

BANK BARNS IN MILL CREEK HUNDRED, DELAWARE

By

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A. MCINTIRE BARN  
(Simon Hadley, c.1717)

## INTRODUCTION

The Mill Creek Hundred (Mill Creek Hundred) bank barn is a two level structure situated on a hill parallel to the slope. The upper level was formerly used for threshing grain and storing hay and is entered via the hill or ramp by wagon. If still in agriculture the upper level is presently used exclusively for storing hay. The lower level was origin-ally used for housing livestock and is used today for the same purpose, sheltering the few remaining dairy herds in the hundred, and stabling suburbanite owned horses.

The intent of this study was to locate and document all extant bank barns in Mill Creek Hundred and to trace their development from the earliest known examples of the late eighteenth century to the latest examples of the 1930's. This is almost purely a descriptive study in hopes of adding to the growing catalogue of vernacular architecture from which more comprehensive studies can be made.

The methodology consisted of driving over every known road in Mill Creek Hundred using a topographic map

for reference since it has buildings as well as roads marked. Also, Beers Atlas of Delaware was used for locating each farmstead and the owner in the year 1868. These names are used in describing the barn unless indicated post-1868, then the current owner's name is used. Other surveys from the Delaware Bureau of Historic Preservation and papers by American Studies Department classes were utilized in locating barns and for pertinent details. Every barn has been photographed and surveyed noting such details as type of construction, number of levels, types of framing, siding and roof. An unscaled plan of each level was drawn to accompany the notes. The barns were further documented with exterior photographs. Twenty-five percent were studied in greater detail with interior as well as exterior photos. Floor plans were drawn to scale. This information is on file with the Delaware Bureau of Historic Preservation. Secondary sources were also used in trying to understand these barns. These sources include the 1804 and 1817 tax lists and the agricultural census of 1850, 1860 and 1870. Other studies were consulted to compare barn types and to learn methodology, especially Henry Glassie's comprehensive study "The Variation of Concepts within Tradition: Barn Building in Otsego County, New York" after which this paper is weakly modeled.<sup>1</sup> Finally, in order to perceive more clearly the relationship between bank barns in

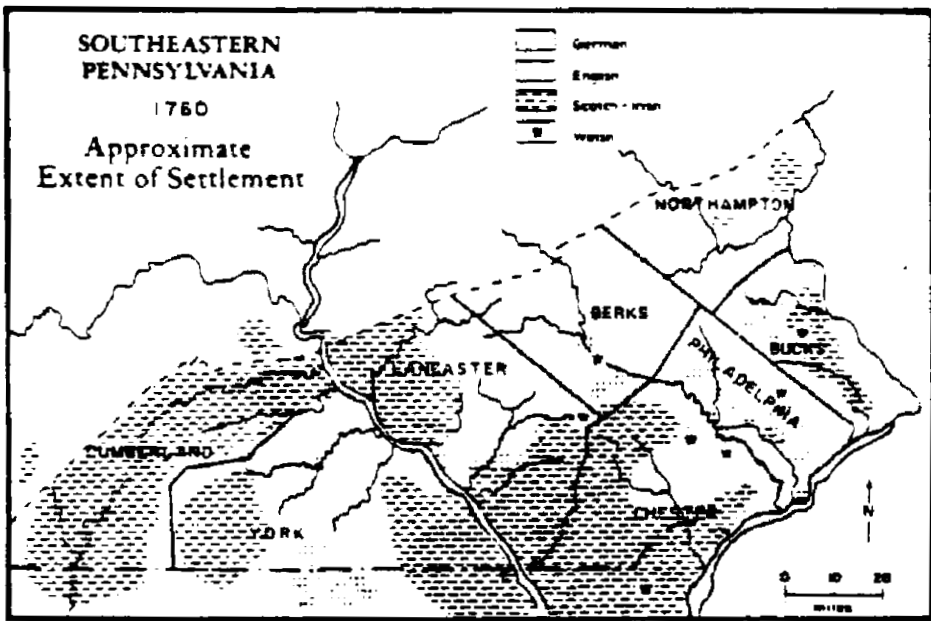
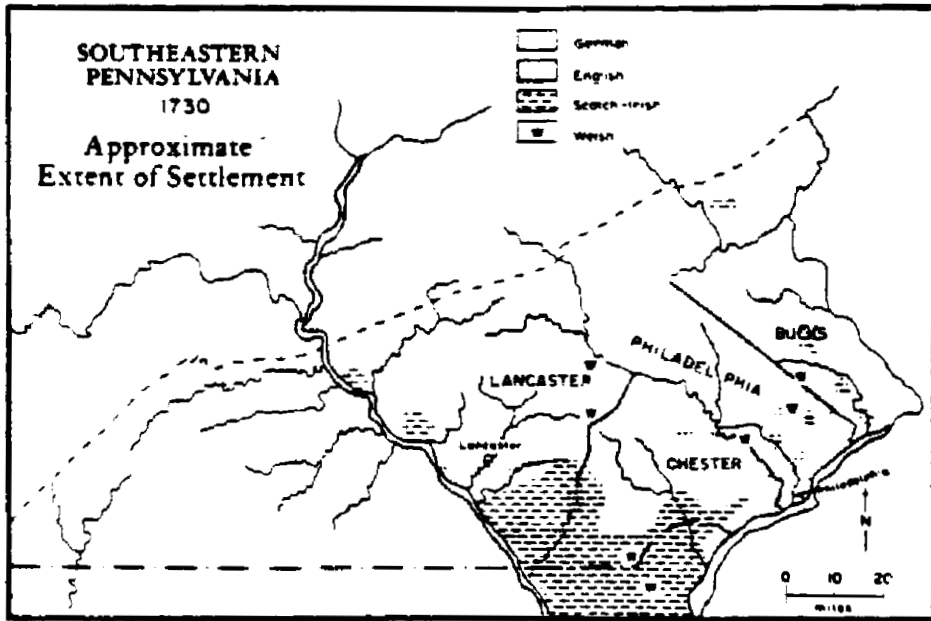




northwestern England and bank barns in Mill Creek Hundred, a study trip was taken to Cumbria, England for two weeks of intensive field work including photographic documentation and measured floor plans. Notwithstanding the inclement weather, this trip achieved its goal.

Mill Creek Hundred is in northern New Castle County and is bordered by White Clay Creek to the west and south, Red Clay Creek to the east and the curvilinear state line with Pennsylvania elsewhere. Mill Creek Hundred is the southeastern most extension of the Piedmont Plateau consisting of deep, friable, well drained soil on a gently rolling landscape. There is an underlying layer of micaceous gneiss and schist with which many of the early buildings were constructed. The fall line between the Piedmont Plateau and the Atlantic Coastal Plain is roughly parallel to Route 2 and is effectively the southern border of the Hundred. This is also the southeastern most extension of the traditional bank barn type except for some examples of popular origin. The southeastern tilt of the Plateau accounts for the nearly 100% northwest-southeast orientation of Mill Creek Hundred bank barns although this was also advantageous to the farmers for the warming southern exposure.

The settlement history of Mill Creek Hundred is straight forward but more needs to be known about the



From James Lemon, The Best Poor Man's Country, pp. 49 and 50.

specific origins of the settlers. This area was originally inhabited by peaceful, agrarian Lenni-Lenape Indians of the Algonquin nation who had hunting camps around Hockessin. Threatened by the more aggressive Iroquois the Lenni-Lenape moved to central Pennsylvania and thence crossed the Appalachians into Ohio. By 1750, there were no Indians left in Mill Creek Hundred.<sup>2</sup>

European settlement in the seventeenth century was mostly Dutch and Swedish traders. Settlement actually began when William Penn obtained control of the three lower counties of Delaware from the Duke of York in 1682 and when Delaware became a colony in 1704. When Penn divided his vast holdings into seven blocks the Manor of Steyning was created which consisted of New Garden Township, Pennsylvania and Mill Creek Hundred. Early settlers were mainly Scotch-Irish and English like Simon Hadley who came from West Meath County, Ireland but whose father was from Lancashire, England.<sup>3</sup> There was a great deal of confusion over the land titles and squatters began to settle the land around 1800. Established farmers like William Morgan of Corner Ketch settled up the original purchase price, "interest accrued and all quit rents" with an agent for William Penn's relatives. Southeastern Pennsylvania continued to be predominantly English and Scotch-Irish throughout the eighteenth century.

Farming practices of the British and their Germanic neighbors have been found to be similar despite popular opinion of Germanic superiority. The significant factor was the sectarian cohesion of the Quakers and Mennonites who were able to help each other, and who practiced conservative but productive methods.<sup>4</sup> The farmers of Mill Creek Hundred in 1850 mainly practiced mixed farming with an emphasis on grain like wheat and Indian Corn. Butter was also made though not in the quantities of lower New Castle County.<sup>5</sup> From 1850 to 1875 a dairy industry developed with a creamery situated in Hockessin in 1875.<sup>6</sup> By 1890, many farmers would have been involved in supplying dairy products to the urban centers of Baltimore and Philadelphia. The increase in hay production from 1850 to 1870 and the extensive additions to barns with similar framing techniques bear this out.

During the latter half of the nineteenth century rural literature became popular such as agricultural journals like The American Agriculturalist and The Breeders Gazette. These publications also published books with ideas and types of structures to build as well as advice about every aspect of farming. How much influence the pattern books had is difficult to tell though field work indicates that popular ideas were incorporated into traditional forms.<sup>7</sup> As early as the 1820's the bank barn was a compelling agricultural image as it was commented upon by

travelers.<sup>8</sup> The bank barn form was heartily endorsed by the agricultural journals and pattern books. The influential Barn Plans and Out-Buildings by Byron Halsted recommended that "If possible, the barn should be located upon a rise of ground, where a cellar can be built, opening upon the lower ground to the rear."<sup>9</sup> It should be remembered that these agricultural books are a compendium of barn forms that are already existing structures. The owners of the barns sent in their plans to the publishers describing their new or more efficient methods of building. At the same time these people are disseminating vernacular or traditional forms through the popular media to be used in non-vernacular ways. That is, this use of vernacular forms would not have emanated from a tradition, and frequently, the vernacular form would be modified or used in a way for which it was not originally intended, for instance the introduction of the manure basement in the bank barn.<sup>10</sup>

A basic problem in this study should be dealt with. That is the unintended emphasis presented by the large percentage of stone barns surviving from before 1810. The 1804 tax list catalogued barns in three materials: log, frame, and stone. There were that year seventy-six log barns, forty-one frame barns, and thirteen stone barns. Although dating barns is risky business because of the "idiosyncratic mix of conservative and

progressive tendencies on the part of the builder:,<sup>11</sup> out of five possible pre-1810 barns four are stone, one frame and none are log. This absence of log buildings is greatly disturbing because they comprised the bulk of early agricultural buildings both here and in Pennsylvania and not one is extant in Mill Creek Hundred although there are several in Pennsylvania.<sup>12</sup> The rapidity of the replacement of log barns is evident in the confusing but still illuminating tax list of 1816-17. In this tax list in various categories, some of which may be describing additions, the shift from log to frame and stone can be seen. There are only twenty-four log barns listed compared to thirty-three wooden, twenty-five frame, three stone and frame, seven stone and wooden, and forty-eight stone barns, a 450% increase of stone barns in fifteen years. This can be compared with the (incomplete) figures of today which are thirty-one frame, five stone, seven stone and frame, eight rebuilt or modern and ten foundations or shells, with seventeen currently unknown.

The following pages will deal with the form, construction and antecedents of the Mill Creek Hundred bank barn and offer a suggestive sequence of development, with comments on the influence of agricultural literature and technological change.

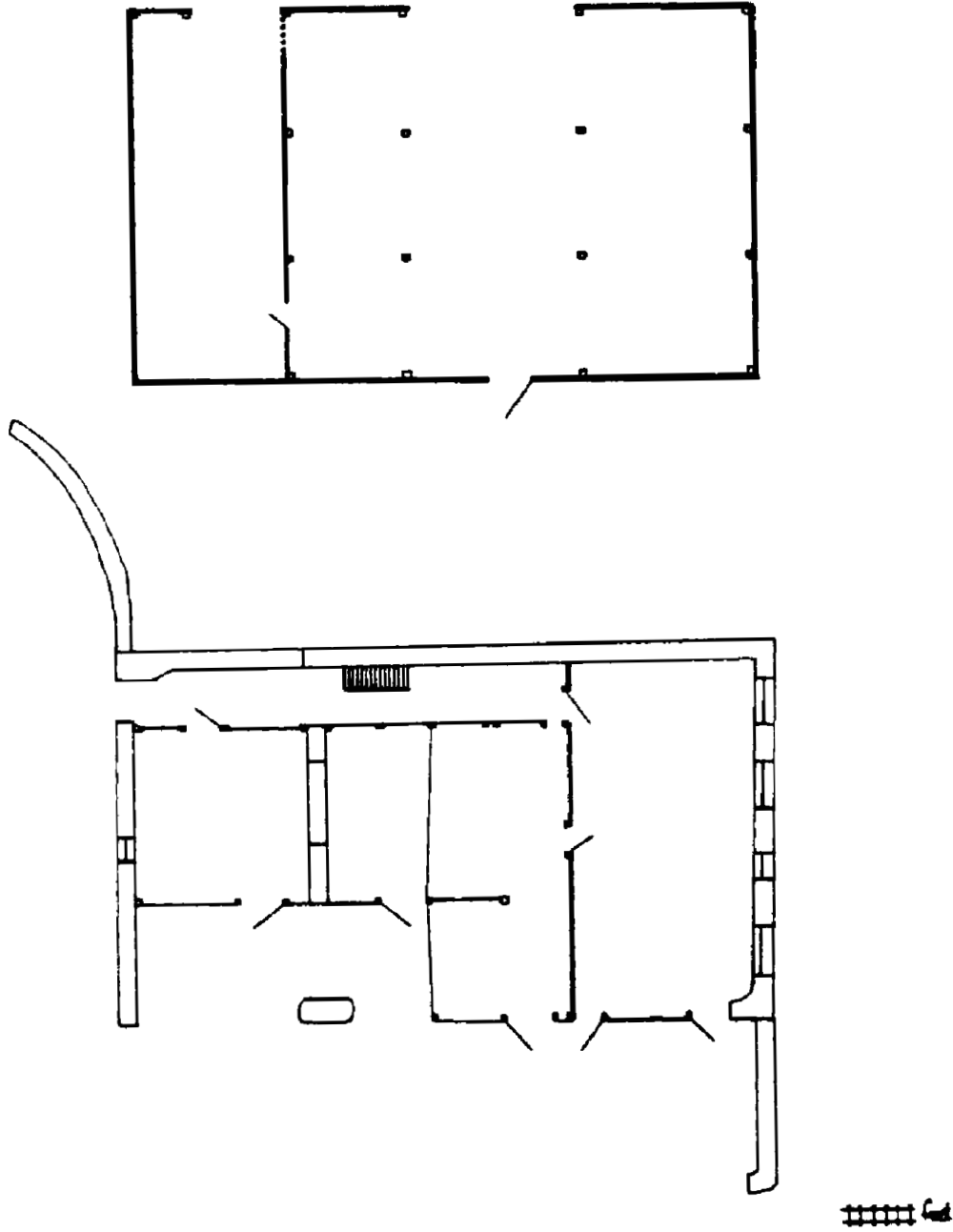
J. Cloud Barn, Union Road.



## FORM

There is a general form or type common to Mill Creek Hundred even though each barn has individual characteristics. The typical bank barn is rectangular, almost square, with a gable roof and one or more additions. It has two levels and is sited parallel to a hill with an artificial ramp allowing access with a wagon to the upper level. On the opposite side, the front, there is access into the stables from the ground level.

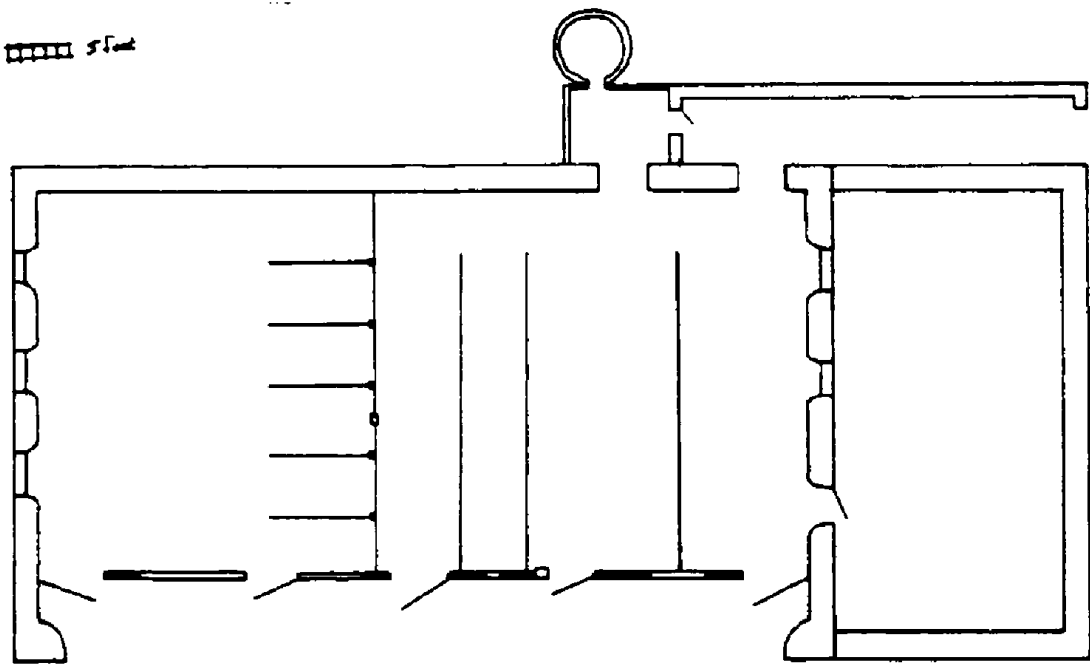
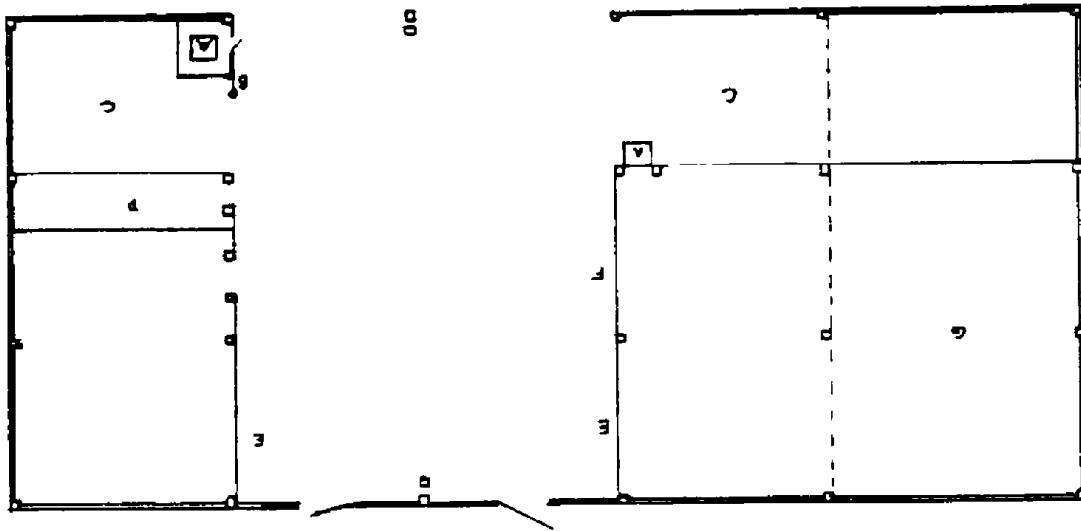
The upper level is entered through double doors that are hung on large strap hinges on older barns, but more frequently are hung with rollers on a track. Often in one of the hinged doors is a smaller door for ease of entry. The upper level is divided into three bays. Bays are defined by structural units of posts and beams that bisect the barn transversely called bents. The bents also define longitudinal bays by the number of spaces created by the principal posts. The typical Mill Creek Hundred barn is three bays long by three bays deep. The one level tripartite form is better known as a Yankee, Connecticut, or Double Crib barn and is an ancient form that was used across Europe and Great Britain before being transmitted



Robert Gore Barn, Ebenezer Church Road.  
a) Upper Level. b) Lower Level.

to colonial America and Canada.<sup>13</sup> The double doors open into the center driveway and threshing floor bay flanked on either side by a hay mow. This center bay was originally used for threshing grain by flail at first, and then by threshing machines. A domestic size door is on the opposite wall in order to create a crossdraft for winnowing, the process of separating the grain from the chaff by tossing it in the air. This bay was, and is used for storing idle wagons or tractors, but primarily is used for driving a wagon on and unloading hay, loose then, bales now, into the hay mows. The bents are walled up with thick, wide boards four feet high in the center, and up to eight feet on sides in order to keep in the hay. In the hay mow floors are rectangular holes, variously placed, for dropping hay to the stables below. These openings measure roughly 3 by 4 feet and are kept open by four saplings, one at each corner, that go up to the rafters and are held together with horizontal boards forming an open sided chute. Always on the upper level there is a stair to the lower level and usually placed along the wall just beside one of the wide doors. These stairways are frequently framed in and have their own door.

The lower level contains the stable for livestock which originally housed cattle and horses. When still in use, today's farmer uses it similarly for dairy cows, or for stabling horses, although the rebuilt R. Taylor barn



Kellig Bank Barn, Old Paper Mill Road.  
a) Upper Level. b) Lower Level.

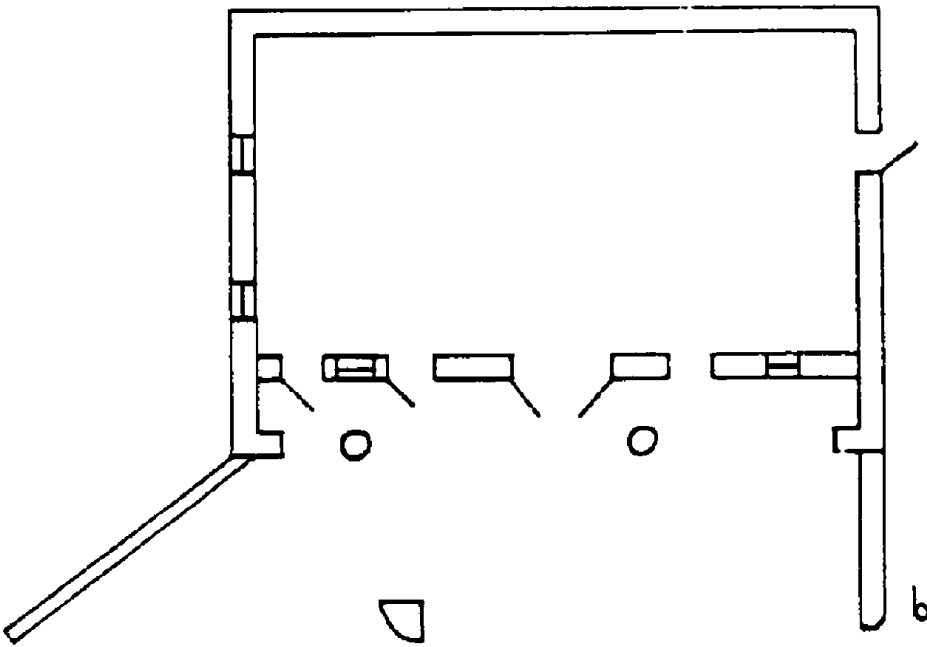
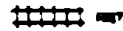
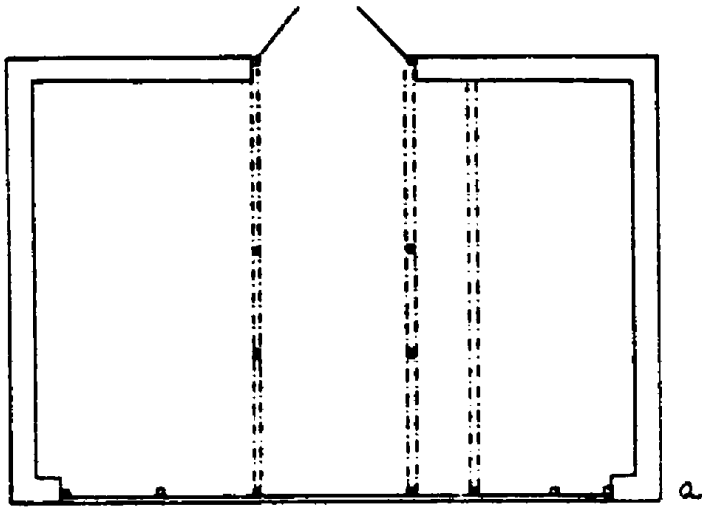
on Possum Hollow Road is used for sheltering sheep. It is difficult to determine the precise original lower level arrangement since most barns have undergone change or the stalls have been removed altogether. Many farmers poured concrete floors and installed steel stanchions in efforts to modernize, and to create a more sanitary environment. A trend strongly encouraged by agricultural literature at the turn of the century.<sup>14</sup>

From posts, extant stalls and modern steel stanchions something can be learned about original stalling arrangements. This arrangement is related to the position of the doors leading to the cow yard. There are usually three to five doors in this long wall, each open into an aisle that leads to a longitudinal aisle along the opposite long wall. This is especially true for modern or modernized stables such as the Kellig barn (c.1910) on Old Paper Mill Road. The older arrangements seem to be much less open as revealed by the extant stalling in the R. Peters barn (c.1800) also on Old Paper Mill Road. This barn has five doors with transverse aisles, however, the two end doors open into walled in transverse stalling with no passage to the center. The J. Stinson barn (c.1805) on Corner Ketch Road echos this arrangement although most of the stalls have been removed. In this barn a central, transverse aisle leads into the longitudinal aisle along the ramp long wall, dividing the barn into two units of

J. H. Mitchell Barn, Fox Den Road.  
Note unusual recessed gable end stable wall.

stalling. The southeast gable wall has two doors, one opens into a stable, the other opens into the longitudinal aisle. Most barns have one or more gable end doors. The J. D. Forrest barn, known as the Fredericks barn, on Thompson Station Road, is a very large structure and has a longitudinal, center aisle serviced by a door centered in each gable end. Apparently, there were also doors on the missing front long wall which would allow further access.

In a large percentage of Mill Creek Hundred barns, the stable long wall is recessed 10-15 feet. Almost half of the earliest barns (1750-1825) have this trait, and it persists throughout the nineteenth century. This "forebay" of the upper level is included in the overall structure and is not cantilevered like many of the "Swisser" barns of Pennsylvania. The function is completely different as well. While the "Swisser" discernable forebay (often a frame forebay on a stone barn)<sup>15</sup> was used as a granary and other functions disparate from the main barn, the Mill Creek Hundred forebay is just a contiguous part of the upper level with no changes in form or function. The recessed wall and resultant overhang provides an extra measure of protection for the livestock, and a shelter for other activities such as hog slaughtering during bad weather. The most dramatic .pa change would be the appearance of the frame front wall in a stone barn. There may be a Swiss antecedant for this<sup>16</sup>

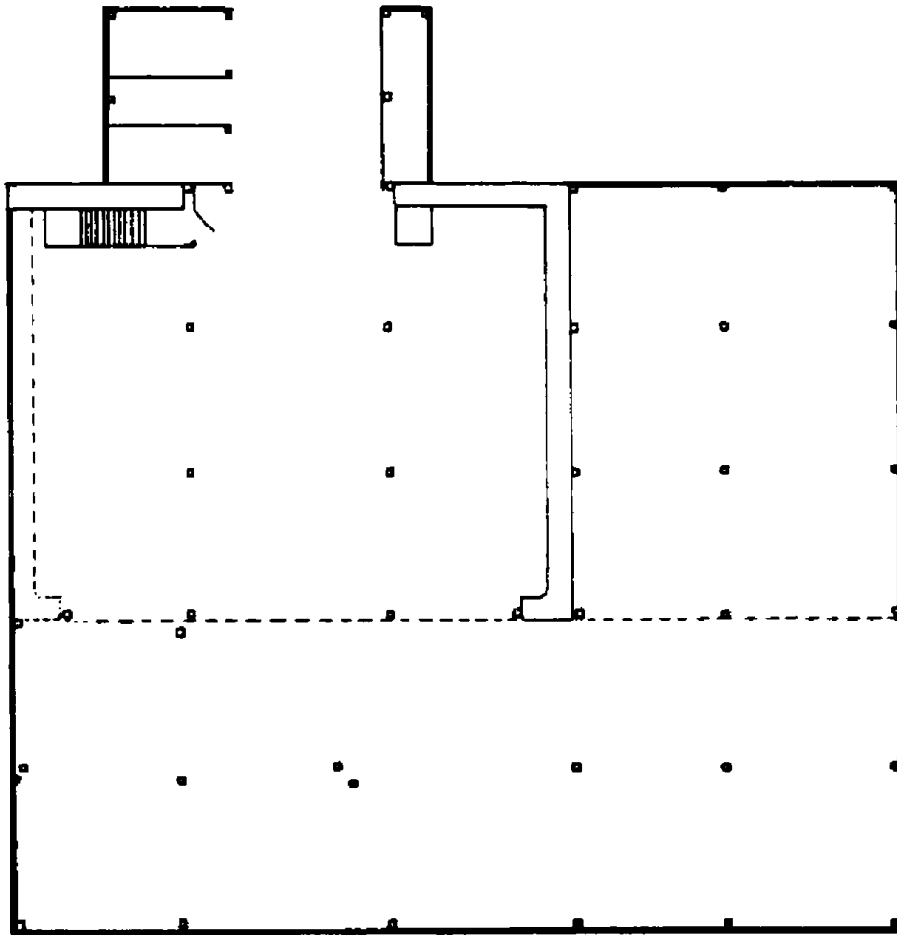


Wm. Bell Bank Barn, Pleasant Hill Rd.  
a) Upper Level. b) Lower Level.



but why Simon Hadley, a Scotch-Irishman whose father was from Lancashire, would build this form in the early 1700's is not known.<sup>17</sup> The stable wall can be seen as a variable component in defining the lower level arrangement. Its placement does not change the barn's form or its internal arrangement.

A less frequent but more striking barn form is the "double decker". A double decker has the same basic form and plan of a two level barn except the driveway is raised high enough for rooms to be created beneath it. The hay mows remain at the same level as these rooms, thus making it much easier to toss the hay down, and to store greater amounts of hay. The rooms beneath the driveway had various functions. In the J. D. Forrest barn, the middle level has a granary, a tack room and a trap door stair to the lower level. The Mrs. Daniels barn on Paper Mill Road has a corncrib, granary, two small stalls and a hay drop to the lower level. These barns are extraordinarily large with the raised driveway and sunken hay mows. Access to the raised driveway is from a steep artificial slope which stops 10-15 feet before the barn wall. The gap is covered by a bridge house, a gable structure perpendicular to the barn. The bridge house is similar to the English mid-strey, a gable structure also perpendicular to the barn and was used for storing a loaded wagon not pulled on to the threshing floor.<sup>18</sup> Also similar is the bridge house



D. Eastburn Bank Barn, Corner Ketch Hill Rd.  
Upper Level with Bridge and Additions.

in Switzerland which is often seen at the gable end and bridges a gap between the ramp and barn. The Mill Creek Hundred bridge house had a variety of functions. Certainly it was used for implement or wagon storage when the center bay was full or being used. The bridge house nearly always contains corn cribs on each long wall, incorporated into the structure. Beneath the bridge house a number of activities took place. On double decker barns, a central doorway is in the long wall which opens to the area beneath the driveway. This door is often set at wagon height so that different things, especially bags of grain, could be loaded and unloaded easily. A barn does not have to be a double decker to have this feature as several two level barns have bridge houses with a space beneath it for various activities. The D. Eastburn barn and the J. Stinson barn, both on Corner Ketch Road, have a bridge house with corn cribs and space beneath although they are only two levels. The R. Peters barn has a bridge house that was added on. It appears to have been added quite early but apparently the farmer needed the extra space conveniently next to the threshing floor. This bridge house has a corn crib on one side and is situated flat on the ground.

Additions were built onto virtually every barn. Some barns were altered a little, others so much that the original barn is buried. The Wm. Bell barn (c.1810) on

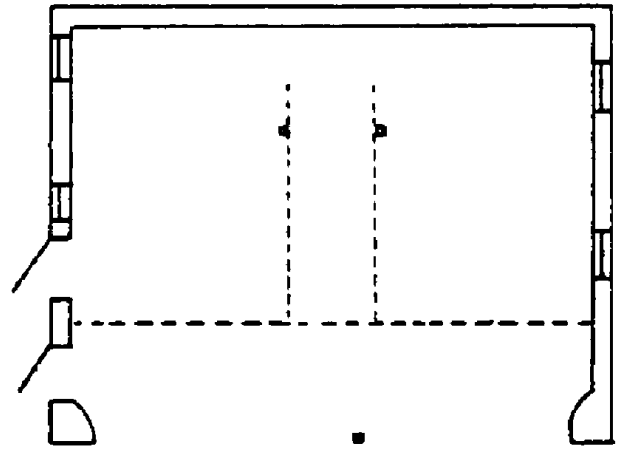
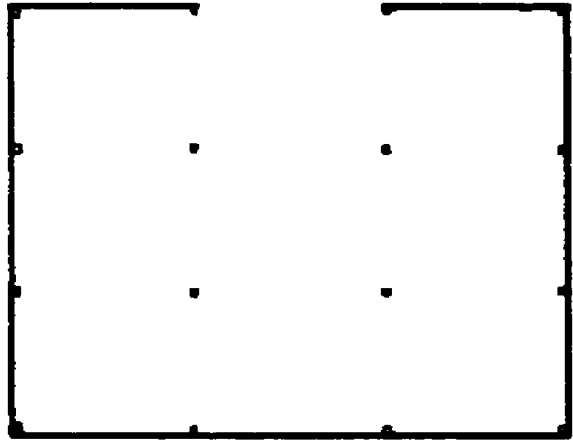
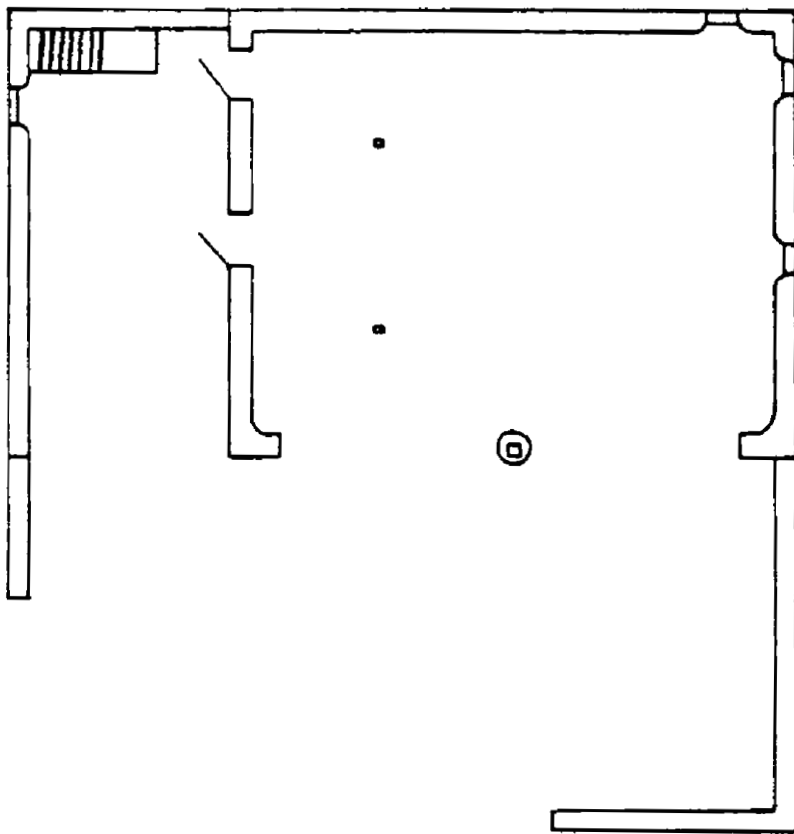
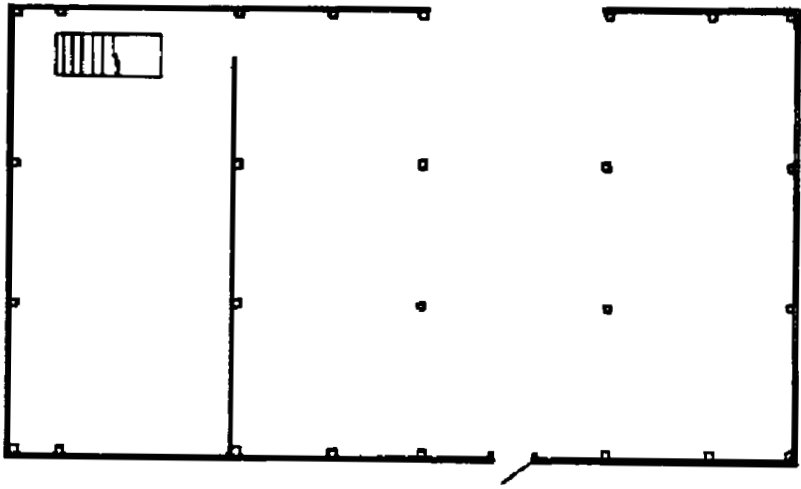


FIGURE 1

R. Fitzsimmons, Polly Drummond Hill Rd.  
a) Upper Level. b) Lower Level.

Pleasant Hill Road near Corner Ketch was only altered by the addition of a shed roof to shelter the sheep being raised in the 1930's. The R. Fitzsimmons barn near Milford Crossroads (c.1850), a frame barn with recessed stable wall, has not been altered at all. On the other hand, the F. Thompson barn on the old Wilmington-Landenburg Road is a rather ugly compendium of additions on a large double decker barn soon to be destroyed. These are the exceptions. Most additions were added so regularly that some later barns incorporated them into the original structure when building.

The most common addition was the hay shed on the front long wall. This can be seen on the Milton Michner barn on the Wilmington-Landenburg Road in Corner Ketch. This all stone barn has an opening knocked out of the front long wall in order to have access to the lean-to hay shed. Originally, this barn did not have a forebay so the shed provided extra shelter for the cattle. The R. Peters barn had the same thing done to it. Frame barns were added to more easily than the stone barns. The Mrs. Daniels barn, a double decker, has a small gable in the center of the hay shed roof in order to have headroom over the raised driveway. Other barns have a gable hay shed which is usually larger than the lean-to variety. These gable additions have the same divisions as the barn, the upper level for hay and the lower for livestock. The



||||| ←

W. M. Peters Bank Barn, Old Paper Mill Rd.  
a) Upper Level with Gable End Addition. b) Lower Level.

framing is usually different from the original barn with diagonal post components. This shall be dealt with in the section on construction. The Mrs. Outhrie barn located on Limestone and Little Baltimore Roads takes this addition to its logical conclusion. When the barn was built, the gable wing was built along with it, the farmer foreseeing the need for extra space. But the joinery remained the same. That is, the main part was built and the gable wing was added on, joined to it just as if it was added some years later. Apparently, this was not enough room as another gable addition is butted up to the wing gable end.

Another frequent addition is the gable end wagon shed. This provided extra implement storage and often has a corn crib along the long wall. This addition was sometimes incorporated into the barn as an extra bay under the gable roof. The D. Eastburn barn at Corner Ketch added on an extra frame bay even though the barn is stone to the eaves. The Kellig barn also incorporates an extra bay on its east gable end. On Polly Drummond Hill Road, the Robert Gore barn (post-1868) has a gable end addition with a large set of doors for implement storage and a loft for hay, unlike the other barns above which just store hay.

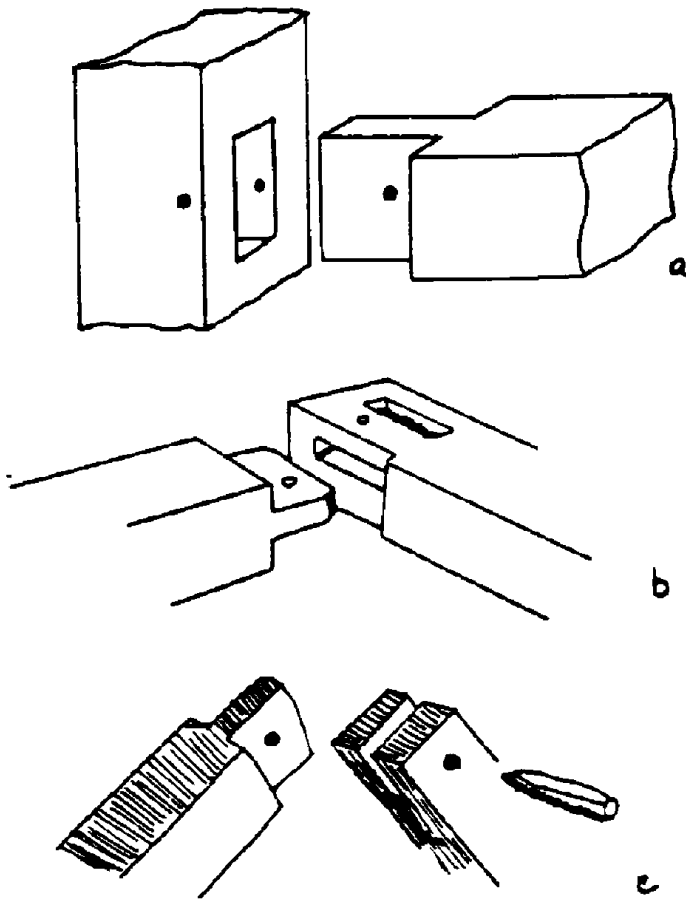
All of these forms are vernacular, that is they are coming out of folk traditions changed some, of course, by modern materials and technology. However, there are

some forms which emanate from literary sources such as agricultural journals and farm building pattern books.<sup>19</sup>

A gable end barn on Fairhill School Road built by one of the Duponts (c.1930) certainly reflects this influence.<sup>20</sup> This barn sits perpendicular to the slope with a large artificial ramp up to the entry. There are no large double doors, but instead, three separate doors are lined up vertically with a large hay door in the gable peak. The upper level interior is completely open for hay storage. The lower level is divided up into stables and a covered yard. There are entries on one long side and the gable end, and a hay shed along part of the long wall.

The second barn undoubtedly influenced by literary sources is another Dupont barn (c.1930) which is ell shaped. Part of this barn is rectangular and parallel to the slope, this part is used for a driveway and corn storage. A narrow wing juts off the left side and jogs south. The ramp elevation is 200 feet long and the perpendicular wing is 120 feet long. This giant building could be right out of an agricultural pattern book.<sup>21</sup>





- a) Mortise & Tenon Joint.
- b) Sill.
- c) Rafter Apex.

## CONSTRUCTION

The barns of Mill Creek Hundred can be typed according to construction material. There are all stone barns which have stone walls up to the gable peak. There are two types of stone and frame barns: stone walls with frame gable peaks; and stone walls up to the gable peak with a frame front long wall (which indicates a recessed stable wall). The majority of barns are frame with stone basement walls as is the case in Pennsylvania.<sup>22</sup> These barns are braced timber frame using large timbers (a 7x7 inch timber would be a typical size) which are joined together by mortise and tenon joints. The timbers are finished in various ways. They can be left in the round as logs, or partially so. They can be hewn by broad-axe leaving a roughened finish with tell-tale vertical slashes. There are two ways that the timbers were sawn: vertical sawn or circular sawn. Only one barn had vertical sawn timbers and it is located next to a mill that was run by W. Phillips & Bro. on Greenbank Road near Prices Corner. Early barns have hewn major timbers with only smaller members such as rails and braces sawn. In later barns, all timbers are circular sawn except major pieces

such as purlins, plates and girts which were hewn because it would have been too much effort to take the large logs to the mill and back. By the second half of the nineteenth century most barns were built with circular sawn timbers.

The earliest extant barns are all stone or stone with a frame front wall. The tax lists of 1804 show forty-one frame barns to thirteen stone barns, while in 1817 the disparity is lessened with fifty-nine frame barns and forty-nine stone barns. The early surviving barns are, as can be seen, less an indication of dominant building material and more a tribute to stone's durability.

The stone walls of Mill Creek Hundred barns are constructed of micaceous gneiss, the underlying rock of the region that deteriorated to create the deep, friable soil of the Piedmont Plateau, and the darker micaceous schist. The gneiss is a banded, brown and white colored rock with glittery specks of quartz. It has a variable shape, though not often large, and was used widely throughout the Hundred. Schist is very dark, even black, also with glittery specks of quartz and was used less widely although the two were often mixed. These rocks are generically known as fieldstone. Slaked limestone was used for mortar but the exact composition of the mortar is not known. The pointing or finish of the mortar is

J. Lindsey Barn, Stoney Batter Road.

generally quite plain except for the J. Lindsey stone barn on Stoney Batter Road, built of dark micaceous schist cleanly delineated by fine pointing, with segmental arches of wedge shaped limestone or sandstone over the doors and windows. Some barns are so smeared with mortar from butter pointing that they appear to be stuccoed.

The stone walls were laid uncoursed and the stone was rubble cleared from fields being prepared for plowing. This rock is apparently always working its way up into the soil as one farmer stated that he always had stone in his fields every spring. The stone is laid up in narrower and narrower sections until it reaches the top. This can be seen especially well on the interior of a stone barn. The W. Torbett barn off Limestone Road has stone walls up to the eaves with a frame gable peak. On the interior can be seen the clearly delineated striations of the increasingly narrow courses. From the barn floor, the first two striations are separated by 4 feet and the top is nearly 17 feet off the floor. Wall thicknesses vary from 18 inches to 24 inches with a typical barn wall being 19 inches thick. Large field stone quoins tie the stone walls together at the corners by their alternating placement on each wall.

Most of the window edges are rounded on the interior with a gentle taper, about 12 inches wider on the

inside than the outside, to allow more light in. Although some windows had arch lintels, most had stout timber lintels overhead. The windows themselves are various but the W. M. Peters barn on Old Paper Mill Road still has the original horizontal, wood mullions. Arches are more common over doors than windows, and brick was used more often than stone. The W. Torbett barn has brick arches over the doors as does the Mrs. Peach barn on Paper Mill road and the filled-in doors of the rebuilt G. Klair barn on Limestone Road. The M. Michner stone barn on the Wilmington-Landenburg Road has a nice center stone archway on the front long wall. The reason brick was used more often for making arches is that it is a much easier medium to work with. The hard, metamorphic rocks of Mill Creek Hundred are difficult to shape into the wedges most desirable for making arches.

The ends of the walls by the front long wall, tend to be either a fat 1/4 round knob, or a 2 foot jog around the corner. This is especially true when the stable wall is recessed and the girder spanning the distance needs the extra support. Further support is often added by conical or 1/4 round columns for the forebay girder or for additions like hay sheds.

The lower level stable posts sometimes were placed on a sill on a short foundation like the ruined J. R. Crossan barn on Riblett Lane, which defined the central transverse aisle and the longitudinal ramp long wall aisle. However, most of the time it was not possible to tell what supported the posts.

All of the barns surveyed which did not have stone walls or some modern covering like aluminum siding or asbestos shingle (which were few), had vertical board siding. There are a couple examples of beaded tongue and groove siding but these represent late nineteenth century replacement. For the majority of frame barns this vertical board was some 3/4 inch thick by a variable width of 7-8 inches. On some barns the gable peak boards overlapped the wall boards at the girt, but most of the barns exhibited an uninterrupted face indicating the boards were butted together at each tier. Sometimes the boards were left plain but most often there were thin vertical strips called battens nailed over the spaces between each board. This "board and batten" was a part of the country gothic style and is the predominant form of siding in Mill Creek Hundred.<sup>23</sup> There are four different kinds of battens used in the barns of Mill Creek Hundred: the plain and flat; those with raised rounded centers; those with wide raised centers truncated (ogee); and those with narrow, raised centers truncated. Nailing surfaces for the vertical

boards are provided by two sets of small horizontal members (rails) joined between each post, as well as by major members and their up braces. Diagonal posts did not have up braces but did have rails for nailing surfaces. Extra up braces were sometimes added between the post and the rail. This was a flexible variable decided upon by the farmer or builder. The frame barns are most often painted red but other colors such as white and green are represented as well as applications of oil, or no paint at all.

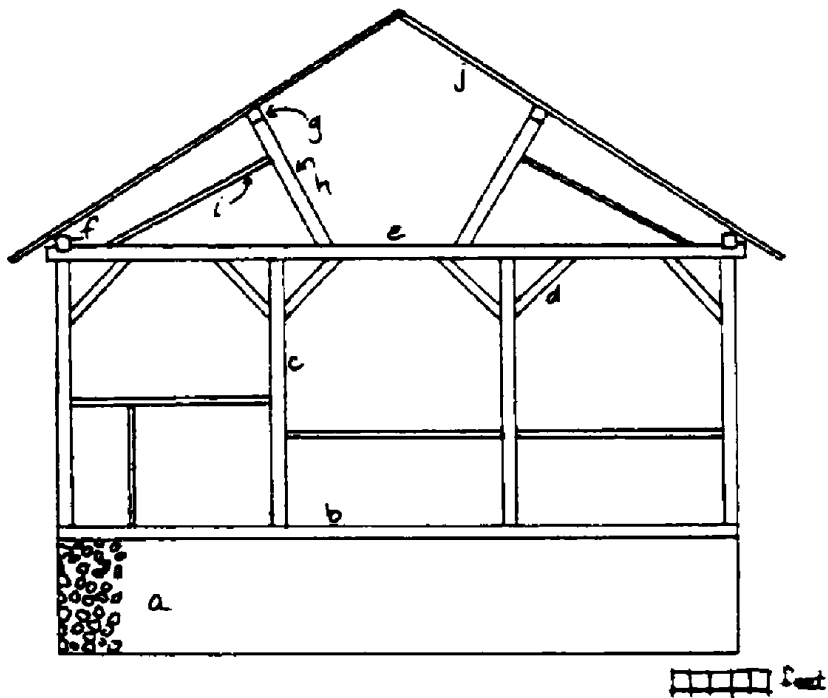
Roofing materials are almost exclusively wood shingles nailed to lathes perpendicular to the common rafters, although there is at least one example of a slate roof. In the latter part of the nineteenth century cupolas began to grace the roofs of some barns because of the emphasis on ventilation as espoused by agricultural pattern books<sup>24</sup> but nevertheless, cupolas remained few in Mill Creek Hundred.

The timber frame structure is shaped like a box. The vertical posts are joined into the sills which rest on top of the basement stone wall and are joined by mortise and tenon. The upper level floor is supported by transverse log floor joists which are hewn on top and bottom. This is the most frequent type of joist and was used in the northeast as well.<sup>25</sup> Sometimes the log was left round with just the top hewn and was often left with the bark



on. This type of joist is recommended in literature as late as 1893. It was suggested that "joists of the main floor to be of timbers hewn on two sides to six inch thickness and three feet apart," when describing the kind of barn a farmer built.<sup>26</sup> The joists supporting the bents and into which the bent posts are tenoned are nearly always hewn or sawn square. These joists stretch from one long wall to the other or else lap on the supporting central girder. The joist ends rest on the stone walls and are tenoned or notched onto the sill. One or more large girders span longitudinally from gable end to gable end and supporting the joists. In early barns, like the Wm. Bell and M. Michner stone barns, the girders are a single hewn timber of immense proportions, 13 inches by 11 and 14 1/2 inches by 13 1/2 inches respectively, each 50 feet long. More commonly, there is at least one scarf joint supported by a large post. In large barns there are two large longitudinal girders as well as the girder or sill which spans the distance between the two end walls and supports the frame forebay wall above. There is at least one post supporting the girder under the scarf joint which may be bolted as well as pinned. The W. M. Peters Barn has a post which is half hewn and half log that sits on a stone pier.

Joists which are tenoned into the girders are extremely rare and evidence or extant examples appear in



Bent Nomenclature: a) Field stone basement wall.  
 b) Timber Sill. c) Post. d) Up Brace. e) Tie Beam.  
 f) Wall Plate. g) Principal Purlin. h) Purlin Strut.  
 i) Purlin Strut Brace. j) Common Rafter.

Mrs. Outhrie Bank Barn, Limestone Rd. Inner Bent.

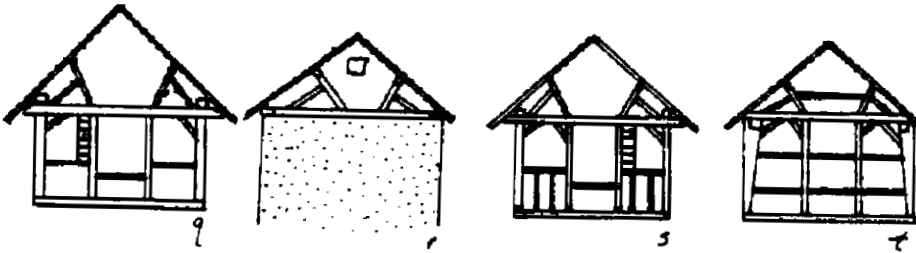
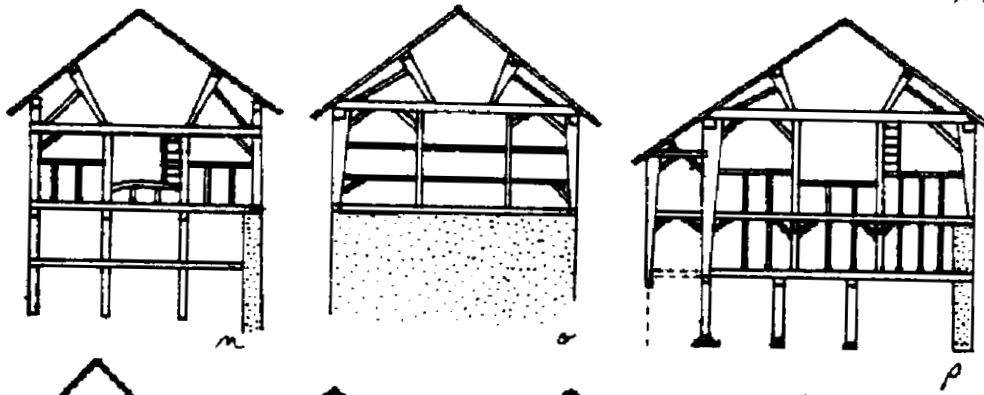
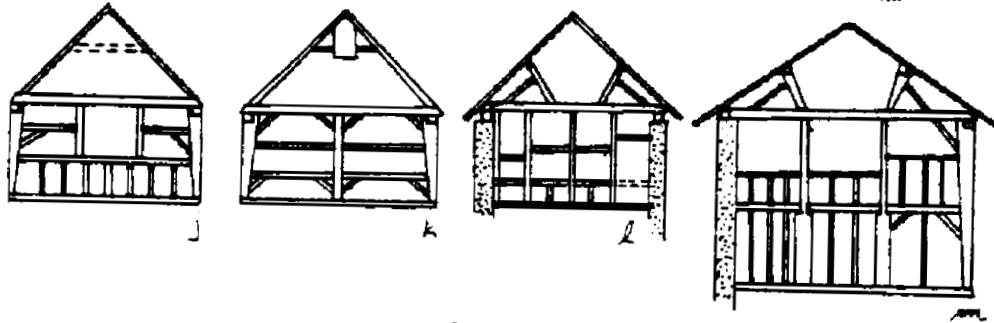
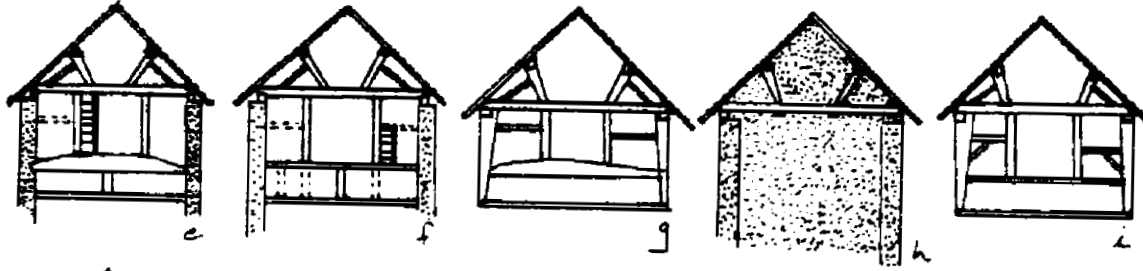
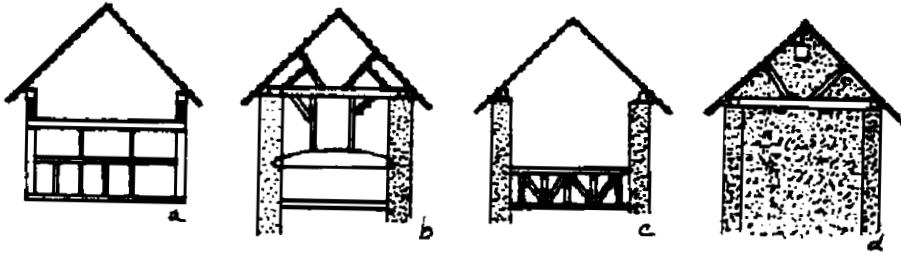
only three barns. The use of the tenoned joist can be seen at the Mrs. Daniels barn just off Paper Mill Road where the joists join the forebay girder. The problem with this kind of joint is that it weakens both the joist and the girder unless done perfectly. Thus, the joist joints used in New England are described as "the ultimate in degraded carpentry" and only worked because the timbers were far heavier than necessary.<sup>27</sup> At the Mrs. Daniels barn another joist had to be placed on top of the existing tenoned joist in order to help bear the weight of tons of hay.

Every component is important in the barn but probably the most significant is the bent - the transverse section of the frame.<sup>28</sup> The Mill Creek Hundred bent seems to go through four phases. The first phase is quite diverse in bent types and roof structures and dates roughly from 1750 to 1840. The common denominator in defining the first phase is the diversity and the reliance on horizontal timbers. The typical bent of mid-nineteenth century Mill Creek Hundred would have four posts roughly equally spaced with a tie beam across the top and up braces joining the posts to the tie beam. Lower down would be horizontal members connecting post to post and forming the basis for the wall which retains the hay. The roof structure would be principal purlin supported by angular purlin struts with braces coming off the tie beam,

which support the common rafters joined mortise and tenon at the apex. The earliest barn surveyed, the Simon Hadley barn built sometime in the eighteenth century, has almost none of these characteristics. Framed within the stone shell the bent system consists of two posts with two horizontal beams connected by two short vertical members and the lower beam connected to the floor by four vertical members. The uppermost beam sits in an open notch several feet down from the top of the tapered post. The roof system is common rafters mortised and tenoned at the apex without either principal purlins or principal rafters. This structure is especially remarkable for being one of thirteen stone barns to survive from 1804.

The other bents are basically related through two things: the three bay form, which is retained throughout the century; and the flared post and purlin strut with notched heads. This type of bent which consists of the girt being framed over the plate that sits in the notch of the post head, is very old and was used in New England.<sup>29</sup> In southeastern England it dates back to the thirteenth century,<sup>30</sup> and was commonly used by the time America was being settled.<sup>31</sup>

Three of the five barns that probably date before 1810 have a very unusual feature which is a large, cambered beam that spans the width of the barn about 8 feet



Bent typology. First phase:: Bents with flared posts and purlins.

- (a) A. McIntyre (Simon Hadley) stone barn with frame long wall, Limestone Road; inner bent.
- (b) R. Peters stone barn, Old Paper Mill Road; inner bent with large cambered beam.
- (c) Same barn as b; secondary beam with hay retaining wall.
- (d) Same barn as b; end bent.
- (e) Milton Michner stone barn (1809), Wilmington-Landenburg Road; east inner bent.
- (f) Same barn as e; west inner bent.
- (g) Wm. Bell stone barn with frame long wall, Pleasant Hill Road; northeast inner bent.
- (h) Same barn as g; end bent.
- (i) Same barn as g; southwest inner bent.
- (j) J. Stinson frame barn (1805), Corner Ketch Hill Road; inner bent.
- (k) Same barn as j; end bent.
- (l) J. Gregg stone & frame barn (1803), Stoney Batter Road; northeast inner bent
- (m) S. Dennison double decker stone barn with frame long wall (1825), Limestone Road upper and middle level, inner bent.
- (n) Mrs. Daniels double decker frame barn, Paper Mill Road; all three levels, southeast inner bent.
- (o) Same barn as n; end bent on stone wall.
- (p) J. D. Forrest double decker frame barn, Thompson Station Road; all three levels, northeast inner bent.
- (q) D. Eastburn barn with stone walls, frame gable and frame long wall; Corner Ketch Hill road; northeast inner bent.
- (r) Same barn as q; end bent.
- (s) Eastburn frame barn (post 1868), Corner Ketch Hill Road; inner bent.
- (t) Same barn as s; end bent (note wall plates are to the inside of posts).
- (u) J. Little frame barn, Fox Den Road; southeast inner bent.
- (v) Same barn as u; end bent.
- (w) Not phase one. H. Stewart frame barn, Mill Creek Road; east inner bent.

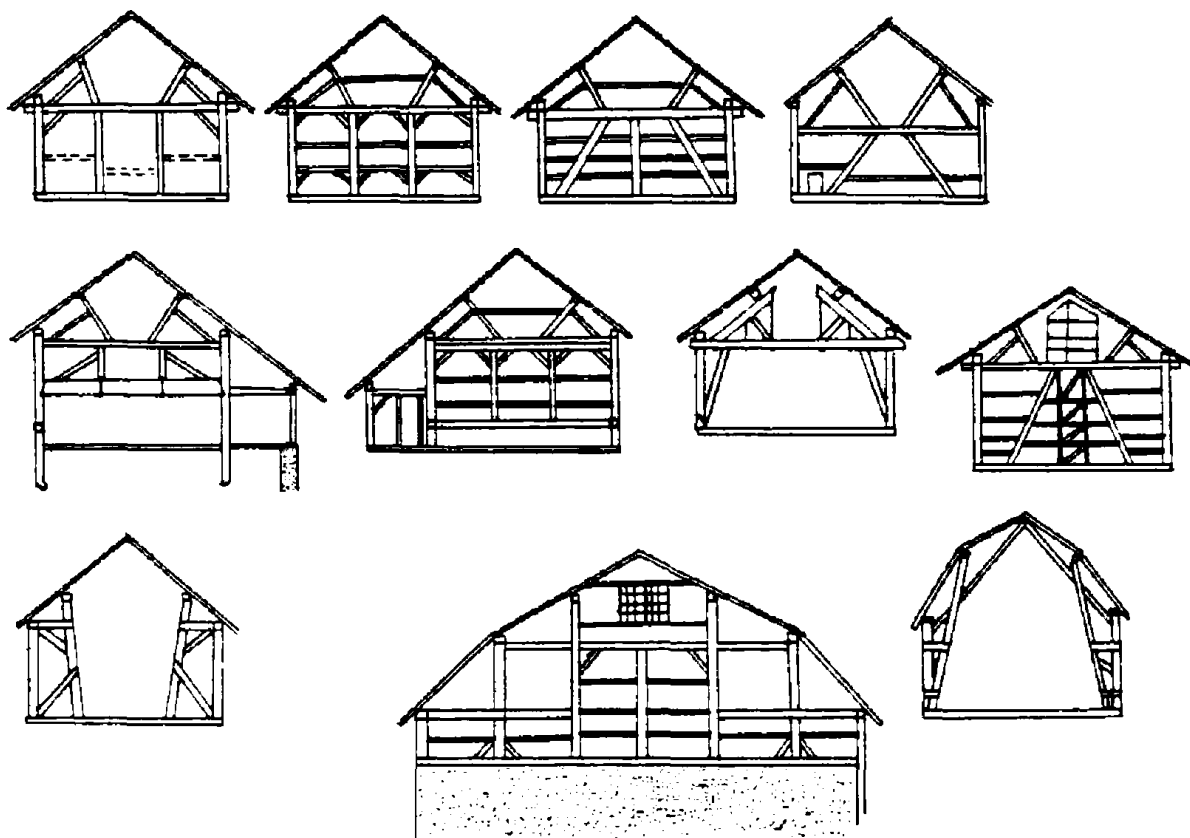
from the floor and carries two inner posts that connect the cambered beam to the tie beam. It is difficult to determine the function of this timber that looks more closely related to a medieval truss than to American or colonial framing. Approximately four feet behind the beam is another horizontal timber set at a much lower height and has posts and braces for a hay retaining wall. Across the top of the cambered beam down to the secondary beam boards were placed making a diagonal surface in the direction of the hay mow. Apparently, this was to make the job of tossing the loose hay easier since any hay landing on the diagonal surface would slide into the hay mow. Also, beneath this little shed roof was extra storage room for implements or a place to hang tools.

Other unusual barns are singular in their peculiarities. The J. Stinson barn on Corner Ketch Road is a frame barn with flared, notched posts. There is a low, main horizontal timber from post to post upon which two interval bent posts in the beam to the girt. The builder then got confused because a collared principal rafter roof was built with common rafters but with no purlins which are needed in a principal rafter system to support the common rafters. The R. Peters barn on Old Paper Mill Road features a principal purlin roof system in which the purlins are butted to the sides of the purlin strut. The butt purlin system is from England and is characterized by

principal rafters.<sup>32</sup> This barn may represent a transitory phase or it may just be bad workmanship.

The flared post of these early barns can be quite large, one example measuring 8 x 8 inches at the foot and 8 x 13 inches at the head. Bents which utilize flared posts must be put up piece by piece and thus were suitable for stone barns which would need a minimal amount of framing. It would indeed be a great deal more work to erect a frame barn using this system. In stone barns, like the M. Michner barn at Corner Ketch, the gable end bent consists of only a tie beam supported by a stone ledge, protruding stones or pieces of wood and joined to the wall plates on either side. Purlin struts support the principal purlin from the girt. Barns with flared posts nearly always have flared purlin struts. These flared struts can be seen in German framing on the east coast<sup>33</sup> but are always associated with the flared posts in Mill Creek Hundred. An alternative for gable end bents of stone barns is found in the J. Gregg and J. Lindsey barns on Stoney Batter Road. The Gregg barn is dated 1803 and the Lindsey barn seems to have copied this feature from it. In these stone barns the principal purlin rests on the gable peak wall with only an angular brace coming out of the wall to support it. This eliminates the need for an end girt or purlin struts. The persistence of the flared post system can be seen in the J. Little barn on





Bent Typology. Second phase:: open mortise posts. (a) W. M. Peters frame barn, Old Paper Mill Road; inner bent. (b) Same barn as a; end bent. Third phase:: diagonal posts. (c) J. Trender frame barn, Old Milltown Road; end bent. (d) J. H. Woodward frame barn, Corner Ketch Hill Road; northeast inner bent. (e) No category. J. Ball frame barn, Polly Drummond Hill Road; north inner bent with swing beam. (f) same barn as e; south end bent, note double end girt. Fourth phase:: bookish bents. (g) Kellig frame barn, Old Paper Mill Road (c.1910); truss bent with tie rods. (h) Dupont frame barn, Union Road (c.1930); northwest end bent. (i) Dupont frame barn, Smiths Mill Road (c.1930); wing inner bent. (j) Alex Jarrel frame barn (rebuilt 1936, G. Klair 1868) Limestone Road; north end bent. (k) J. Thompson Brown frame barn (rebuilt 1936, R. Taylor 1868), Possum Hollow Road; inner bent.

Fox Den Road. This mid-nineteenth century frame barn features the flared post but not the flared purlin strut at a time when other builders had resorted to a quicker and more efficient means of framing.

The second phase of bent typology represents a simplification in bent construction and erection. The typical bent described above is common place at this time which is roughly the mid-nineteenth century. This bent is characterized by the open mortise post head into which the notched girt is fitted. The girt end pierces the exterior wall thus distinguishing the type of bent. Other areas in the country responded similarly in this drive for efficiency and developed a bent with the main girt joined to the posts below the post head.<sup>34</sup> A bent assembled in this fashion with the plate riding on top can be erected as a unit. The W. M. Peters barn on Old Paper Mill Road may represent the earliest example of this type as it is constructed with hewn timbers. The open mortise post persists until the 1930's and the demise of timber framing even when the bent type is not traditional.

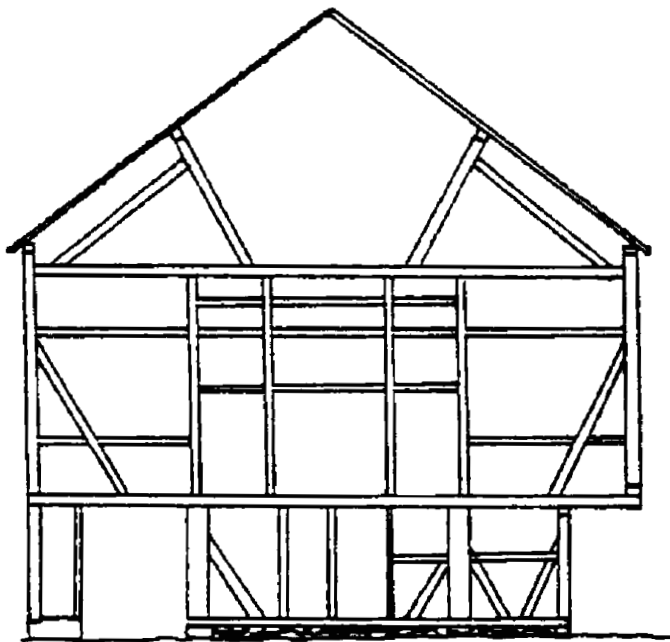
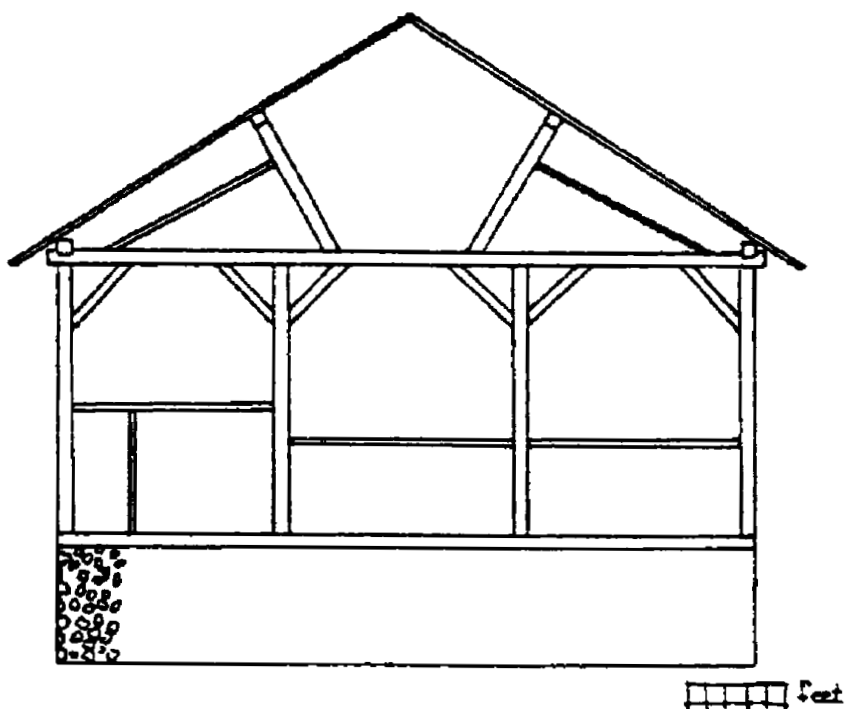
The third phase of bent typology in Mill Creek Hundred is really just a variation of the typical bent form. This is the introduction of diagonal posts into end bents and long walls. Diagonal posts are recommended in at least one source as a method of framing without the

small diagonal up braces from post to plate.<sup>35</sup> In its diagram, however, the diagonal posts are placed in the opposite direction of Mill Creek Hundred diagonal posts and look more closely related to the German style of framing which utilizes a large diagonal brace from post to sill. The Mill Creek Hundred diagonal post bent may be derived from the queen post bridge truss, a bent used by engineers for industrial structures. In two barns, the J. H. Woodward barn in Corner Ketch and the A. Woodward barn on North Star Road, there are inner bents that contain two diagonal inner posts instead of the usual two vertical posts and the main tie beam is dropped so low that the purlin struts are virtually the same size as the diagonal posts. Perhaps the advantages for this bent were the lack of up braces and hence less work to assemble, and more room between the tie beam and the roof apex, important for operating a hay fork.

Phase four of Mill Creek Hundred bent typology is a rather mixed bag of bents inspired by agricultural literature. These bents were all constructed in the twentieth century and most of them attempt to make more open space by subtracting vertical or horizontal members. The Kellig barn is a four bay barn on Old Paper Mill Road and was built in 1910. The two center bays are made into an open area by utilizing a truss form which eliminates the need for inner vertical posts. This truss consists of two

truncated principal rafters (the apex is cut out) that carry the principle purlins and are fastened to the tie beam by four tension bars and two bolts. The rest of the bents are of the typical bent variety, however the long wall features two diagonal braces from post to post.

The Dupont barns, built in the 1930's and located on Smith's Mill Road and Union Road respectively, seem to be derived from literary sources. The barn on Smith's Mill Road is a gigantic ell-shaped complex as described in FORM. It has two types of bents, a more traditional form four bays deep with exceptionally large principal purlins (12 x 6 inches), and five vertical posts with up braces, and a bent only joined together at the floor, shaped like a vee. The purlins are carried by two purlin posts which tilt slightly towards the exterior walls. These purlin posts are joined to the wall posts by a mortise and tenon timber and by spiked planks. This was built as a cattle barn and may well have come out of J. H. Sanders Barn Building from a description of an identical bent in Illinois.<sup>36</sup> The barn on Union Road is the only gable end entrance barn in Mill Creek Hundred, a form usually prescribed by agricultural pattern books. This barn does not have double doors but small doors stacked vertically in the gable end. The end bents have diagonal posts as do the long walls. The interior bents do not have any inner posts leaving a completely open interior for the storage

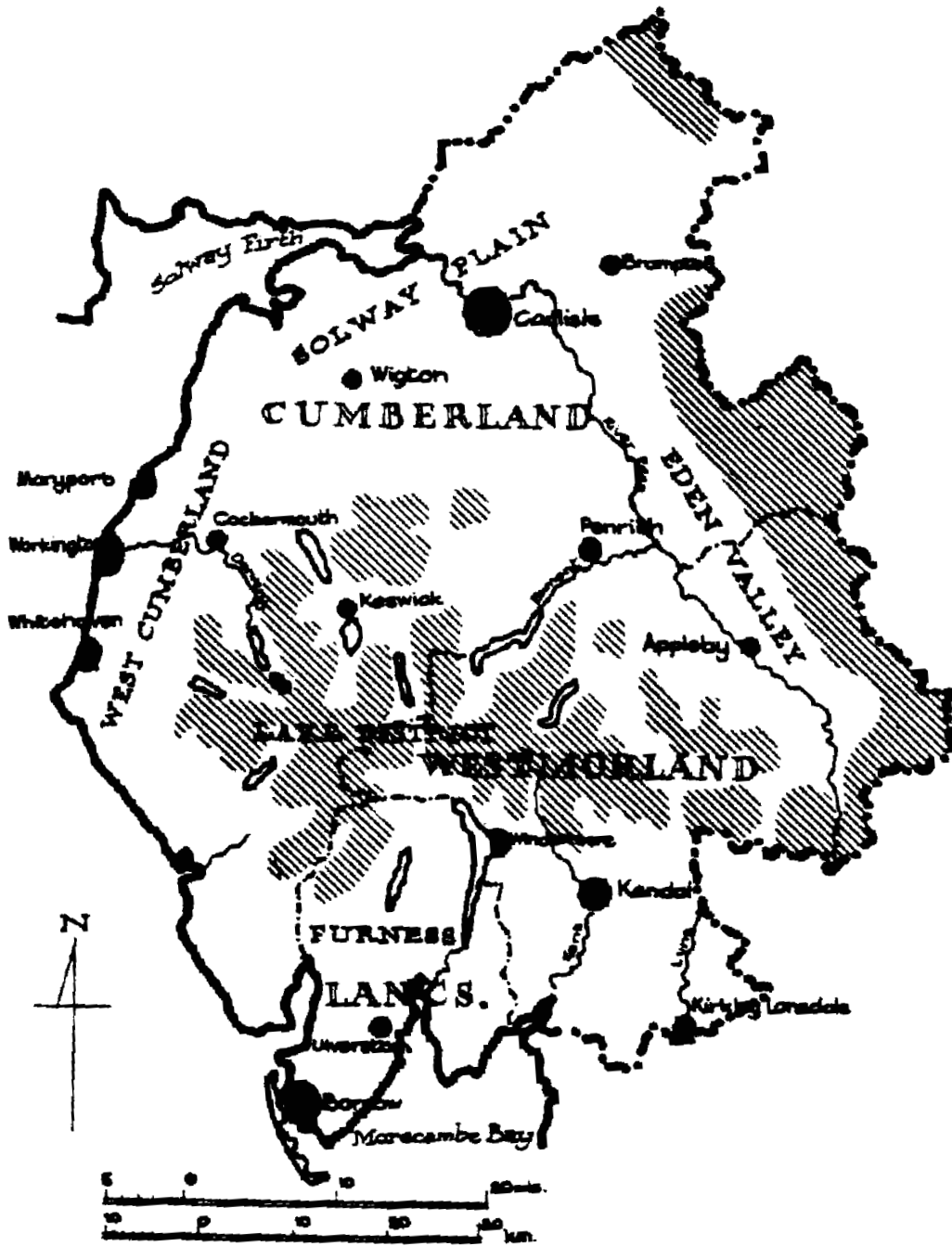


Mill Creek Hundred and Pennsylvania German bents compared.  
 a) Mrs. Outhrie bank barn, Limestone Rd., Mill Creek Hundred. b) Pennsylvania German barn with cantilevered forebay in York Springs, Adams County, Pa. (after Henry Glassie, *Variations...*, p. 228).

of hay. The lower level has stables with a recessed wall with a sheep feed rack right out of Ekblaw's Farm Structures.<sup>37</sup>

Two other fourth phase bents are gambrel roof barns representing the fading timber frame tradition and the ascending plank frame tradition. The timber frame gambrel roof barn is located on Limestone Road and was built in 1936 on the foundations of a previous barn. It is a huge structure with multiple purlin posts; a form used in the northeast and one recommended by pattern books.<sup>38</sup> The plank frame barn had structural problems in the early part of the twentieth century which may account for only two of them of a later date in Mill Creek Hundred.<sup>39</sup>

The bank barn of southeastern Pennsylvania and Mill Creek Hundred is acknowledged as a different or separate type than others in Pennsylvania more obviously derived from Germanic sources.<sup>40</sup> Some of these sources also recognize the similarities between the southeastern Pennsylvania bank barn and the bank barn of northwest England. The settlement of southeastern Pennsylvania by the English, Scotch-Irish, and Welsh has been well documented.<sup>41</sup> In the mid-nineteenth century, Mill Creek Hundred still exhibited this saturation by the English as revealed by surnames on the 1868 Beers Atlas. Because of



From R. W. Brunskill, Vernacular Architecture of the Lake Counties: p. 13.

the similarities in barn types and the settlement history of Mill Creek Hundred, a study-trip was undertaken to the Lake Counties in northwest England in order to photograph and measure some English bank barns for comparison with Mill Creek Hundred bank barns and to assess similarities and differences in the light of this new information.

The Lake Counties, presently known as Cumbria, comprises an area nearly 1/20 of England and consists of the former counties of Cumberland, Westmoreland, and Lancashire, north of Morcambe Bay. This geographical entity has natural boundaries on three sides. It is bordered by the Pennine mountains to the east and south-east, by the Scottish border to the northeast and by the Irish Sea to the west and southwest. Even though this area lies between 54° and 55° latitude (almost the same as Moscow), the climate is tempered by the Irish and North Sea. Great extremes are rare but the steep hills and deep valleys provide a variety of weather conditions at any given time. It is not unusual in winter for this area to experience rain, snow, hail and sunshine in the same day.

The central Lake District is a mountainous hub drained by several valleys. The highland areas are steep and barren, scraped clean of top soil by the same glacier which dug out the scenic, narrow lakes. The landscape has a stark beauty and has been celebrated by Wordsworth,



Middle Grove Bank Barn with Attached House overlooking  
Grove Valley near Ambleside.

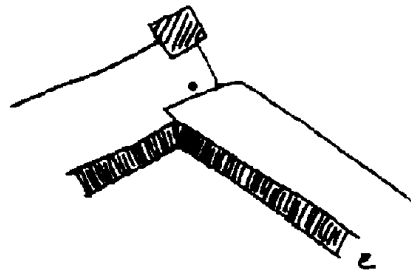
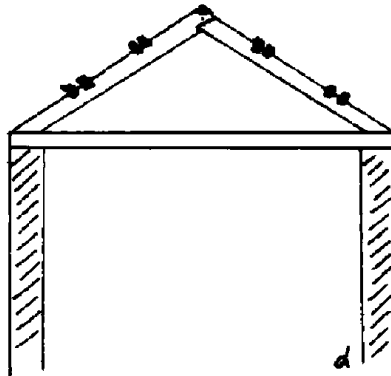
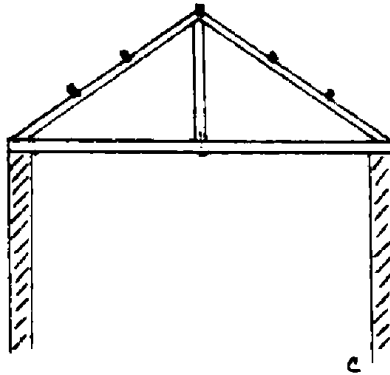
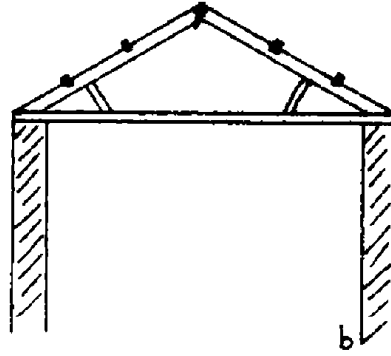
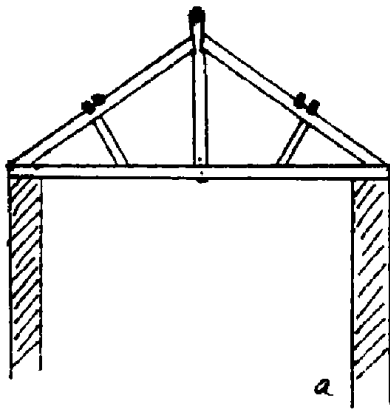
Coleridge and Southey, the Lake Poets. Life for the people of the Lakeland was as harsh as its landscape and generally revolved around livestock farming, especially the raising of the native Herwick sheep, although the valleys are arable as well as the Solway Plain to the north. Also, there was some industry such as mining. The Lakeland had a thriving culture of independent yeomen with their peculiar traditions for dealing with everyday life.<sup>42</sup> These yeomen farmers developed a two level barn with a threshing floor and storage in the upper level and stabling in the lower level. It has really been the tourist trade and the establishment of the Lake District National Park in the heart of the Lake Counties that has brought about prosperity and its resultant problems.

Part of the beauty of the Lake District is the way the slatestone buildings blend into the landscape, some of them rendered and whitewashed. Architecturally, the Lake Counties do not have many extant buildings dated before the mid-seventeenth century because the older buildings were often fragile, or they were rebuilt between 1660 and 1740, a period of low rents and high product prices.<sup>43</sup> This was also the period of settlement in Mill Creek Hundred and southeastern Pennsylvania and so is important for understanding the types of buildings the immigrants were living in and using.

The bank barn is the predominant type of farm building in the Lake Counties. It is less frequently found in the north, Solway Plain, but even here the bank barn can be seen with an artificial ramp.<sup>44</sup> R. W. Brunskill, author of Vernacular Architecture of the Lake Counties, distinguishes between the various banked farm buildings and types the barn parallel to the slope with an upper level that is accessible for a wagon and is used for threshing and storage and has a lower level stable as the "true" bank barn. The barn situated perpendicular to the slope with a side upper level entrance is called a "variant" bank barn. The true bank barn is only found in the Lake Counties with a few stray exceptions, despite similar topography and farming methods in other parts of England and Wales.<sup>45</sup>

The area of study was concentrated in the heart of the Lake District in the village of Ambleside, situated on the northeastern shore of Lake Windermere. Seven barns were photographed and measured in and around Ambleside and the village to the south, Bowness-on-Windermere. A less intense study was made of barns in the surrounding area, including the scenic village of Troutbeck.

Construction methods and materials used were the same for each of the seven barns. Each area of the Lake Counties used materials locally available such as red



f



**Lake District Roof Trusses:**

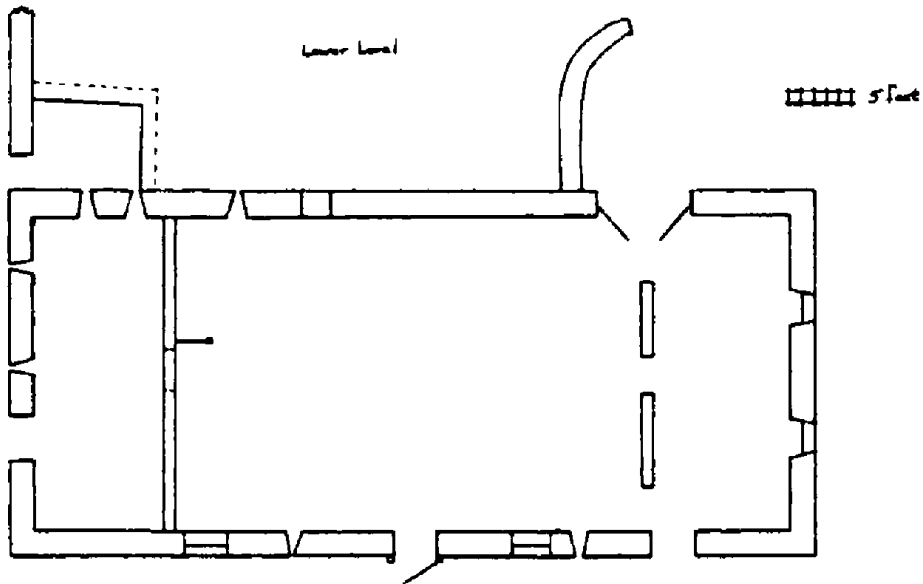
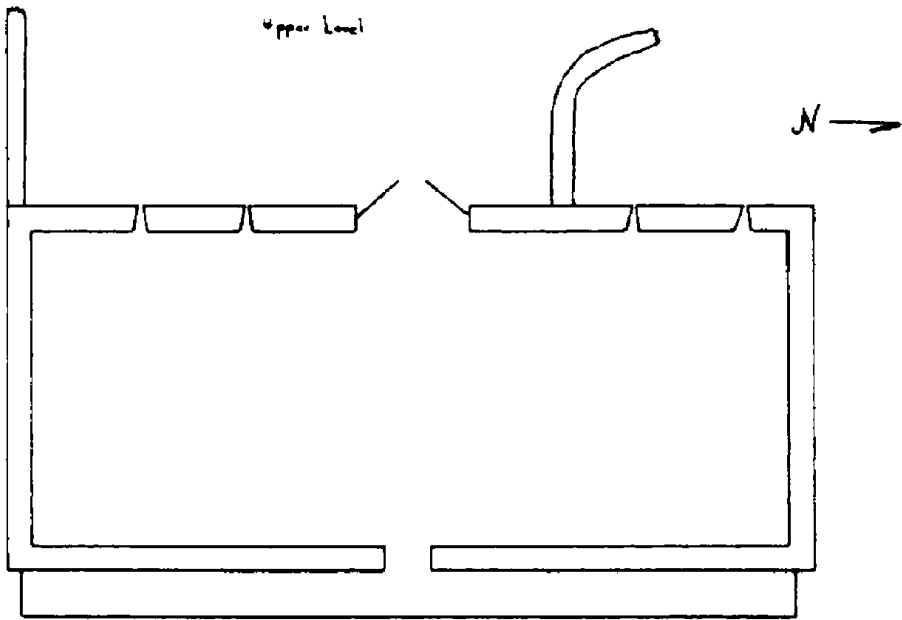
a) Boothwaite Field Barn. b) Low Grove Variet Bank Barn  
 c) Highbeckstock Bank Barn. d) Rayrigg Hall Bank Barn.  
 e) Detail of Apex of d. f) Rayrigg Cottage - 1 level  
 barn (L) and attached wagon shed (R).

sandstone, white limestone, clay, brick or cobbles. The Lake District is known for its blue slate.

Up to the year 1700, buildings were primarily built with cruck trusses and non-load bearing walls of wattle and daub or clay. A cruck truss consists of two curved timbers joined at the top and tied with a beam to form the letter "A". This method of construction developed into triangulated roof trusses by the end of the 17th century and was out of use by the beginning of the 18th century except in Solway Plain. Buildings from this period on were constructed with load bearing masonry walls and triangulated roof trusses or king post trusses.<sup>46</sup>

The masonry walls are constructed in a manner unique to the Lake Counties, and can be seen in most of the buildings of the Lake District. These slate stone walls are built in three sections, an inner skin, an outer skin and an intermediate hearting filled with small stones. Every two or three feet a course of through stones was laid to bind the two skins together. The stones were laid tilted downwards towards the exterior skin so that moisture would percolate through the hearting and be directed to the outside on the through stones. Originally, this "watershot" method was built dry, but today the stones are bedded in mortar two or three inches from the face.

Miss J Jackson Bank Barn 1831 Appleton, Cumbria (Westmorland)



Early roofing was thatch which began to be replaced by sandstone flags in the early eighteenth century. These random size pieces of stone are immensely heavy and require massive roof trusses. Lake District slate and the more regular Welsh slate are the most common roofing materials today.<sup>47</sup>

The following descriptions are of each of the barns surveyed. The similarities are obvious and the differences highlight the diversity of banked barns in the Lake Counties, especially in their forms.

Miss J. Jackson Barn Bank; 1831

The Miss J. Jackson barn dated 1831 is located in Ambleside on the northeastern shore of Lake Windermere. This area is punctuated by glacial deposits of large boulders and stone. The barn sits on the edge of one of these deposits parallel to the slope with a lane around the north gable end leading to the center double doors of the west long wall. This barn is a rectangular structure, 65 feet by 30 feet with a slate gable roof and uncoursed slate walls. The 24 inch walls are tied together with large sandstone quoins, some 4 feet long and 6-8 inches thick. Window and door lintels are also sandstone but only to a depth of 6 inches, behind them are hewn timbers providing the structural strength. The upper level interior was inaccessible but probably is open with king

Miss J. Jackson Bank Barn

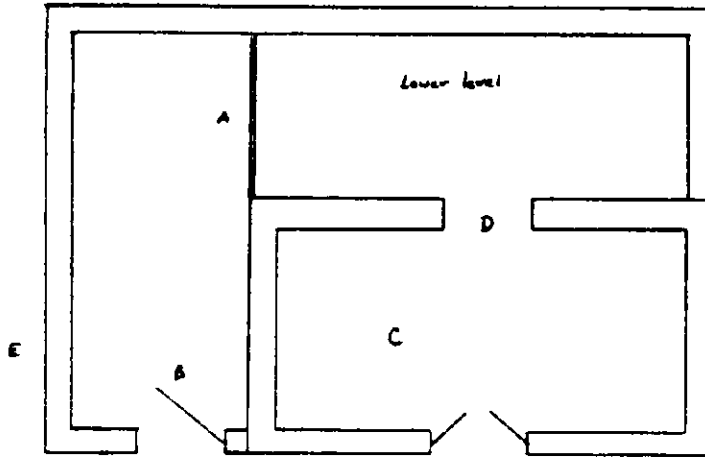


post trusses. The upper level is ventilated with multiple vertical slits and curious shaped holes near the plate level which look like they may have held scaffolding. There is a canopy roof over the center double doors and a pent roof over the stable doors and windows on the lower level. The winnowing door is domestic size and situated opposite the double doors on the east long wall.

The lower level has been cleared out except for several posts and a large slate slab which once served as the side of a stall. There are two stone partition walls creating a chamber in each gable end. There was apparently a center longitudinal aisle as indicated by post mortises in the bridging girders. These support posts were also used as stall posts. The floor is cobble stone. Access is through two split (dutch) doors in the east long wall, a door in the south gable end and a wide, double door wagon entrance on the north side of the west facade. Another chamber was built underneath the bank on the south end of the west facade. Drip ledges or protruding slate are over each door and window.

Boothwerk Field Barn Grove Valley Ambleside, Westmorland

Upper level



A Roughly boarded up to retain heat from stables below

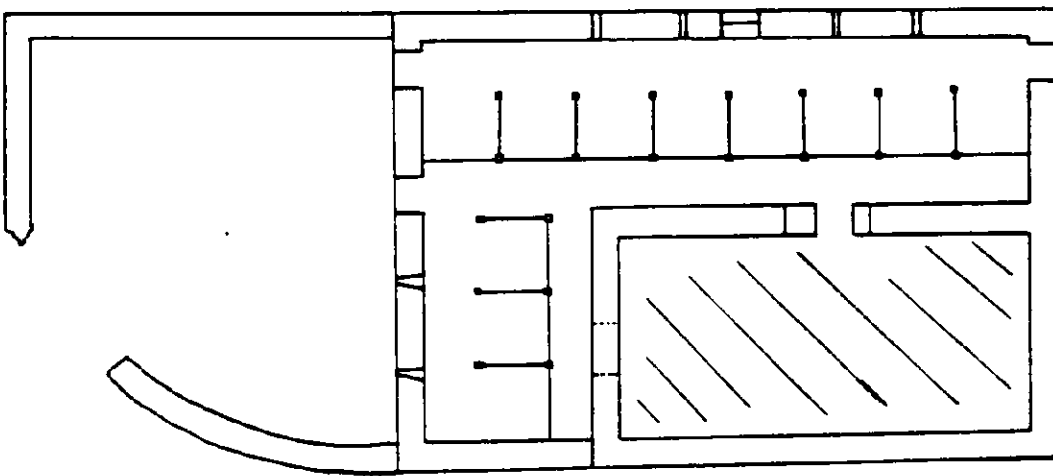
B Loose floor boards on timbers provide footing for dropping hay to animals below

C Open Hay Mow

D Hay sink - this opening slopes down to the lower level. Hay is thrown down the sink and distributed from there

E This wall was constructed as a "dry wall" (i.e. no mortar) to provide ventilation to fresh hay and to facilitate drying

5 Feet



Boothwaite Field Barn; Early to Mid-19th Century

Boothwaite barn is an early to mid-nineteenth century field barn located north of Ambleside on the southeast side of Grove Valley. It is situated on a steep hillside midway between the hill top and the valley, along a dirt lane leading from Low Grove Farmstead to Middle Grove Farmstead, each several hundred yards distant. The barn contains hay, presumably the full two levels, while the shed roof additions contain stalls. A blocked up door on the lower level of the southwest gable and indicates use of the lower level and perhaps a different use of the barn prior to the addition.

Boothwaite barn is small compared to the others surveyed, at 36 feet by 20 feet. It is rectangular with 25 inch slate stone walls, the quoins are large stones and not sandstone like some of the other barns. The gable roof has slate shingles supported by king post trusses. The king post has an open mortise to hold the ridge board and is bolted to the tie beam. The principal rafters are seated into the king post joined by mortise and tenon and are further supported by angular struts. The two king post trusses define the three bays of the barn with the purlins seated in the gable peaks.

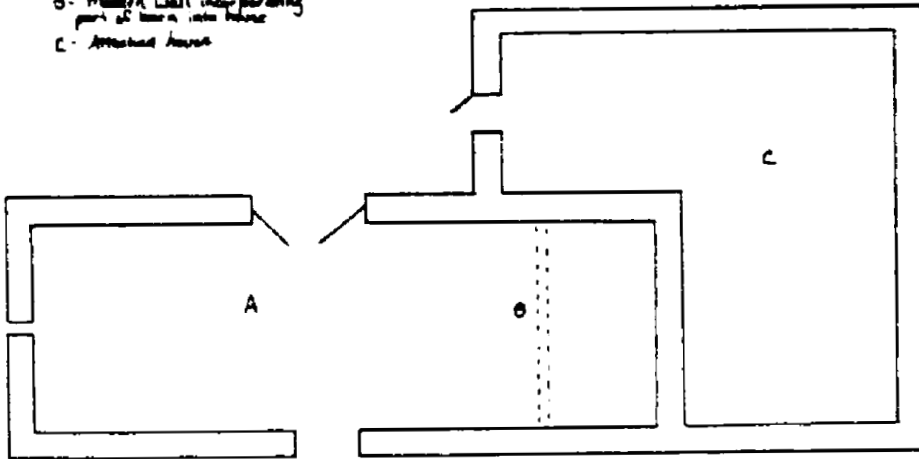
The upper level has a double swinging door entrance centered in the southeast long wall along the dirt lane. A winnowing door has been altered on the opposite wall to ease the transport of hay to the stable. The barn was piled high with hay that had an aroma of cured tobacco, and it was difficult to tell whether there was a sink mow or not. It seems more likely that there was just a chamber on the lower level and this was blocked up when the addition was put on.

The shed roof addition extends the barn 15 feet to the southwest and 15 feet to the northwest making it both wider and longer than the original barn. Along the long wall eight stalls were put in extending the full 50 feet of the wall with an aisle on either side. Perpendicular to this are four more stalls along the gable end. Two doors in the southwest gable end open into a walled cow yard with a gate. There are only two windows for light but several vertical slits for ventilation. Above the gable end addition is a loft floored with loose boards and entered from the upper level through a large door. According to the farmer, this slate wall was built drywall to give ventilation to fresh hay and facilitate drying. The farmer also said that the roof had been replaced at one time. This is supported by the presence of hewn purlins in the addition and a naturally curved knee brace.

Low Grove Farm "variant" Bank Barn and Attached House  
 Grove Valley, Antelope, Westmorland

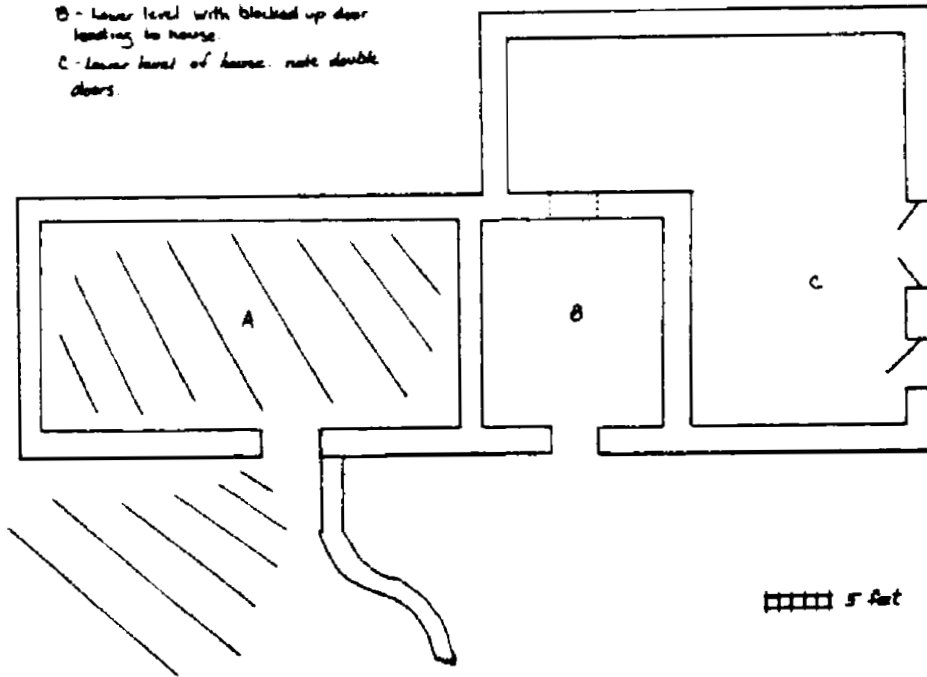
- A - Barn wing perpendicular to slope. Open interior
- B - Modern wall incorporating part of barn into house
- C - Attached house

Upper Level



- A - Upper level portion, with door on sloping ground next to retaining wall.
- B - Lower level with blocked up door leading to house.
- C - Lower level of house, note double doors.

Lower Level



5 feet

This is quite clearly a field barn as typified by Brunskill, as an isolated building with hay in the upper level and cattle in the lower level.<sup>48</sup>

Low Grove "Varient" Bank Barn With Attached House;  
Late 18th Century

Low Grove farmstead is located north of Ambleside on the southeast side of Grove Valley. It is situated several hundred yards north of Boothwaite barn, on a more gentle slope beside a stream. Low Grove is a "varient" bank barn as classified by R. W. Brunskill, meaning that the barn is sited perpendicular to the slope. This farmstead is also a part of the tradition of joining the house and barn together. In this case, the house is rectangular and perpendicular to the barn. The two story dwelling has a basement with access on the ground level because of the gradient. The southwest gable end and outshut (lean-to) are rendered and white washed to distinguish the house from the barn, although this is not done on any of the other sides of the dwelling. The northeast wall of the barn is continuous with the house indicating the two were built at one time.

Low Grove barn is long and narrow measuring 55 feet by 21 feet. It has slate stone walls 25 inches thick, and a gable roof with slate shingles. The roof is supported by hewn trusses with angular struts, a housed

- a) Boothwaite Field Barn
- b) Low Grove "Varient" Bank Barn, Grove Valley, Ambleside.

diamond ridge beam, and purlins, dividing the barn into four bays. The upper level is open from end to end, except for a modern wall incorporating part of the barn into the house, and is currently used to store implements. Entry is through wide double doors in the southwest long wall offset southeast, a little bit away from the house. On the opposite wall is a domestic size winnowing door. The lower level is next to the house under the northeast end of the barn with only room enough for a couple of stalls. There is a blocked up door on an interior wall indicating there may have been some communication between the house and barn. Under the house itself is room for storage with access for a carriage or wagon through double doors.

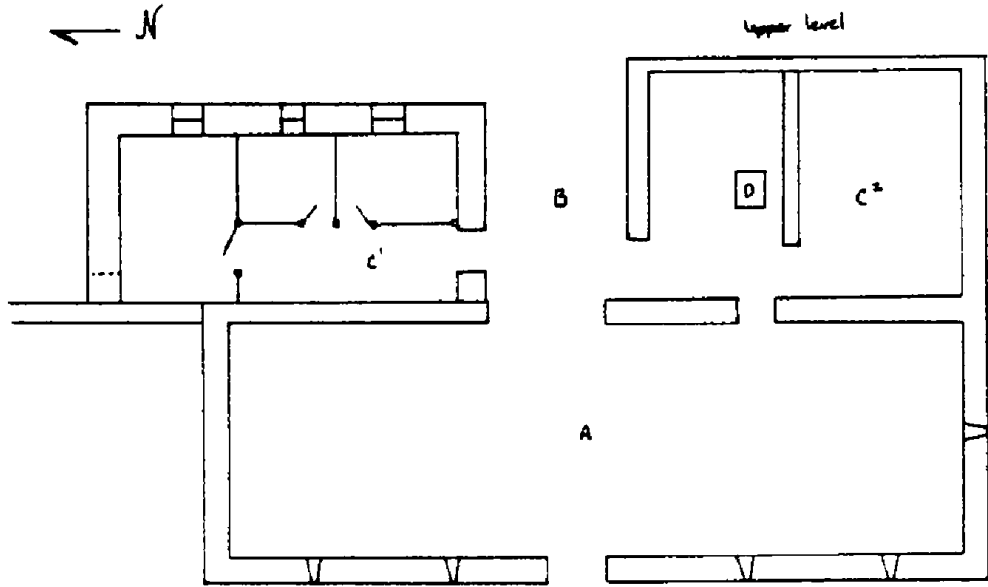
This farmstead was probably the result of splitting tenements, or family connections as indicated by the names Low Grove, Middle Grove and High Grove.<sup>49</sup> High Grove may have been the original farmstead. The ruins of the house and barn are furthest north of the three and highest on the road from which the settlers had a commanding view of the valley.

Middle Grove Bankbarn and Attached House;  
Late 18th to Early 19th Century

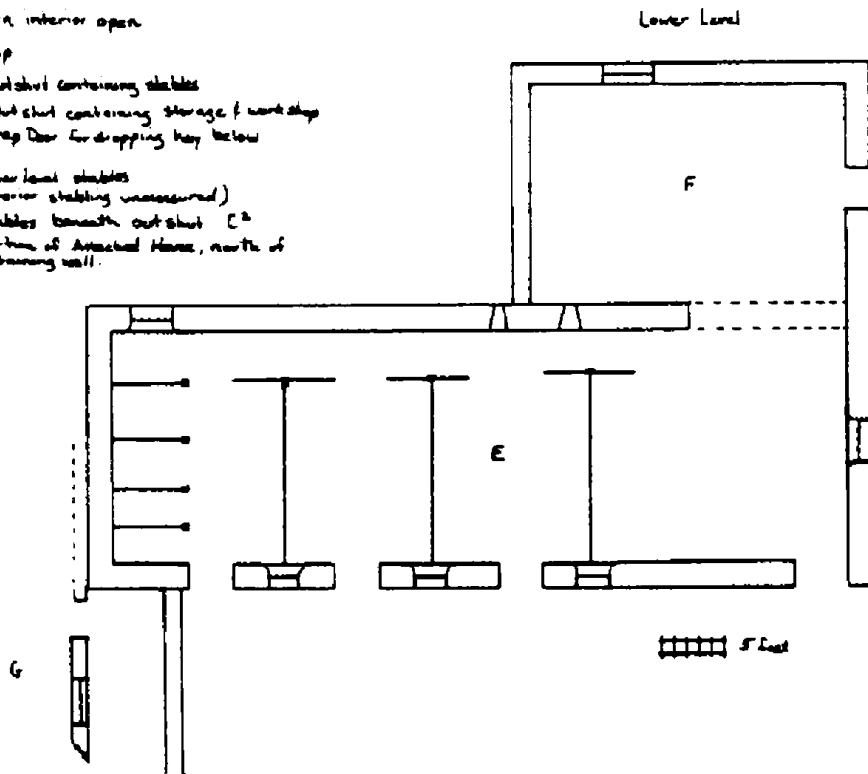
Middle Grove, as the name suggests, is between the ruins of High Grove to the north and the farmstead of Low



Middle Grove Farm Barn w/ Attached House  
 Grove Valley Ambleside, Wash. state



- A - Barn interior open
- B - Ramp
- C¹ - Outshot containing stables
- C² - Outshot containing storage & workshop
- D - Trap Door for dropping hay below
- E - Lower level stables (interior stabling unmeasured)
- F - Stables beneath outshot C²
- G - Portion of Attached House, north of retaining wall.



Grove, to the south. The farmstead is situated on a relatively flat area before the slope falls steeply again. These connected buildings, like Low Grove, consists of a house with an attached barn with no visible means of inter-communication. The house is a "T" gable with one part contiguous with the barn while the other is perpendicular to it and the barn, the gable ridges forming a "T". The walls of the house are rendered and whitewashed to distinguish it from the barn. Its rounded chimneys and slate roof are characteristic of the area.

The barn is long and narrow, measuring 63 feet by 23 feet. It has a gable roof with slate shingles, and 24 inch thick slate stone walls with sandstone quoins and lintels. There is a slightly inclined ramp to the upper level from the side of the slope descending to the southwest. In contrast, the house sits flat on an excavated site with a retaining wall. The barn upper level is entered from the ramp which is flanked by an outskirt on each side. The double doors are not centered but offset to the north. An open and spacious interior was created by use of the king post truss. The king post is bolted or screwed to the tie beam, dating the roof to sometime in the 19th century when the king post was recognized as a tension member which held the truss together instead of a compression member which held it apart.<sup>50</sup> The upper level is ventilated with tapered, vertical slits, the interior

Middle Grove Barn, Grove Valley, Ambleside.

wider than the exterior to allow in the maximum amount of light. A domestic size winnowing door is opposite the double doors.

The outshut north of the ramp is just one level and was clearly added after the barn was constructed as indicated by its thicker walls (29 inches), a seam in the north wall, and the way it overlaps the junction of the house and barn. This outshut was used as an extra stable, the three box stalls still extant with a short aisle next to the barn wall. A window for each stall provided light and ventilation. The outskirt south of the ramp has two levels, the upper level divided by a stone partition wall is used for storage and a tool room and the lower level is a stable. The upper level chamber next to the ramp has one doorway to the ramp and one to the barn interior. It also has a trap door for dropping hay to the stable. The lower level, formerly cut off from the main barn by the continuation of the stonewall, has its own doorway to the work yard. This isolation from the other animals, the individual entry and the trap door above indicates that this was probably a horse stable as horses and cattle were kept separate. This outshut was built along with the main barn as no alterations can be detected in the south gable wall or in the original upper level door to the interior.

The lower level of the main barn contains the cattle stable with transverse stalling, three rows of which are modern pipe stalls. Four split (dutch) doors open to the transverse aisles and service one side of each row of stalling, which lead into a longitudinal aisle along the east long wall. Five windows, interior sides rounded and spaced at each stall and the south gable end, give forth a dim light which is supplemented by electric light today. One of these windows at the northeast corner still retains the old diamond mullions (vertical bars of wood). The barn floor is presently supported by several steel "I" beams but the main structural strength is still in the large transverse girders. These hewn timbers with chamfers stretch from long wall to long wall and rest on the thick stone walls notched to receive them. Along the east long wall the girders are further supported by cobbled stone knees extending from the wall. The floor joists are a mixture of older log joists hewn top and bottom and tenoned into the girders, and mill sawn joists resting on top of the girders. The north gable end, next to the house, has small transverse log joists hewn on top, the rest left round. The interior walls are plastered with a mixture of lime and hair.

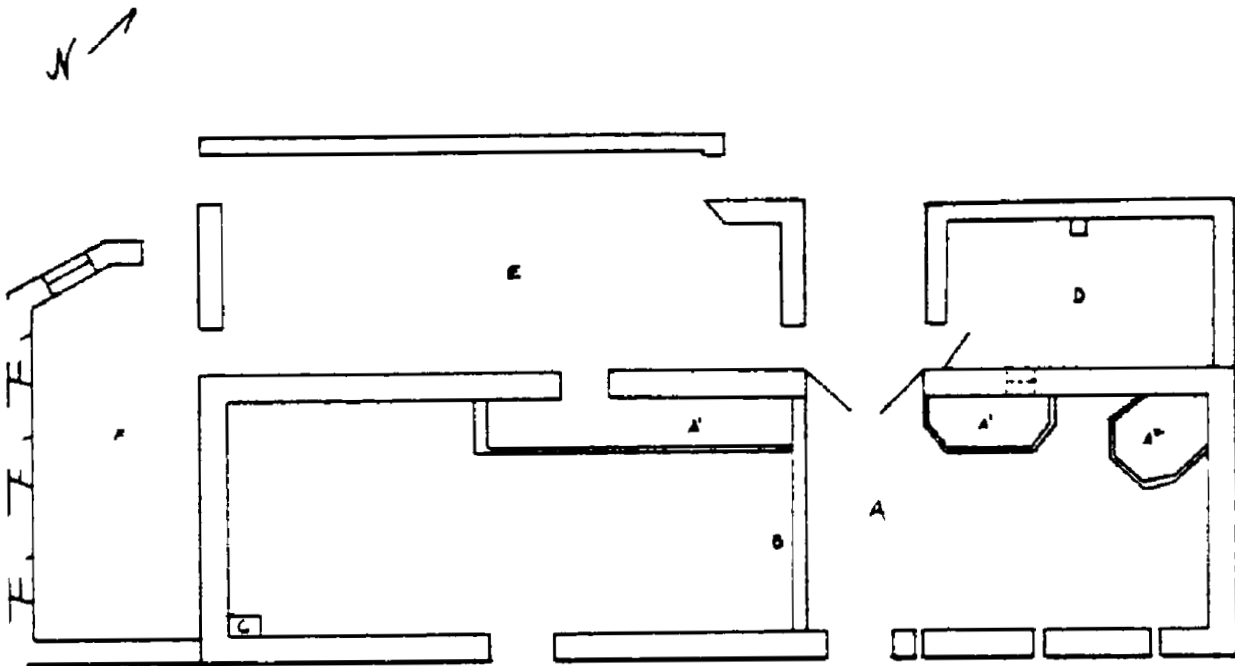
Rayrigg Hall Bank Barn; Circa 1790

Rayrigg Hall bank barn is located on Rayrigg Road just north of the village Bowness-on-Windermere. The farmstead is situated in the relatively flat area of Lake Windermere although the hills rise sharply a couple of hundred yards to the north east. This particular complex is unique among the buildings studied in that there are two distinct building periods represented. The older tradition is a house with cross passage-and-downhouse with attached farm buildings. This particular building according to Brunskill, consists of two ground floor living rooms with an outside cross passage separating it from an unheated chamber called a downhouse which was used for storing fuel and implements, and was often the brew-house.<sup>51</sup> According to Mr. Peter Cole, current resident and farm manager, the downhouse is where the milk used to be stored. Attached to this downhouse, and under the same roof (now used as a garage), is a gable wagon shed with a loft that is entered by stairs on the opposite side. Perpendicular to this section is an old three bay barn apparently sharing the wall for its gable end. This range of buildings, whether built at once or by addition, is derived from a very old traditional building called a longhouse.<sup>52</sup> The longhouse is a building in which people lived in one end and the livestock in the other with inter-communication between the two sides. The trusses of

the wagon shed/granary and the barn are different. The barn has a truss with a collar beam, and the wagon shed has a truss with angular struts. This probably indicates different building periods. A stair on the barn's front facade leads to a balcony overlooking the threshing floor. This is similar to "spinning galleries" on house and barn exteriors and was probably used for spinning in the warmth of the barn.<sup>53</sup> A chimney is on that same gable end but it was not possible to inspect the ground floor chamber. It is difficult to date but these buildings very well could have been built in the 17th century.

Sometime in the 18th century enough capital was generated to build a large manor house and a large bank barn. The 7 bay facade, "H" plan house has a central block with cross wings, and a center entrance covered with a gabled porch. This dwelling with its large lawn and circular drive is on one side and perpendicular to the farmhouse while the bank barn is on the other side and parallel thus creating a court yard between the farmhouse and the bankbarn. These arrangements reveal the transition among the middle class "statesman", an independent farmer, from living close to the livestock and associated smells, sights and sounds to living apart and, in a sense, were attempting to disassociate themselves from the farm.<sup>54</sup>

Rayrigg Hall East End Rayrigg Rd. near Lawrence, Co. Kans. (Wisconsin)



- 8 bay here, open interior
- 1 - open to lower level
- 2 - concrete wall on perimeter
- Concrete site
- 3 - 3/4 wall w/ opening at that height containing SW
- 4 - Repaired bay along side of the horse stable
- 5 - Outside, presently stone wall
- 6 - Outside, low stable
- 7 - Stable house, which is upper + lower level

Letter Labels

- A - Ramp rising SW to entrance of outside of stable
- B - Bury
- C - Originally horse stable: stalls have elaborate woodwork
- D - Stable stalls for 111 animals
- D' - Present day garage
- E - Shuttered part w/ date 1906
- F - Current site
- G - Stable and lower level floor 3/4 above lower level

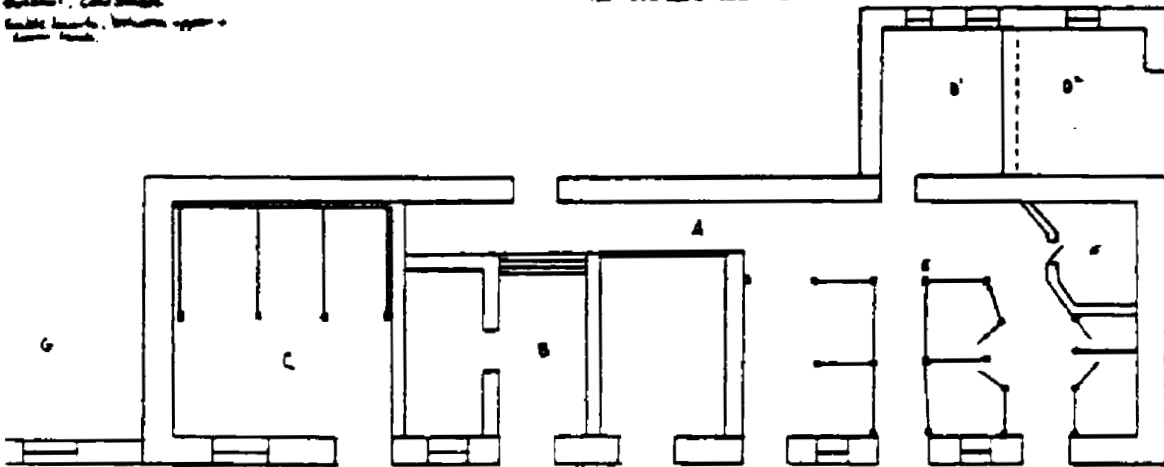


FIGURE 5 Rev



The Rayrigg bank barn was the largest barn studied measuring nearly 100 feet by 40 feet, including additions. The original block is more narrow at 81 feet by 24 feet. The barn is entered through large double doors offset to the northeast, up a sharply inclined ramp which is flanked by an outskirt on each side. Opposite the double doors is a domestic size winnowing door. Another domestic size door is offset northwest on the same long wall, perhaps serving a second threshing floor. This barn has very thick slate stone walls compared to other barns surveyed, measuring nearly 30 inches thick. Unlike some of the other barns, there are no sandstone quoins and lintels. The quoins are just very large pieces of slate and the lintels are timber covered with sideways lapping slate shingles to help keep off water. The gable roof with slate shingles is supported by huge triangulated trusses with a halved apex to seat the ridge beam, and incontinuous overlapping purlins. Some of the principal rafters are so curved that they resemble inverted crucks which some may be since they look re-used and crucks are known to have been re-used in this fashion.<sup>55</sup> Two thirds of the interior is 3 feet above the threshing floor because of the raised ceiling of the stables below. This is reflected in the heights of the lower level doors and windows on the south east facade. Large open areas have been cut out of the floor on either side of the double doors for bay

Rayrigg Hall Bank Barn, Rayrigg Road,  
Bowness-on-Windermere

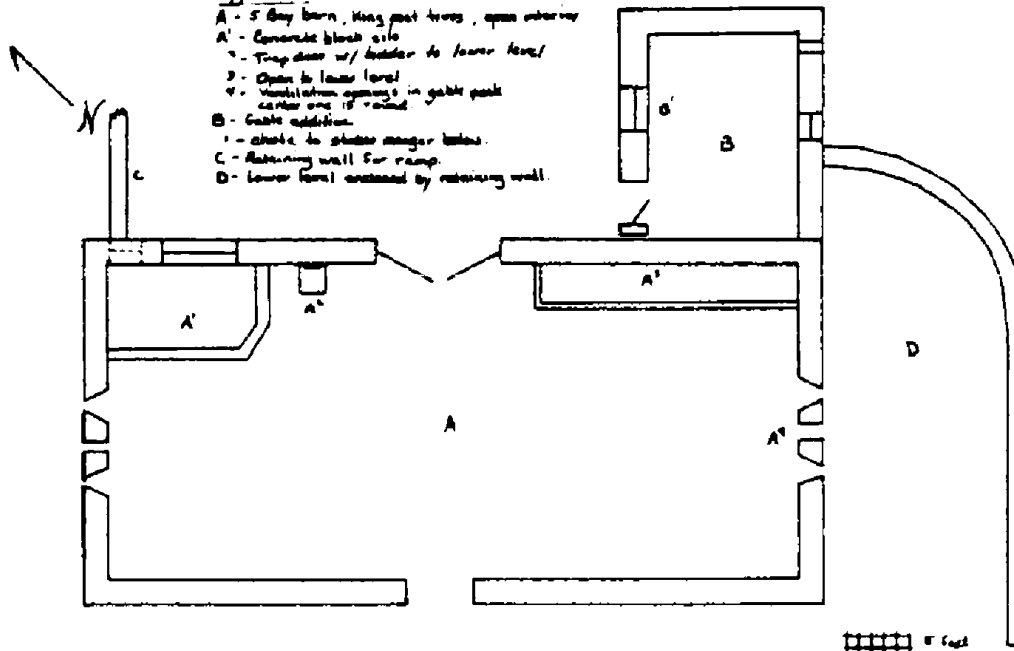
drops. A concrete block silo was added in the north corner. The additions consist of the two outshuts on the northwest facade and a lean-to on the southwest gable end. None appear to be original and are mainly used as extra cow-houses. The outshut north of the ramp is the only two level addition. The upper level is used for feed storage and the lower as a loose box and a garage.

The lower level is divided into several well defined sections by stone partition walls. The northeast end appears to have retained most of the original configuration of transverse slate slab stalling on one side and loose box stalls for calves on the other. These stalls are mainly defined by supporting posts. One of these, a shouldered post, has the date 1790 carved into it. Three doors facing the farmyard open into an aisle to service the stalls and lead into a longitudinal aisle along the northwest longwall which descends as a ramp from the southwest outskirt. The rest of the building is divided into three chambers, one of which has been altered to be a dairy. The horse stable is a completely separate section with elaborate wood work consisting of arched stalls with a central pendant and heavy vertical board siding. There is a ladder in the south corner and a trap door in the ceiling to drop in hay from above, similar to Middle Grove

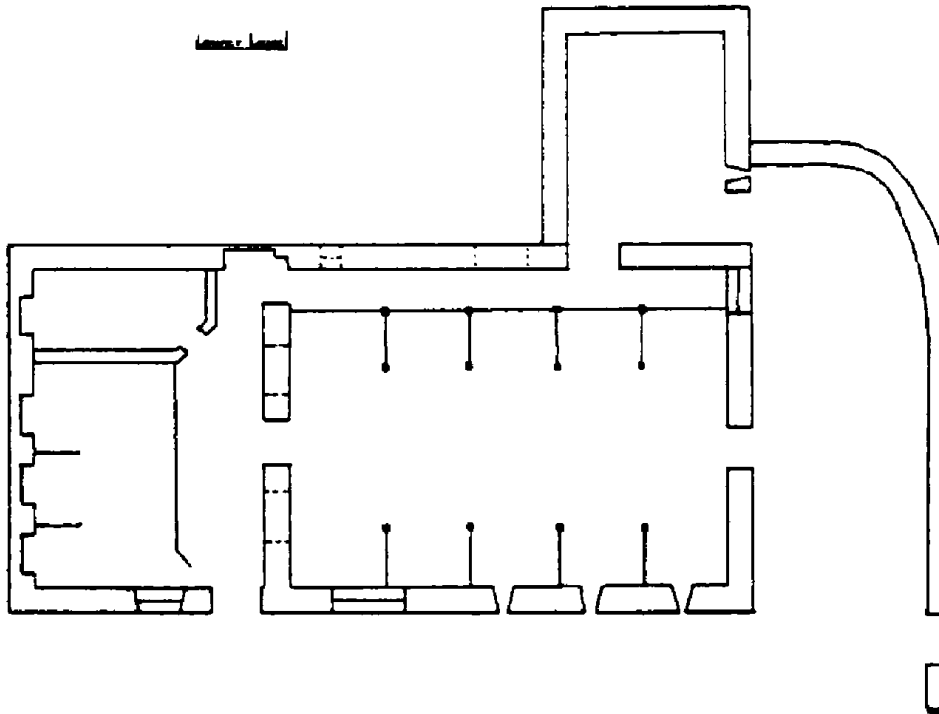
High Backstock Bank Barn      Ambiside - Winter more An. Westward

Upper Level

- A - 5 Bay barn, long post holes, open exterior
- A' - Concrete block site
- 1 - Trap door w/ ladder to lower level
- 2 - Open to lower level
- 4 - Ventilation openings in gable peak center one if wind
- B - Gable addition
- 1 - chute to storage manger below
- C - Retaining wall for ramp
- D - lower level enclosed by retaining wall



Lower Level



barn. Most of the windows of the lower level have retained wooden mullins in various designs. The structural support for the upper level floor is not visible because of ceiling board, except for the longitudinal girders extending from wall to wall. The concealed joists of unknown nature are probably joined transversely from girder to girder. This is quite different from other barns surveyed in which the girders were transverse and the joists longitudinal.

Highbeckstock Bank Barn; Mid-Nineteenth Century

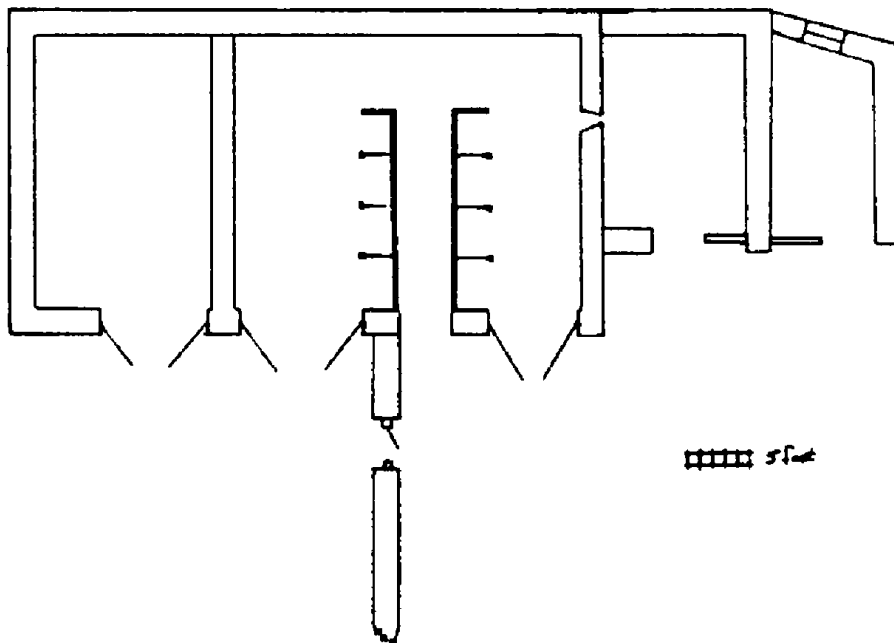
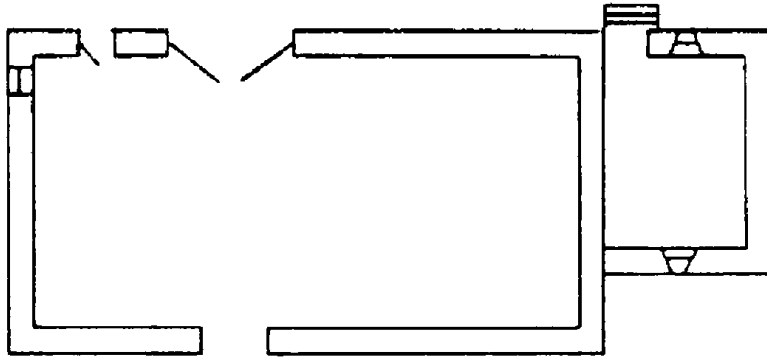
Highbeckstock bank barn is located on Rayrigg Road between Bowness-on-Windermere and Rayrigg Hall Farm. This imposing structure sits about 100 yards from Rayrigg Road beside a lane near the foot of a very steep hill. No ramp was required for access to the upper level but a retaining wall was built in order to form a terrace for the barnyard. The name Highbeckstock comes from the house across the lane although there is no indication that the two go together.

Highbeckstock barn measures only 60 feet by 30 feet but it has an imposing presence because of its height which is accentuated by the sharply declining slope. The barn has the characteristic 24 inch thick, slate stone walls with sandstone quoins and gable roof with Lake District slate shingles. The upper level is entered

Highbeckstock Bank Barn  
Rayrigg Road, Bowness-on-Windermere

through double doors on the northeast longwall which are a little off center and have a protective canopy or pent roof. North of the door, along the lane, is a retaining wall, and south of the door is a two level, gable addition. This small addition contains storage on the upper level and extra stabling in the lower level. Hay can be dropped through a low window by the ramp to the manger below. The upper level interior of the barn is open and spacious with 5 bays defined by king post trusses. These smooth timbers are mill sawn and the king post is fastened with a large screw to the tie beam, dating it to the mid-nineteenth century. A large concrete silo stands in the north corner. South of the door, a large opening measuring 3 feet by 20 provides a hay drop for the stalls below. This opening is identical to the one in the barn at Rayrigg Hall Farm to which Highbeckstock belongs. The gable peaks are pierced by two tapered slits and a circular hole for ventilation.

The lower level is divided into two sections by a stone partition wall and has only two entries, one door centered in the southeast gable end, and one on the north side of the long wall. The cow house section has a central longitudinal aisle in line with the gable end door and a door in the partition wall. The stalls are lined up longitudinally with an aisle along the northeast long wall. These stalls look original and are made of slate



Middlerigg Bank Barn  
a) Upper Level  
b) Lower Level



slabs with weight bearing timber posts. The posts support transverse girders that have longitudinal plank joists between them. The partition wall has two blocked up doors; it is difficult to understand why these doors would be needed if the current arrangement is original. The other section on the northwest gable end contains the silo and some modern pipe stalling. It is likely that this was the horse stable, isolated as it is from the cattle. Light and ventilation is provided by three variously placed windows and three tapered, vertical slits.

Middlerigg Bank Barn; Early Nineteenth Century

Middlerigg bank barn is located on Rayrigg Road between Ambleside and Bowness-on-Windermere, north of Rayrigg Hall Farm. Situated at the foot of a steep hill, the barn is several hundred yards back from the road. Because of the steep gradient, the only access to the upper level is around the southwest gable end and up the inclining slope. An aligned, large house sits right beside the barn.

This rectangular barn measures 47 feet by 25 and has 24 inch thick walls with sandstone quoins. The wall is unusual compared to others studied because of the projecting through stones giving the walls a ragged and rustic appearance. The slate shingled, gable roof is also peculiar with its "corbie stepped" gable ends.

Middlerigg Bank Barn  
Rayrigg Road, near Ambleside.

There is a two level gable addition with a one level lean-to on the southwest gable end. This gable addition has a loose box stall in the lower level and a chamber in the upper level. It's roof structure consists of a ridge beam with four purlins. One of these purlins is extremely rough, being left in the round. The lean-to is another loose box stall apparently for horses. These additions have split door entries with the top being considerably smaller than the bottom. Entry to the upper level of the barn, which was inaccessible, is through double doors offset to the northeast, close to the end of the wall. On the opposite wall, a domestic size winnowing door overlooks the yard.

The lower level is divided into two sections by a stone partition wall. In the southwest section is a cow-house with transverse slate slab stalls and weight bearing posts bisected by a central transverse aisle. Every other post supports a longitudinal girder which rests on the partition wall and gable end wall. A ceiling conceals the floor joists. There are double door entries on either side of the stalls. The northwest section also has a double door entry and was likely a horse stable because of the wall between it and the cow-house.

Gambrel Roof Barn - Rebuilt 20th Century

This barn is located on an estate beside Rayrigg road near Ambleside. It is situated along a lane at the foot of a steep hill. The barn is rectangular, measuring 45 feet by 27 feet, has 19 inch thick, slate stone walls, and a gambrel roof. The upper level is entered through double doors offset southeast, from the lane. Three bays are defined by four plank trusses which form the roof. Composite tile cover the roof. The lower level is completely clear and has three tapered windows on each gable end, and three entries along the southwest wall, including an off center double door entrance. Longitudinal plank joists ride on transverse girders. The roof and floor are probably 20th century replacements, using the stone shell of an older barn.

A comparison between English Cumbrian bank barns and Mill Creek Hundred bank barns may help in analyzing the relationship of the two traditions. The differences are, of course, vast because of the time span and the great variety of influences upon the Mill Creek Hundred farmer such as other ethnic and cultural groups, the different building materials available and the wide circulation of agricultural journals. Similarities do not necessarily imply precedence.

The Lake Counties bank barn, for example, is narrower and more rectangular, with a relationship of length to width from 4:1 to 2:1, than the Mill Creek Hundred bank barn which is more square with typical ratios of 4:3 and 3:2. Probably the greatest difference lies in roof framing systems. Most farm building in the Lake Counties have some form of roof truss consisting of principal rafters, tie beam, ridge piece, and lapping, incontinuous principal purlins, often with supporting struts or king post. This type of system does not appear in Mill Creek Hundred although there are two examples of mixed up roof types which are the J. Stinson barn with principal rafters and collar tie but no purlins to support the common rafters, and the R. Peters barn which has purlins butted into the purlin strut with no principal rafters to support the purlin. The king post roof truss was used on the east coast, especially in buildings with open ceilings like churches, and was standard for wide span buildings in the eighteenth and nineteenth centuries.<sup>56</sup> The predominant roofing system in Mill Creek Hundred barns is common rafters supported by continuous principal purlins with angular struts off the tie beam. The whole framing system of Mill Creek Hundred is more closely related to southeastern England framing types than to the cruck related trusses of northern England.

Flooring in the Lake Counties bank barn mostly had transverse girders with longitudinal joints tenoned into them, except where stone partition walls made it possible for girders to span the area longitudinally. Mill Creek Hundred bank barns, with rare exceptions, have one or more large longitudinal girders supported by two or more large posts which sometimes define the central transverse aisle. These girders carry hewn, log joists; tenoned joists are rare. This system is identical to German flooring in Pennsylvania.<sup>57</sup> But it must be remembered that there was (and still is) a dearth of timbers in the barren hills of Westmorland to accomplish such a spanning. The crooked timbers used in some of these barns would have been looked upon as nothing more than firewood by Mill Creek Hundred settlers used to a surplus of straight oaks. Half round logs were also used for joists in Middle Grove bank barn.

The Lake Counties bank barn form is different in several other ways. It has multiple bays. The barns surveyed had three to seven bays which are only defined by the roof truss. The Mill Creek Hundred bank barn is always a three bay form partitioned by bents with horizontal rails blocking free passage. This differs with the southeastern English tradition of free passage between the bays. The American form represents a definition of space for certain functions such as threshing and hay storage. Lake Counties barn double doors are often off center, and

the lower level frequently has stone partition walls. The doors are also double on Mill Creek Hundred barns but they are always in the center bay. The lower level is usually open and only partitioned by stalling. Furthermore, there are no ventilation slits or outshuts on either side of the ramp although there are a couple of examples of lean-to's across the entire ramp elevation.

There are, of course, many elements missing in the Lake Counties bank barn which are present in the Mill Creek Hundred bank barn such as hay sheds, lean to corn cribs, stairs from the upper level to the lower level, and the four, vertical poles which accompany each hay drop. But it should be remembered that form is "the least changing of an object's components: and that some similarities can be seen.<sup>58</sup> The primary similarities are the rectangular shape parallel to the slope, the one bay threshing floor, the multiple doors and windows on the lower level stable wall, and the transverse direction of stalls. Also important is the lack of cantilevered forebay and the presence of conical stone columns that are used in the Lake Counties in implement sheds, and in Mill Creek Hundred for supporting bay sheds. If there are any antecedents to be found, they will be found in Pennsylvania. In Pennsylvania there are numerous examples of barns very similar to Lake Counties barns. These similarities include outskirts beside the ramp, vertical slits or loop-

holes in the wall, pent roofs over stable level entrances, and even a roof truss.<sup>59</sup> This is significant because southeastern Pennsylvania was settled earlier than Mill Creek Hundred and therefore should have more buildings with traditional forms. It has been shown that the traditional architecture of European settlers began to change almost as soon as they arrived in North America.<sup>60</sup>

A major problem in trying to assess the relationship of the two traditions is the time element. According to Brunskill, fully developed true bank barns do not appear until the late seventeenth century, and become more numerous after that. The problem is that this is roughly contemporary with Mill Creek Hundred and Pennsylvanian barns which were mainly log at this time but did have a developed bank barn form as evidenced by the Simon Hadley barn of the mid-eighteenth century. The rational premise would be that these were parallel traditions that developed simultaneously. This premise could include the introduction of the bank barn form into the New World by the English and Irish Quakers and reinforced by newly arrived settlers, especially those from the Lake Counties. The Mill Creek Hundred bank barn is definitely an English barn as the framing, the tripartite and two level form suggests. The difficulty is in figuring out the different English regional styles and how they contributed to the making of the Mill Creek Hundred bank barn. Germanic



features such as the recessed stable wall and the longitudinal floor girder were not unfamiliar to the English as attested by buildings in New England and the Lake Counties respectively.

It may be that structures in Pennsylvania are the links between the fully developed bank barn in Mill Creek Hundred and its antecedent in northwestern England. Even in Mill Creek Hundred, the earliest barns exhibit a wide diversity of framing types but the two level form is consistently present. The great amount of hardwood available such as oak and walnut gave the carpenters sufficient material with which to experiment without worry. More fieldwork needs to be done on barns in the areas of English settlement in order to gain a better idea of how the English bank barn has evolved in America.

## CONCLUSION

The development of the four phases of framing in Mill Creek Hundred throughout the nineteenth century within the framework of the same form represents a similar development in the homogenization of English practices in New England during the seventeenth century,<sup>61</sup> the development of barn bent types in New York,<sup>62</sup> and the development of buildings during the years of American settlement in general.<sup>63</sup> Although these sources deal mainly with English traditions the same developmental patterns are applicable in situations where different ethnic groups may mingle such as southeastern Pennsylvania. This mingling or homogenization is well represented in the Mill Creek Hundred bank barn with its ubiquitous tripartite form, variations of English framing, and Germanic forebay and frame front wall. The search for direct antecedents may be an impossible task as the Mill Creek Hundred bank barn appears to be the result of the mingling of English styles based on a northwestern English form evolving into a uniquely American structure.

## ENDNOTES

1 Henry Glassie, "The Variation of Concepts within Tradition: Barn Building in Otsego County, New York," in Geoscience and Man, Vol. V (1974), pp. 177-235.

2 Joseph R. Lake, Jr., Hockessin - A Pictorial History (Hockessin-Yorklyn-Yorklyn-Corner Ketch Bicentennial Committee, 1976), p. 9.

3 Lake, p. 9.

4 James Lemon, The Best Poor Man's Country (Baltimore: John Hopkins Press, 1972), Chapter 6, pp. 150-183.

5 Comparative Statistics New Castle County Agricultural Census 1850, TS. This and individual Hundred statistics are in the Department of American Studies Office, University of Delaware.

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