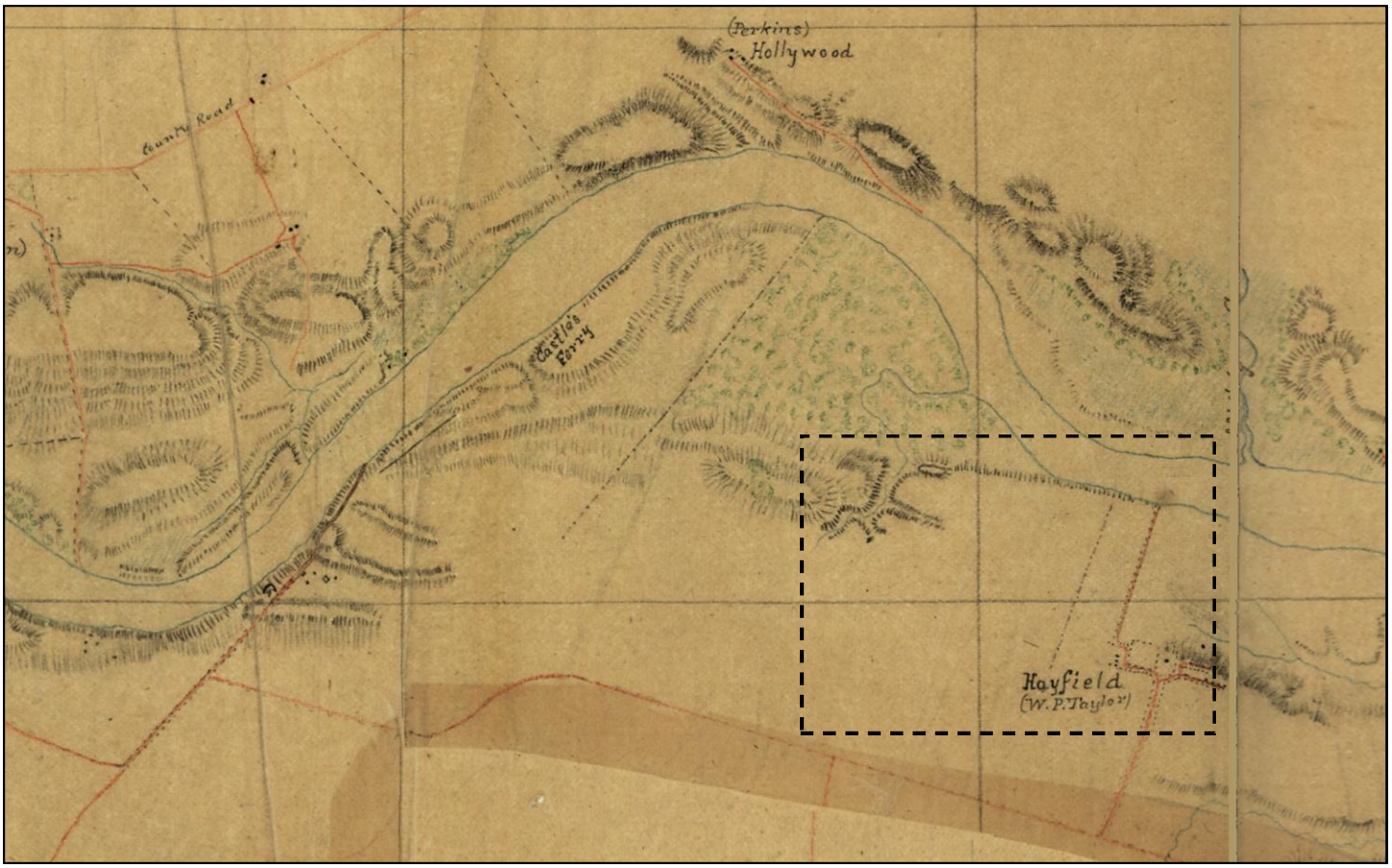

Fig. 19: 1860s map depicting the adjacent plantation, Hayfield, at the time owned by the Taylors. Enlargement of the boxed area however reveals a possible structure located within the vicinity of the farm structures today. (Map from the Library of Congress)

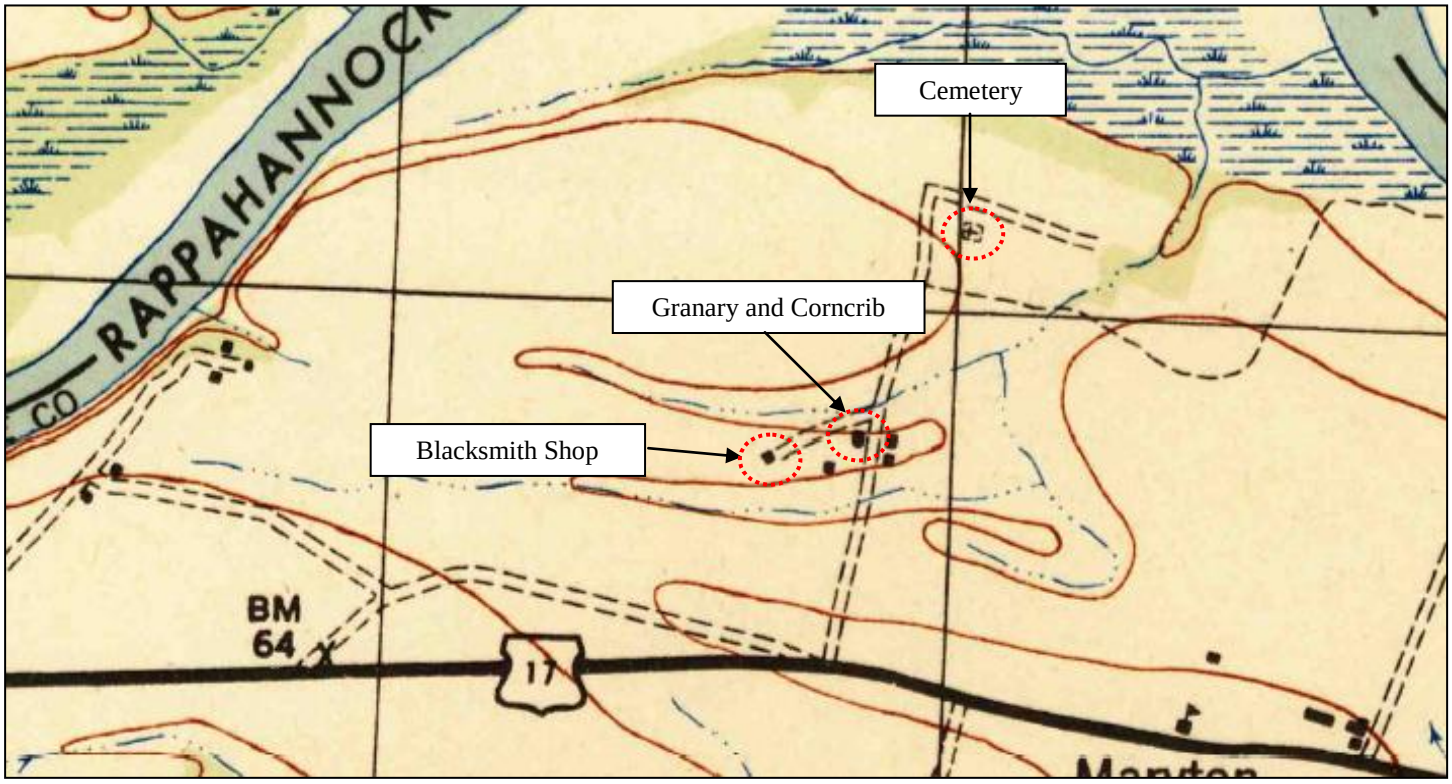

Fig. 20: 1942 USGS topographical map showing Flintshire farm and various agricultural structures.

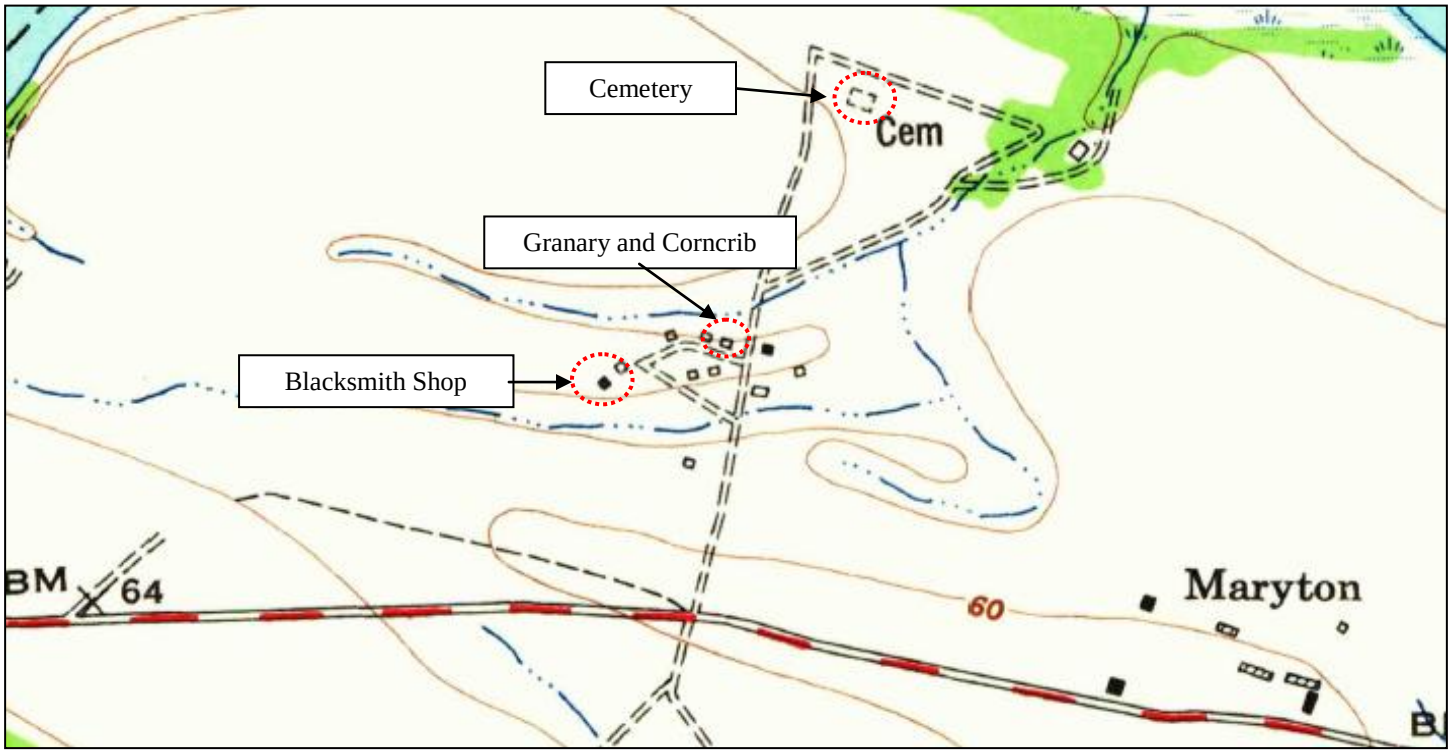

Fig. 21: 1952 USGS topographical map showing Flintshire farm. Note the additional structures as well as changing farm roads.

Flintshire Granary and Corncrib, Caroline County, Virginia:

Fig.22: The east elevation of the Flintshire corncrib. The opening at the top would have allowed for the loading of the corn. While the structure appears to be one large crib it is actually divided into two separate storage areas, likely to promote drying and air circulation. (Image, 2012)

Fig. 23: This image shows the southwest corner of the granary which is adjacent to the corncrib. Note the down bracing as well the interior wood siding, likely to secure the grain. The visible studs have no siding due to the fact that the structure originally had a shed roof projecting from this area and so additional protection was not necessary. (Image, 2012)

Fig. 24: Early 20th century image showing corn being unloaded from a wagon and place in an elevator which then loads it into the corn crib.

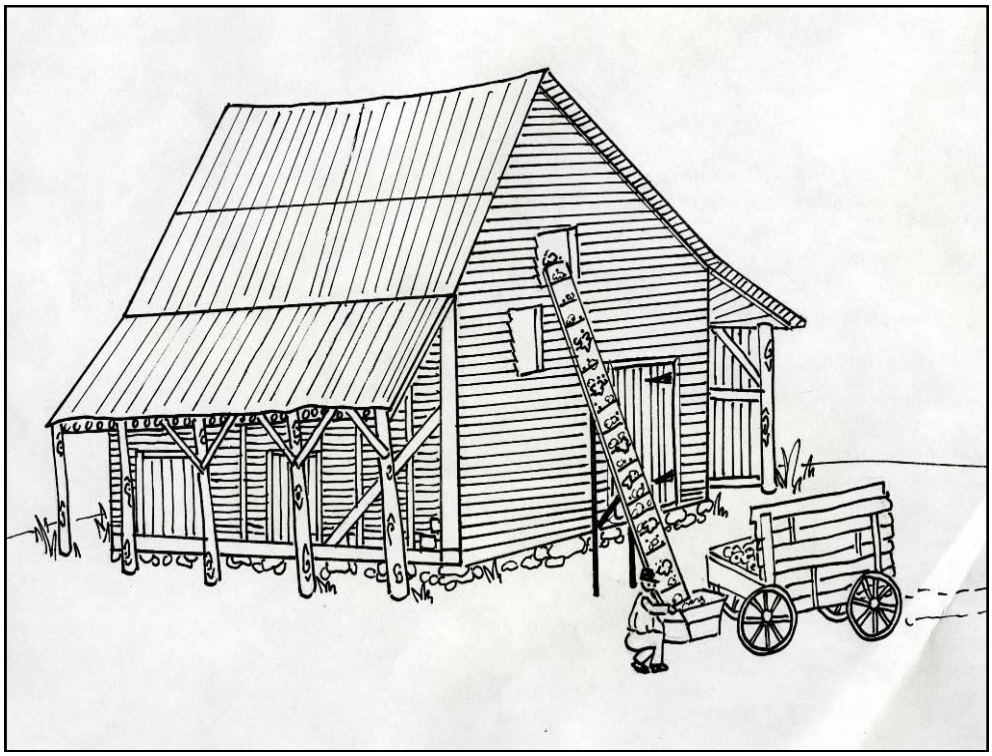

Fig. 25: Illustration showing the Flintshire corncrib being loaded using a similar device as pictured above. (Annie Geotophorst, 2012)

Fig. 26: The southeast corner of the corncrib showing the down bracing as well as the ventilation slats. Note the hand hewn sill at the bottom as well as the large corner posts with "ghost" mortise (upper portion of the corner post).

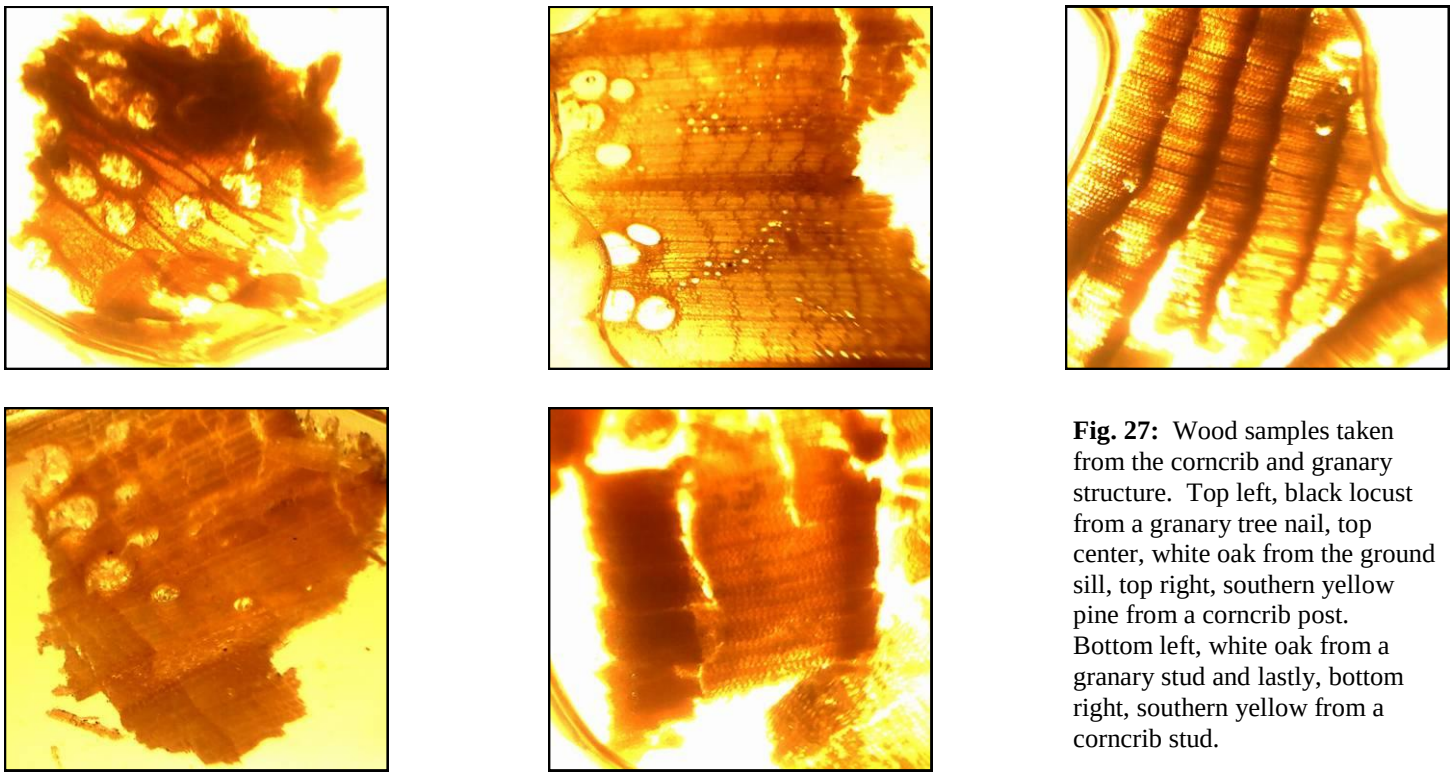

Fig. 27: Wood samples taken from the corncrib and granary structure. Top left, black locust from a granary tree nail, top center, white oak from the ground sill, top right, southern yellow pine from a corncrib post. Bottom left, white oak from a granary stud and lastly, bottom right, southern yellow from a corncrib stud.

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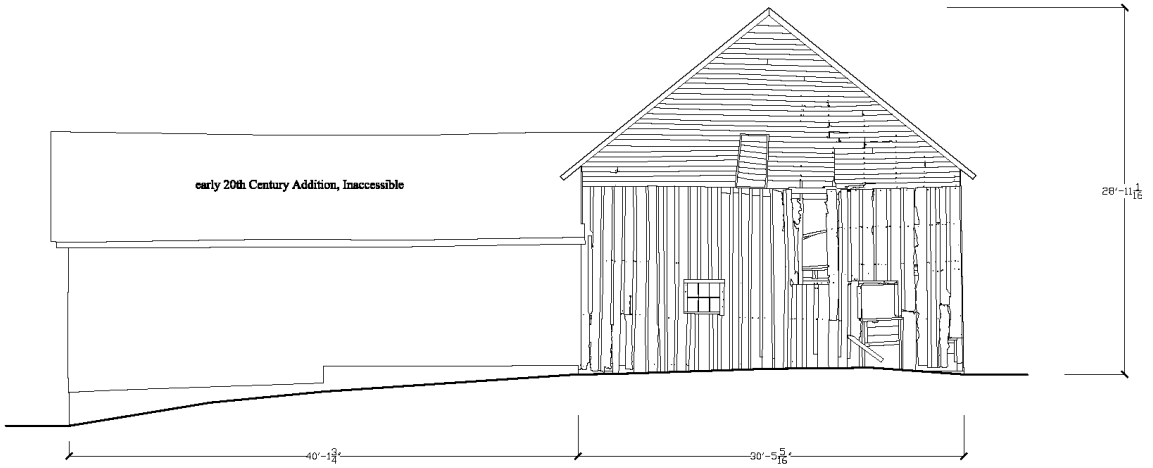
Appendix A: Drawings

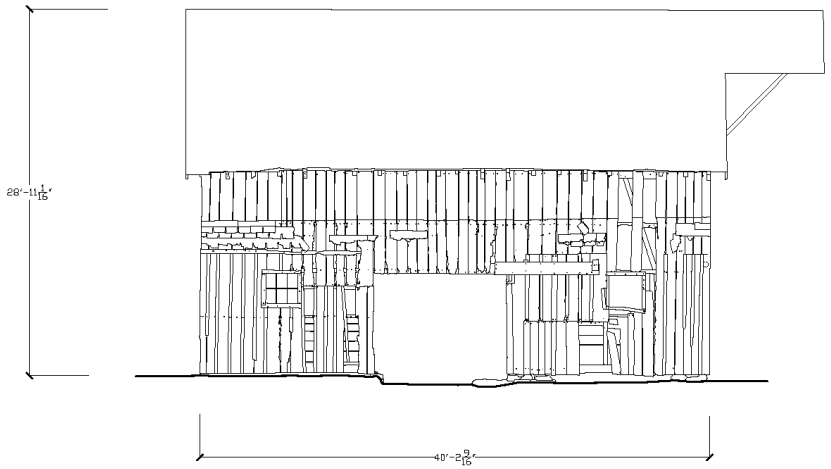
East Elevation
Drawn by: Jessica O'Connell



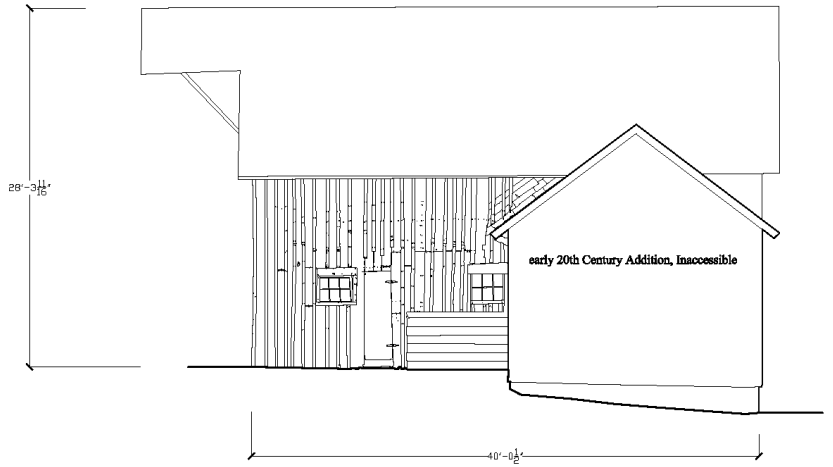
West Elevation
Drawn by: Jessica O'Connell

Scale: 1/4" = 1'-0"

UNIVERSITY OF MARY WASHINGTON DEPARTMENT OF HISTORIC PRESERVATION	Houseworth Farm (Montpelier Estate), Barn Orange County, Virginia	Edited by: Michael Spencer Date: January 8, 2013	SHEET NUMBER 1



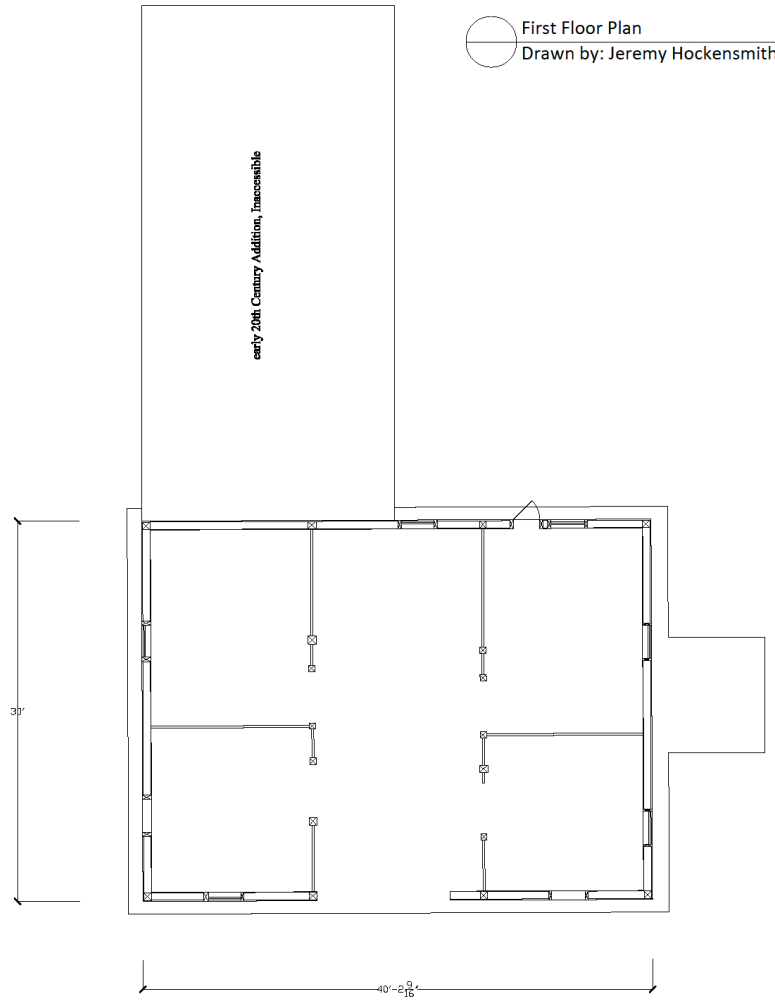
South Elevation
Drawn by: Sarah Sanders



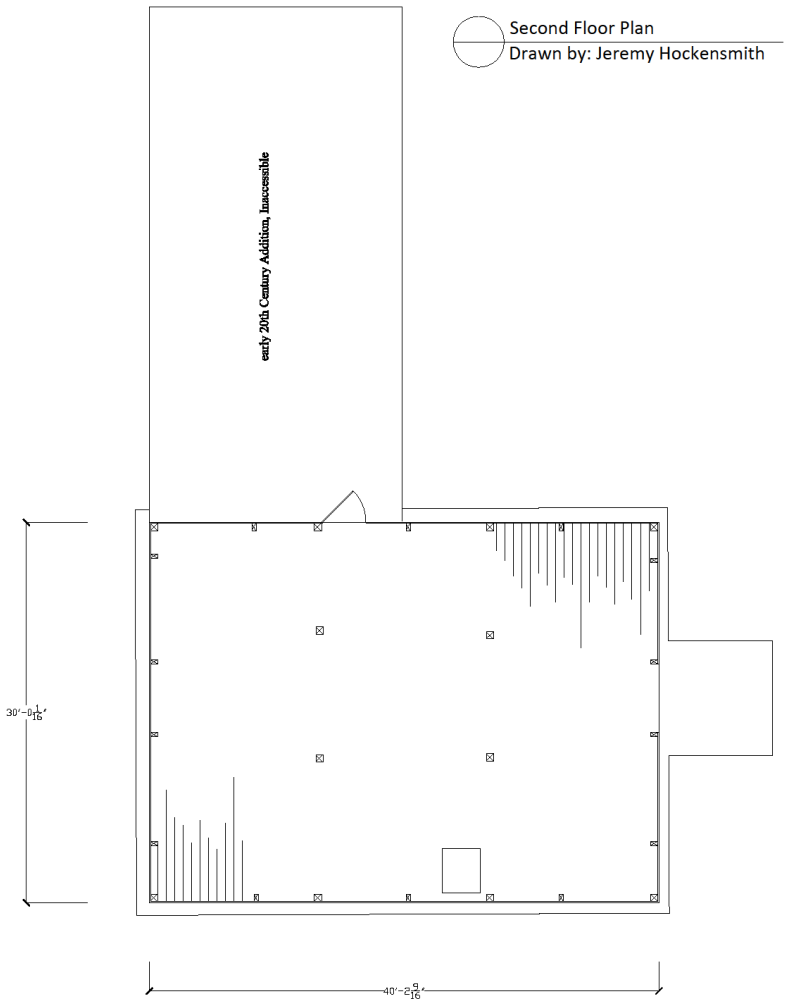
North Elevation
Drawn by: Sarah Sanders

Scale: 1/4" = 1'-0"

UNIVERSITY OF MARY WASHINGTON DEPARTMENT OF HISTORIC PRESERVATION	Houseworth Farm (Montpelier Estate), Barn Orange County, Virginia	Edited by: Michael Spencer Date: January 8, 2013	SHEET NUMBER 2



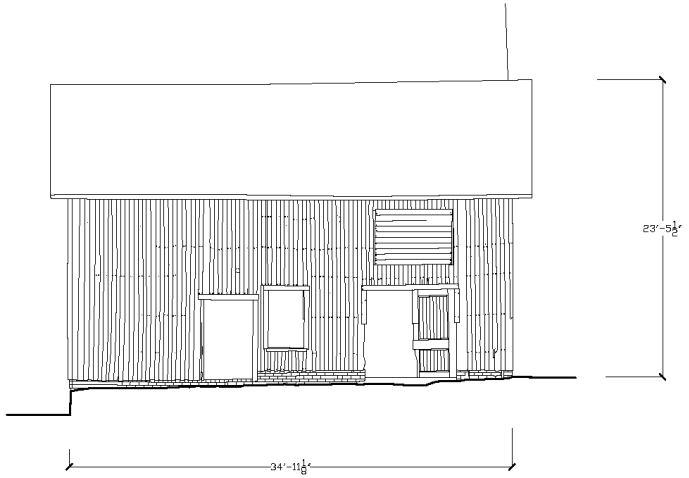
First Floor Plan
Drawn by: Jeremy Hockensmith



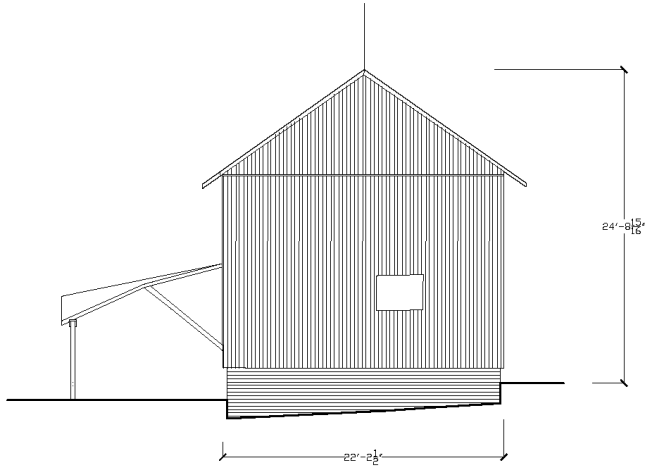
Second Floor Plan
Drawn by: Jeremy Hockensmith

Scale: 1/4" = 1'-0"

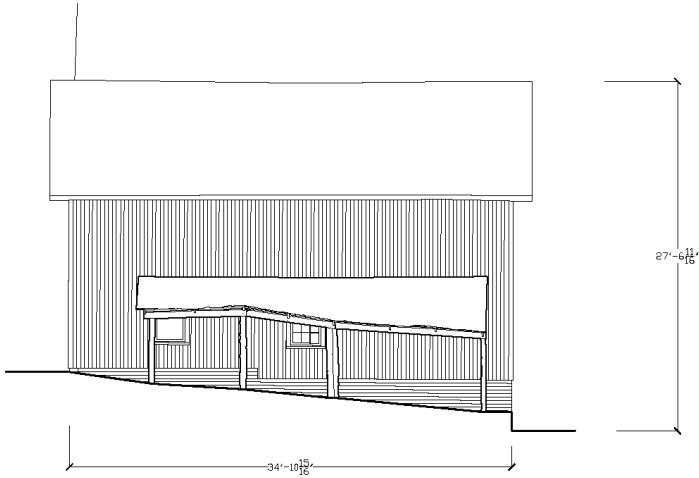
UNIVERSITY OF MARY WASHINGTON DEPARTMENT OF HISTORIC PRESERVATION	**Houseworth Farm (Montpelier Estate), Barn** Orange County, Virginia	Edited by: Michael Spencer Date: January 8, 2013
		SHEET NUMBER 3



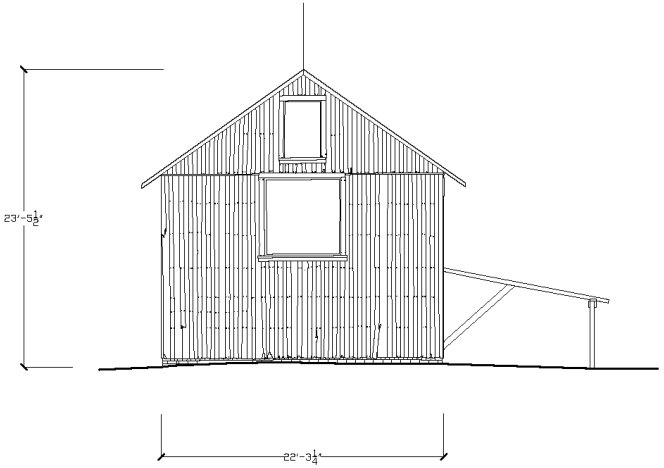
East Elevation
Drawn by: Michael Spencer



South Elevation
Drawn by: Michael Spencer



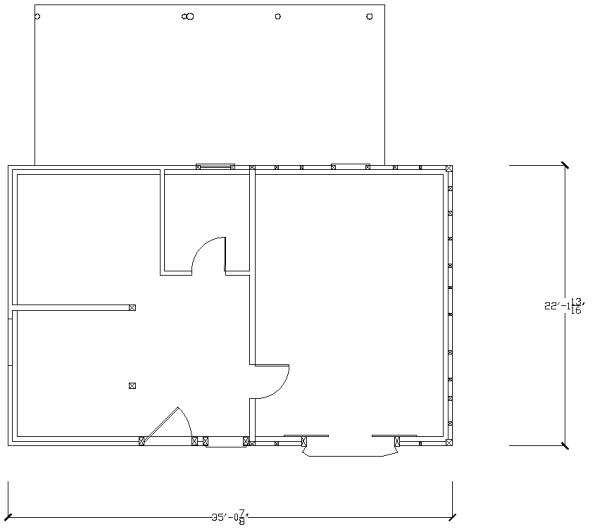
West Elevation
Drawn by: Michael Spencer



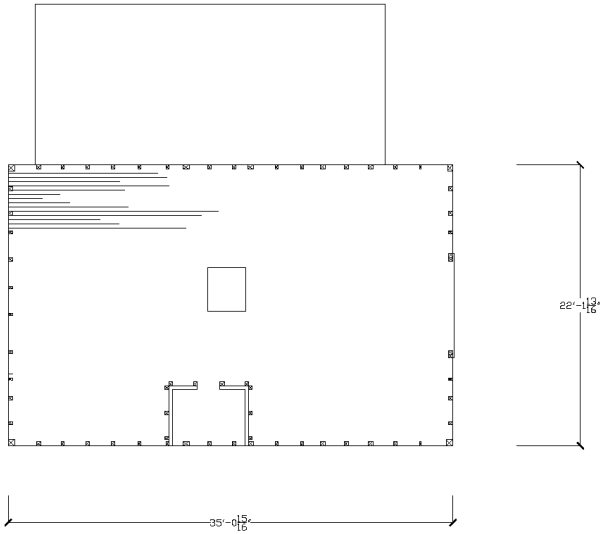
North Elevation
Drawn by: Michael Spencer

Scale: ¼" = 1'-0"

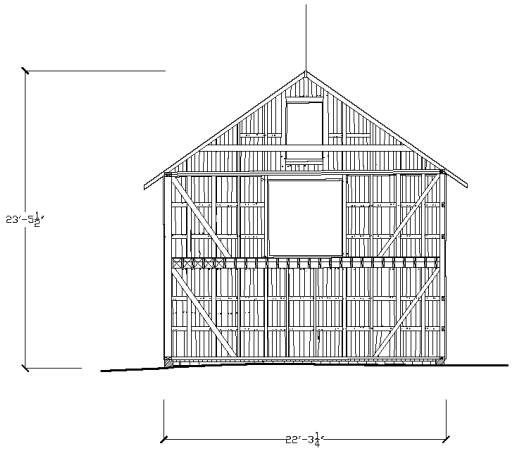
UNIVERSITY OF MARY WASHINGTON DEPARTMENT OF HISTORIC PRESERVATION	Arlington House Farm (Montpelier Estate), Carriage House Orange County, Virginia	Edited by: Michael Spencer Date: January 10, 2013	SHEET NUMBER 1



First Floor Plan
Drawn by: Samantha Krenzer



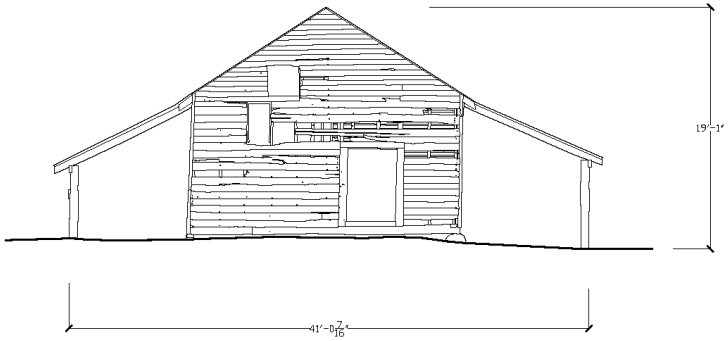
Second Floor Plan
Drawn by: Samantha Krenzer



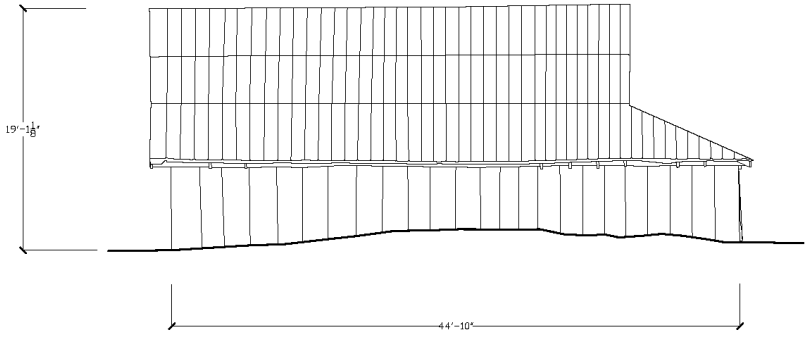
North Section
Drawn by: Samantha Krenzer

Scale: 1/4" = 1'-0"

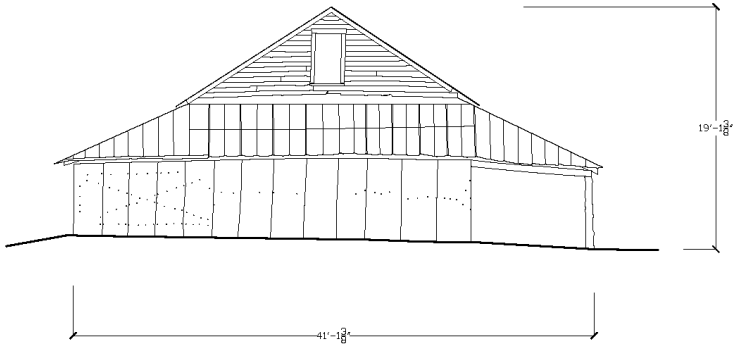
UNIVERSITY OF MARY WASHINGTON DEPARTMENT OF HISTORIC PRESERVATION	Arlington House Farm (Montpelier Estate), Carriage House Orange County, Virginia	Edited by: Michael Spencer Date: January 10, 2013	SHEET NUMBER 2



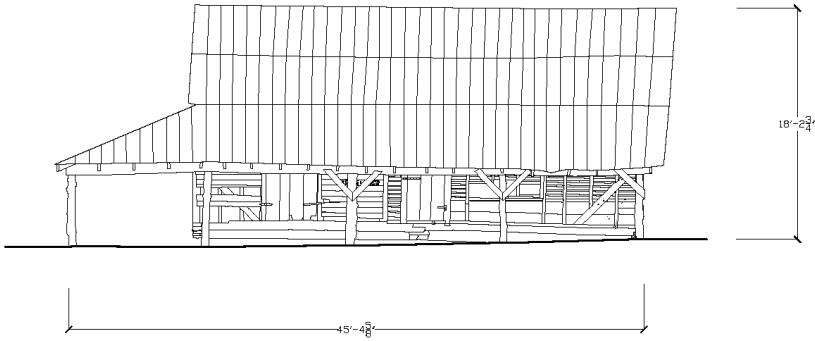
East Elevation



North Elevation



West Elevation



South Elevation

Scale: 1/4" = 1'-0"

UNIVERSITY OF MARY WASHINGTON DEPARTMENT OF HISTORIC PRESERVATION	**Flintshire Farm, Corn Crib and Granary** Caroline County, Virginia	Drawn by: Michael Spencer Date: January 3, 2013	SHEET NUMBER 1

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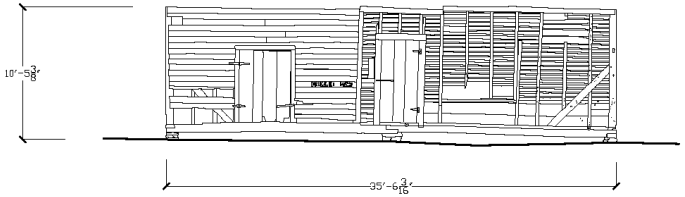
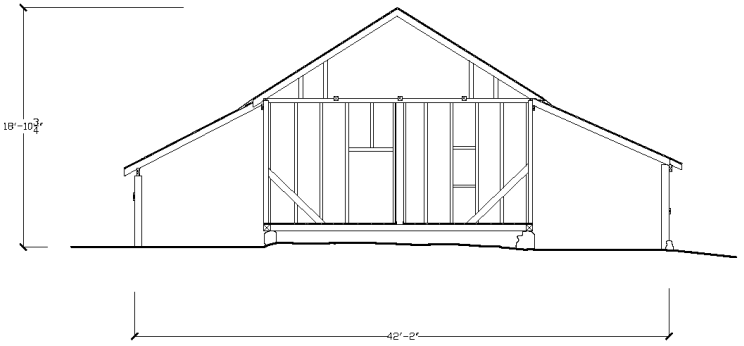
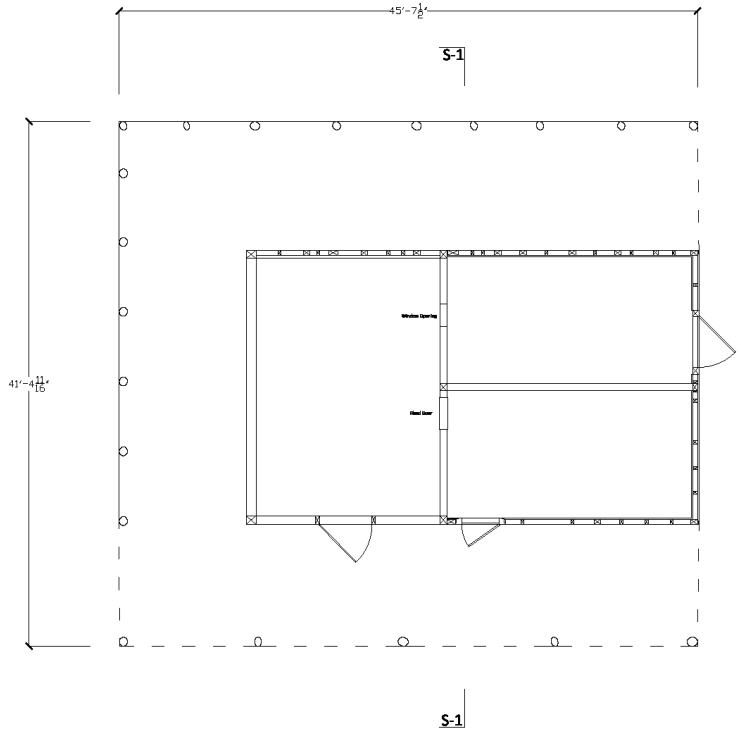


D-1 South Elevation Detail
Drawn by: Michael Spencer



S-1 West Section
Drawn by: Jen Sustar



Plan
Drawn by: Catherine Brau

Scale: 1/4" = 1'-0"

UNIVERSITY OF MARY WASHINGTON DEPARTMENT OF HISTORIC PRESERVATION	Flintshire Farm, Corn Crib and Granary Caroline County, Virginia	Drawn by: see drawings Date: January 3, 2013	SHEET NUMBER 2

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UMW students investigating the corncrib at Weston Farm, in Fauquier County, Virginia