BJHC
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Description and Analysis of the Fabric of the Barn at Holyfield Farm, Holyfield, Waltham Abbey, Essex. 20th March 2009.

Holyfield Farm Barn pictured in March 2009 from the north-west.

General Description.

Holyfield Farm Barn is situated parallel to the Crooked Mile road and is orientated almost perfectly north to south along its ridgeline. It is a timber framed barn of ten bays, clad in weatherboarding with a plain clay peg-tiled roof. It is approximately 34.25m long and 6.00m wide externally and set on a plinth composed in the main of plain red bricks. Also incorporated into the plinth on the western side is a course of bonded rough stone work. The boarding and the plinth have been tarred over.

The western facade houses two large, eaves height barn doors and previously had several windows denoted by C20th blockings with short sections of weatherboarding. To the far south is a partitioned off bay finished with bricks in all the walls and a chimney in the south-eastern corner. This has its own seperate doors and the ceiling serves as a hayloft accessed from inside the barn.

The southern end of the barn is connected to a second barn set at right angles to it by a large annexe currently used for storage and an office. The annexe was evidently at one time a harness room and horse standings. The second barn was converted into a house about twelve years ago and much of the structure in the annexe dates from this period. The full height weather-boarded wall marks the end of the main barn whilst the conversion is marked by a full height celcon block wall.

The rear of Holyfield Farm Barn shown in context with the farmhouse converted from another barn. Looking from the south-east.

The eastern elevation has three lean-to outhouses built against it. That to the north was originally built in Victorian brick and remodelled in brieze blocks. To the centre is a large pan-tiled roofed lean-to and to the south an extensive ramshackle, tin-roofed chicken house. With the exception of a few earlier structural elements these are all later C20th.

Listing Reference. HOLYFIELD ROAD 1. 1767 Barn at Holyfield Farm TL 30 SE. 4/213. II 2.
IoE Number: 117647.

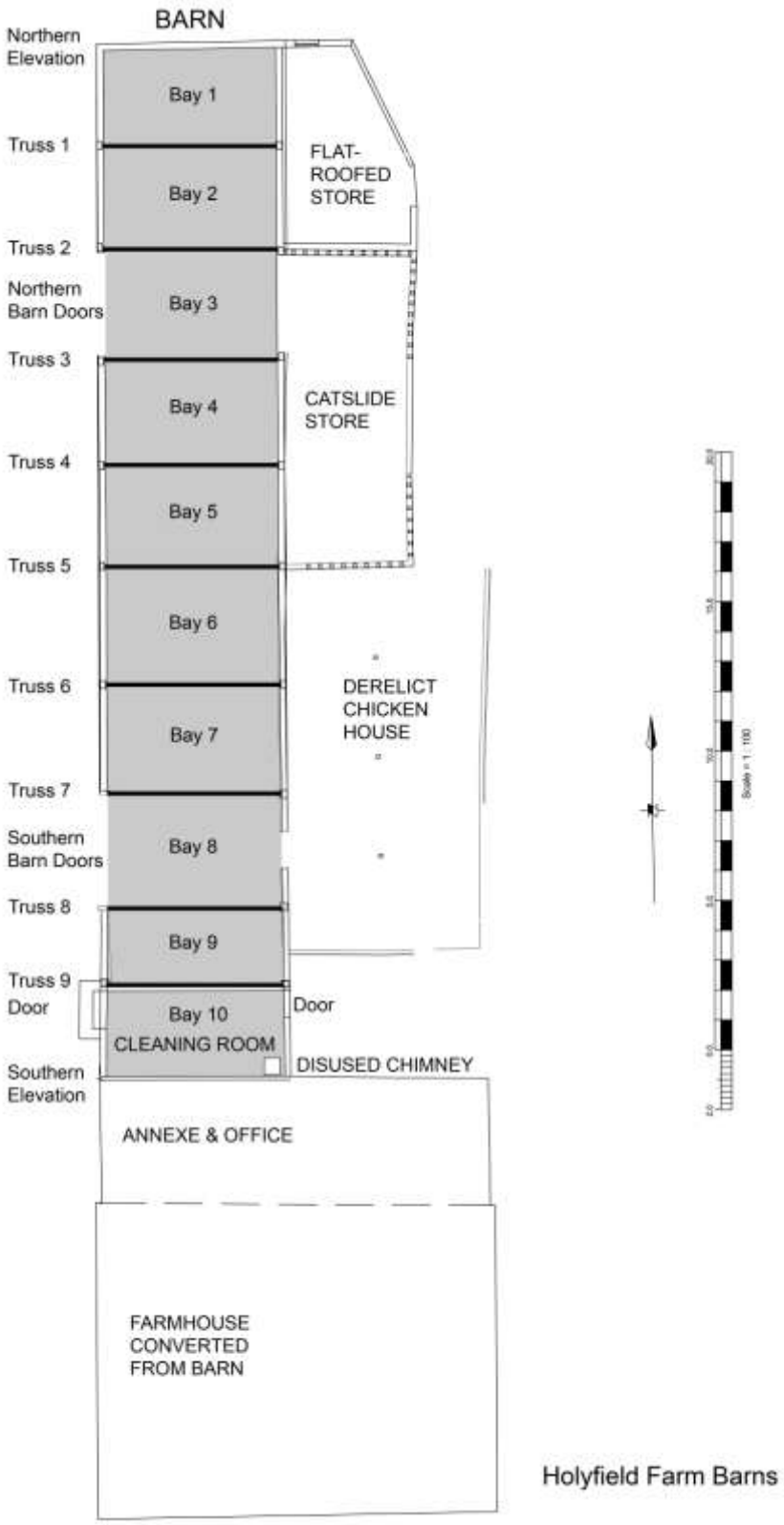
Description in Detail.

The barn has nine trusses and thus ten bays. The following diagram annotates the trusses and the bays and shows the disposition of the outhouses and its connection with the Annexe to the Farmhouse.

Detailed drawings at a scale 1:50 were made of all the elevations, the trusses and the ground plan and these are illustrated throughout the report and presented as an appendix.

All the buildings were photographed using a 12Mb professional digital camera and the weatherboarding on the northern and western elevations was photographed using a 645 format camera in black and white. The boarding elsewhere is C20th.

Some anecdotal evidence was provided by Mr David Chapman, the current farmer who together with his father before him was responsible for many of the C20th alterations.



Schematic scaled architects drawing showing the disposition of the barn and the buildings connected to it. The numbering system is that used throughout this report.

Northern Elevation.

The northern elevation is in poor condition having lost much of its boarding.

The northern elevation consists of the gable end of the barn together with a small outshot to the east. The barn elevation is 6.0m wide, 5.0m to the eaves and approx 8.25m to the ridge on the outside. The wall is composed of a narrow section timber frame set on a red brick plinth. The frame is visible from the outside due to the loss of several of the weather-boards.

The timber-frame is clad in weather-boards of two distinct types - modern machine sawn feather edge boards secured with galvanised french nails and painted with cold brushing tar - and much older, thin section, possibly riven boards secured with wrought iron rose headed nails. These were coated in hot tar with their edges defined by many droplets. It is evident they have not been tarred for a long while. There are many additional modern nails.

The Flat-Roofed Outshot.

The flat-roofed outshot was originally smaller with a steeper pent roof.

The outshot was originally much smaller than today and was built of yellow London Stock bricks (65x100x230mm) in the northern wall. The southern wall was shared with the larger Central Outshot which is entirely timber-framed but lined to waist height in brick. The outshot was essentially a roofed enclosure using the existing barn wall to build off.

The northern elevation had a narrow door with a high threshold, which has been filled with brieze blocks and a small window created. The building was evidently quite shallow at the front of its former 45 degree pitched roof and was originally rectangular in plan. It was likely a pig pen.

The eastern corner has been removed and the building finished in brieze blocks to create a wider turning arc for modern farm machinery . (Mr David Chapman - pers comm). The opportunity was taken to increase the head height by inserting a wedge of modern studwork and placing a ramshackle corrugated iron roof on top at a near flat pitch. Inside is a date in the render of 28 Nov 94. It was used as a chicken house.

Western Elevation.

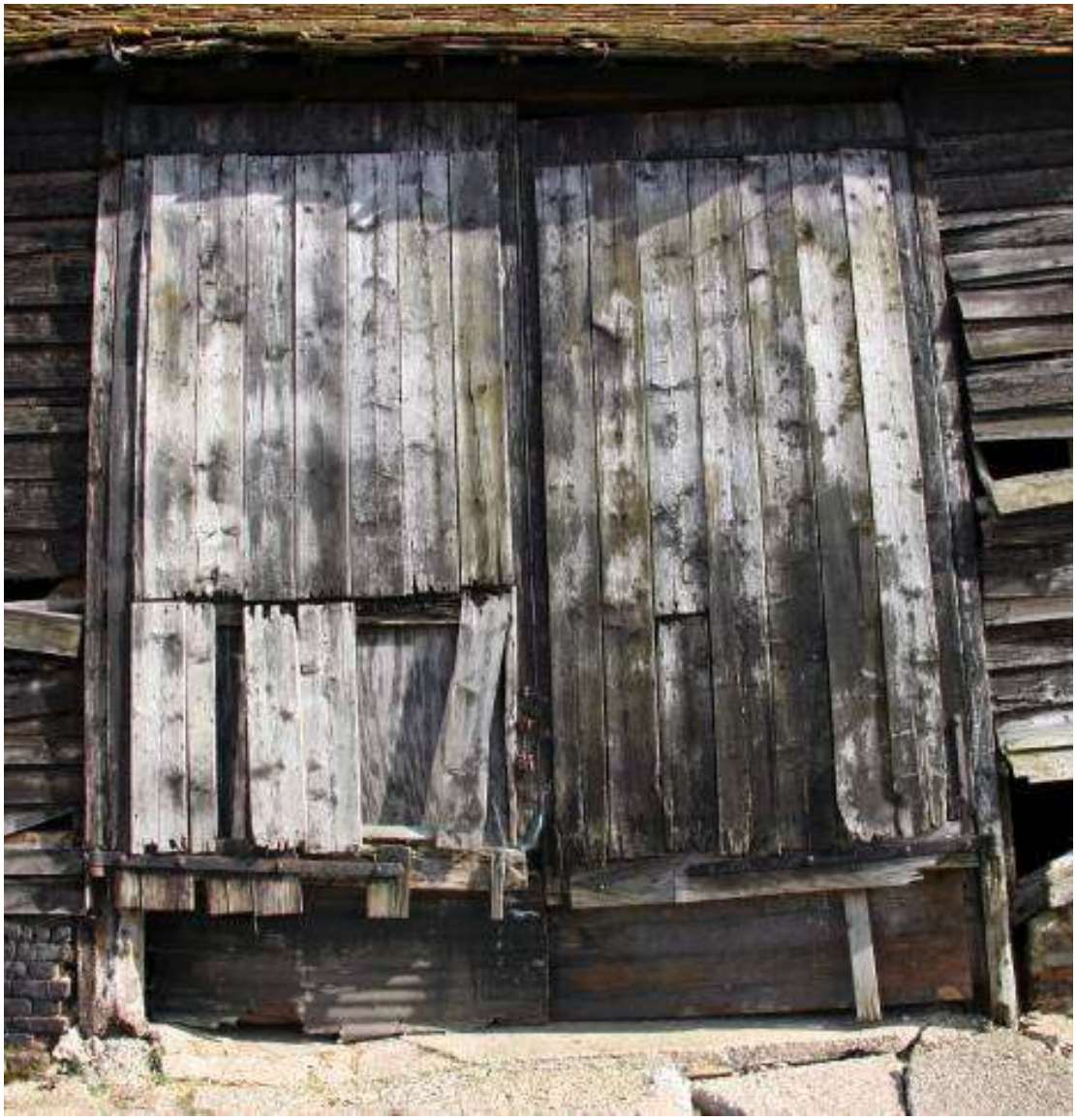
Western elevation from the SW. The barn is annexed to the current farmhouse denoted by the black weatherboarding.

The western elevation faces the road and is 34.25m (115ft 6in) long. The timber-frame is clad in a variety of modern weather-boarding as well as the older riven type which is mostly towards the northern end. Most of the boards are fastened with galvanised french nails or spiral roofing nails. The boarding was photographed in detail. There are carpenters assembly marks number III visible above the midrail on the outside of the frame where the boards had fell off. See section on Carpenters Marks.

Doors.

There are two large barns doors, both of C20th construction being nailed vertical softwood plain edge board with a variety of vernacular repairs. The ledgers and braces show clear marks of a circular saw. The long strap hinges are secured with modern fixings. Both are in poor condition and unable to be opened fully.

The northern doors open outwards to Bay 3 and the southern ones open to Bay 8.



The northern doors have had their bases removed and a makeshift barrier put in place.

The pair of doors to the north has had its bottom section sawn or broken off and a makeshift barrier of corrugated iron and an old door put in place in imitation of a leap or lower leaf. However there are no apparent fixings to indicate a predecessor. The northernmost leaf has been previously repaired in the C20th with a large let-in lower section. The doors and their frames were prone to being damaged by modern tractors. (Mr David Chapman - pers comm).

The southern barn doors have a smaller pedestrian door cut into them.

The southern barn doors are more complete and of the same C20th construction. The southernmost leaf has been sawn in half to create a lower door for pedestrian access into the barn. Its partner shows the same damage to its lower section as that to the other pair of doors and this is mostly caused by the doors falling on their hinges and dragging on the concrete surface.

Both doors retain their drop bars and the sockets for them indicate that they were always in this position. The very long pintle strap hinges with spoon terminals may possibly be reused from the C19th century but the fittings are modern.

Immediately to the south of the barn doors there is evidence for a small pedestrian door which has been subsequently infilled with studs and boarded over. This is seen more clearly from inside where the work appears C20th.

The C20th door into the Cleaning Room.

There is a gate and ledger construction plank door into the southernmost bay (Bay 10, the Cleaning Room). This is also C20th and in poor condition. Originally there was a glass panel which has been replaced with an offcut board. There are two wrought iron T-strap hinges with spooned terminals which are C18th-C19th in character and probably served an earlier door. The lower one is broken and replaced with a mild steel T-strap hinge. The latch and hasp are C21st.

Windows.

The position of redundant widows is denoted by short sections of modern weatherboards.

There are two blocked in openings that have remnants of frames on the inside to denote earlier windows. One is below the eaves in Bay 1 and the other similarly positioned in Bay 5.

There are also other blocked in apertures in Bay 2 at eyelevel, Bay 4 at eaves height and Bay 5 at eye level. There are also a number of other small sections that may represent earlier openings but their context has been lost by extensive repairs to the frame particularly in Bays 6 and 7. The openings appear to have all been blocked in the C20th with short pieces of narrow section machined softwood feather edged boards.

Southern Elevation.

The southern elevation is contained within the Annexe to the Farmhouse. The upper part above the midrail is weatherboarded with old riven boards and a small two plank door has been inserted to serve the Hayloft. The position of a removed stud is shown by its empty mortice.

Below the midrail there are two long battens each containing the broken off ends of square section timbers that were used to hang the harness and collars of the heavy horses used on the farm. Each stump is numbered in pencil. The room itself was divided into horse standings with timber partitions which were only removed when the farmhouse was converted from the other barn some 12 years ago. (Mr David Chapman - pers comm).

Below these the wall studs are shrouded in fibre board of the type commonly used in the 1970's to line ceilings before plasterboard became the norm. In places the studs can be seen and also the bricks that have been inserted to line Bay 10 - the Cleaning Room. On the southern end of the midrail can be seen the number IIII made with a chisel point. None of the timbers are tarred indicating this was always an interior space.

Eastern Elevation.

On the eastern elevation can be seen the back of the barn, the Chicken House, the Central Outshot and the northern Flat-roofed Outshot.

The Chicken House on the eastern elevation of the barn.

The Chicken House.

The Chicken House was constructed in the 1960's by Mr David Chapman's father from offcuts, spare timber and poles cut from the hedges and clad in corrugated iron sheets. As little expense as possible went into its construction and it has little merit. Its roof is now in a parlous state due to being disused for some years.

The Central Outshot.

The Central Outshot has a pan-tiled roof constructed in the C20th.

The Central Outshot is constructed in the main of C20th timber with machined softwood rafters supporting a pan-tiled roof. The wall to the north is constructed of re-used studwork clad in old weatherboards and may be contemporary with the barn while the other walls are all C20th machined softwood with some vernacular additions.

None of the internal walls are tarred and this indicates that this section of the barn has always been inside. The southern and eastern walls are not clad internally. The Outshot has all the appearance of a small stables.

The Northern Flat-roofed Outshot.

This has been partly discussed as part of the northern elevation.

The Flat-roofed Outshot from the east showing the tin roof and brieze block wall.

The Flat-roofed Outshot is the development of a smaller unit built of yellow London Stock bricks. The original unit was smaller with a low fronted steep pitched roof and a waist height brick wall probably to form a pen for pigs. The height has been increased by inserting a brieze block wall and a small section of studwork and dropping the pitch of the roof which is now clad in rusty corrugated iron sheets. Inside the roof has been clad with fibre board.

The plan of the building was changed to allow a greater turning arc for modern farm vehicles and the work was done in November 1994.

The Barn's Eastern Elevation.

Because the barn has the three structures detailed above built against it only three sections of the elevation are visible externally. These are the back of the Cleaning Room, the wall above the Chicken House and the wall above the Flat-roofed Outshot. The rest of the elevation is contained within the buildings.

The Cleaning Room. (Bay 10).

The section of weatherboarding that forms the cladding to the Cleaning Room is C20th in construction. The boards are machined softwood held in place with galvanised french nails. The boards have been coated in hot brushing tar which has largely peeled off. The door is very similar to that on the western elevation except that it retains its glass panel. It is C20th in design and construction.

The back door to the Cleaning Room. Weatherboarding and door are C20th.

To the south of the door is a fresher section of modern boarding which was evidently done as part of the barn conversion into the farmhouse. These are coated with cold brushing tar.

Inside the Chicken House.

The eastern elevation of the barn inside the Chicken House. C20th door and unframed window.

The hot tarred boards continue into the Chcken House to the north where they clad Bays 6 - 9. This section is entirely C20th and is part of a wholesale replacement of the eastern wall as a result of damage made by an explosion in 1942 in the Waltham Abbey Royal Gunpowder Mills.

There is a substantial vertical boarded, softwood gate and ledger door where the battens are clenched with wrought iron nails and so are the long pintle strap hinges. However it is in very good condition and sits in a c.1942 doorframe. It is more likely of this period than earlier as its rate of wear is the same as the weatherboarding.

There is an unframed opening into the barn in Bay 7 and a small unframed opening above the door. There are also 3 unframed openings in Bay 6 but two of these pass above the roofline of the Chicken Shed and may have been enlarged due to water damage. These smaller openings were to allow the chickens access to the barn.

Inside the Central Outshot.

C20th vernacular partition between the barn and the Central Outshot constructed by Mr Chapman senior.

There is a ramshackle division between the Central Outshot and the barn which was constructed by Mr David Chapman's father which sits where the barn doors should be. However there are no fixings for doors on the main posts and the Central Outshot may have always been here in some form since the barn was erected.

Manger support rails are nailed to the floorboards applied by Mr Chapman senior.

There are two battens on the barn wall aligned in a V shape which denote the former presence of a manger. The current weatherboarding below the midrail on the barn itself is of reused floorboards and placed there by Mr Chapman senior. The boarding above is an eclectic mixture of wide and narrow section boards fastened with wrought iron nails, none of which have ever been tarred implying the Central Outshot has always been there in some form.

Inside the Northern Flat-roofed Outshot.

The weather boarding is made of reused floorboards put in in the C20th.

The weather boarding below the midrail inside the Flat-roofed outshot is made of reused floorboards and put there by Mr Chapman senior. The lower part of the wall containing the plinth is rendered over in cement. The weather boarding above the roof and that of the earlier part of the outshot's southern wall is of the same character as the northern elevation and is hot tarred. There is a small framed opening into the barn which was for the chickens to use.

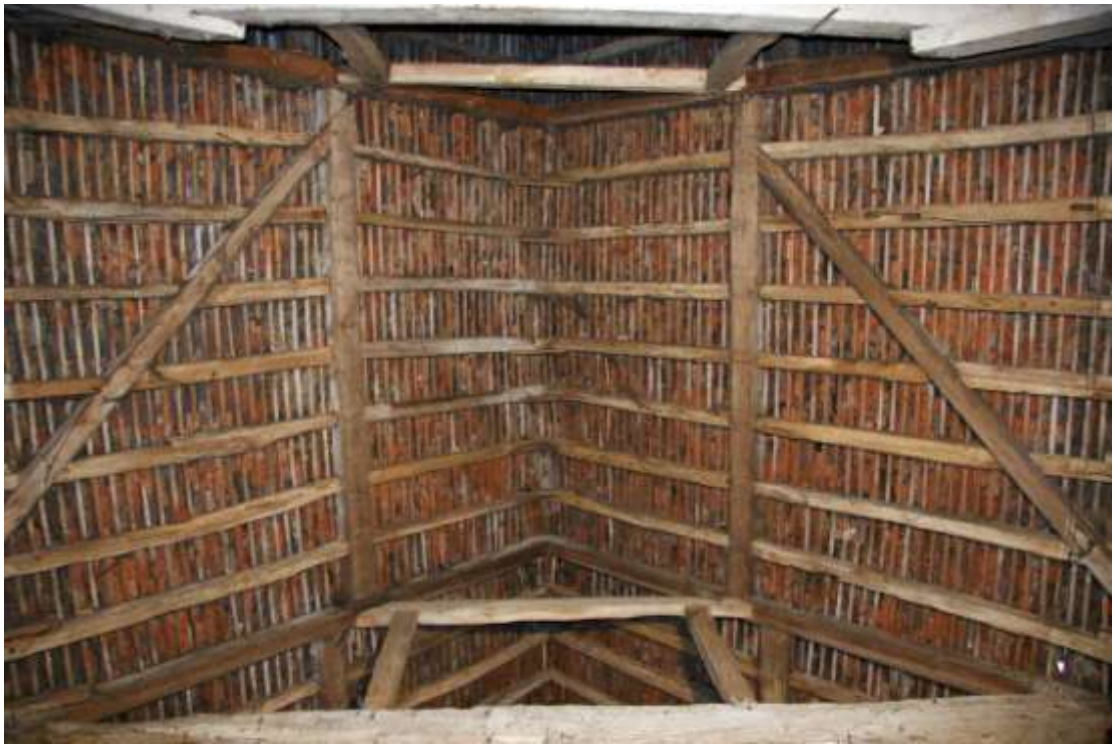
Interior Description.

Roof Structure and Trusses.

The building varies between 5.7m (18ft 8in) and 5.9m(19ft 3in) wide between its principal truss posts. The width at the plinth varies between 5.4m (17ft 9in)at the northern end to 5.9 (19ft 3in) at the southern end. The pitch of the roof is consistent at 45 degrees. The length of the bays varies along the barn as detailed below. Distances are centre to centre on the truss posts. The sizes do not conform to any historic module of size such as the rod (16ft 6in).

Bay 1 - 3.4-5m 11ft 2in - 6in	Bay 2 - 3.5-6m 11ft 6in - 10in	Bay 3 - 3.5m 11ft 6in	Bay 4 3.3-6m 10ft 10in-11ft 10in	Bay 5 - 3.4m 11ft 2in
Bay 6 - 3.9m 12ft 10in	Bay 7 - 3.3-5m 10ft 10in - 11ft 6in	Bay 8 - 3.7-9m 12ft 2in - 10in	Bay 9 - 2.5m 8ft 2in	Bay 10 - 3.0m 9ft 10in

Bays 1-5.



The roof structure is most clearly shown in Bay 4. Note the wind-braces housed in the purlins and the cut and nailed rafters. Looking south. Several rafters are reused or turned over.

The roof structure in Bays 1 -5 is that of an offset butt purlin roof where the principal rafters are connected near the mid point above the top-plates by an axial beam housed in the faces of the principal rafters. The line of the purlin is not continuous but offset by the width of the purlin between each bay. The rafters are then tenoned top and bottom into the purlins.

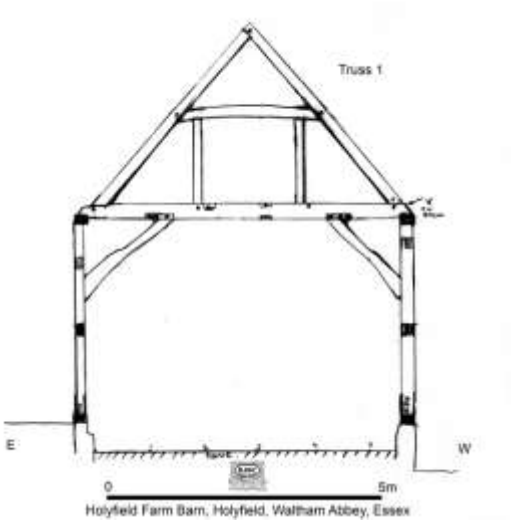
Each principal rafter pair is then braced by a horizontal collar with a slight upward camber which is supported by two queen struts tenoned into the main tie-beam. The roof is ridgeless and the rafters are coupled at the apex and some have been nailed with small C20th timber gussets.

It is this structure that has led to the idea that the barn may originate in the C17th as the style is very much of the early 1600's and many parallels can be found in Essex. However this is not the case here. Many of the timbers are re-used and cut down from their original form and many of the structural elements are softwood including some of the purlins which have a reddish hue.

In Bays 2 and 4 there are diagonal windbraces between the top-plate and the purlin. The rafters are halved and nailed onto these braces. This is not an early technique. Several of the rafters are of reused timber.

The trusses are numbered I to V on their southern faces either on the principal rafters to the western side or near the collars. The numbers progress northwards from Bay 5.

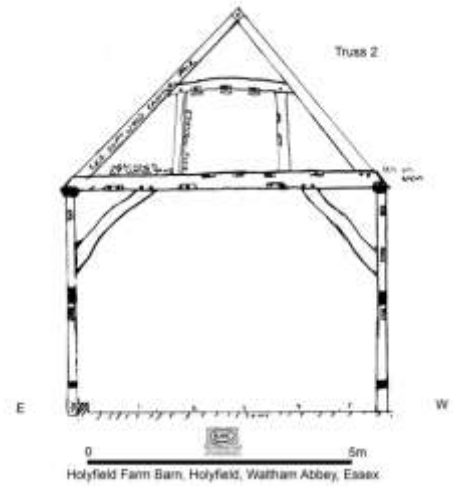
Truss 1.



Holyfield Farm Barn, Holyfield, Waltham Abbey, Essex

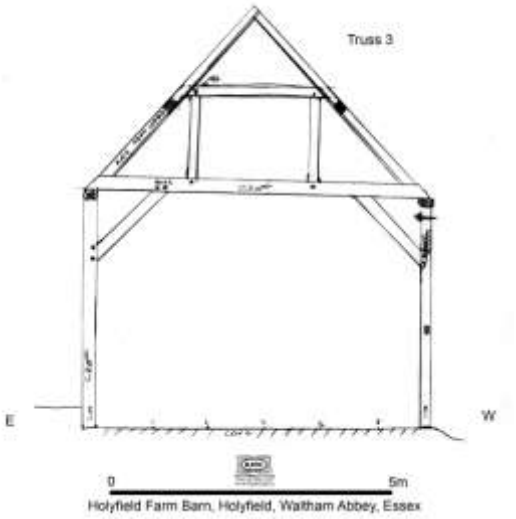
The tie-beam is re-used from an earlier structure and the over-sized mortices of the original braces are present in the underside. In the upper face there are a number of mortices which do not correspond with the upper assembly. The tie-beam braces are halved from a single tree.

Truss 2.



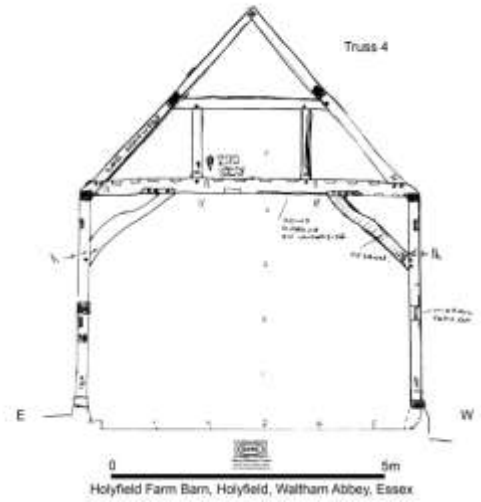
In Truss 2 the principal rafters are red softwood and the pine knots are quite clear in them. The tie beam is cut down from a much longer timber and the vacant mortices of the original braces are present in the underside. In the upper face there are a number of mortices which do not correspond with the upper assembly. Both the queen struts are of reused timber, one being edge moulded. The collar is reused from another timber and the mortices on its underside are round ended illustrating the style of carpentry common from the early 1800's where the builder (rather than carpenter) couldn't be bothered with squaring off the mortice. The tie-beam braces are halved from a single tree.

Truss 3.



Truss 3 has been repaired with a straight cut C20th tie-beam supported with bolted on braces. The principal rafters are red softwood. The collar is marked with the number III.

Truss 4.



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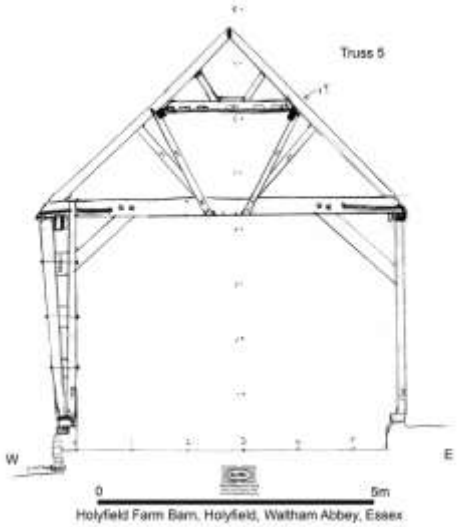
The tie-beam is re-used from an earlier structure and the vacant mortices of the original braces are present in the underside. In the upper face there are a number of mortices which do not correspond with the upper assembly. There is a long groove carved in the underside. The waney tie-beam braces are not halved from a single tree but are seperate elements.

The queen posts are reused timber with the easternmost one having an upside down taper burn mark on it.

The queen posts, main tie-beam and principal rafters are marked with the number II and the braces and corresponding mortices in the principal posts are marked I and II, each with a tag. The westernmost one marked II(tag) has the clear marks of a pit saw upon it and is a very rare example of this type of finish in the barn.

Truss 5.



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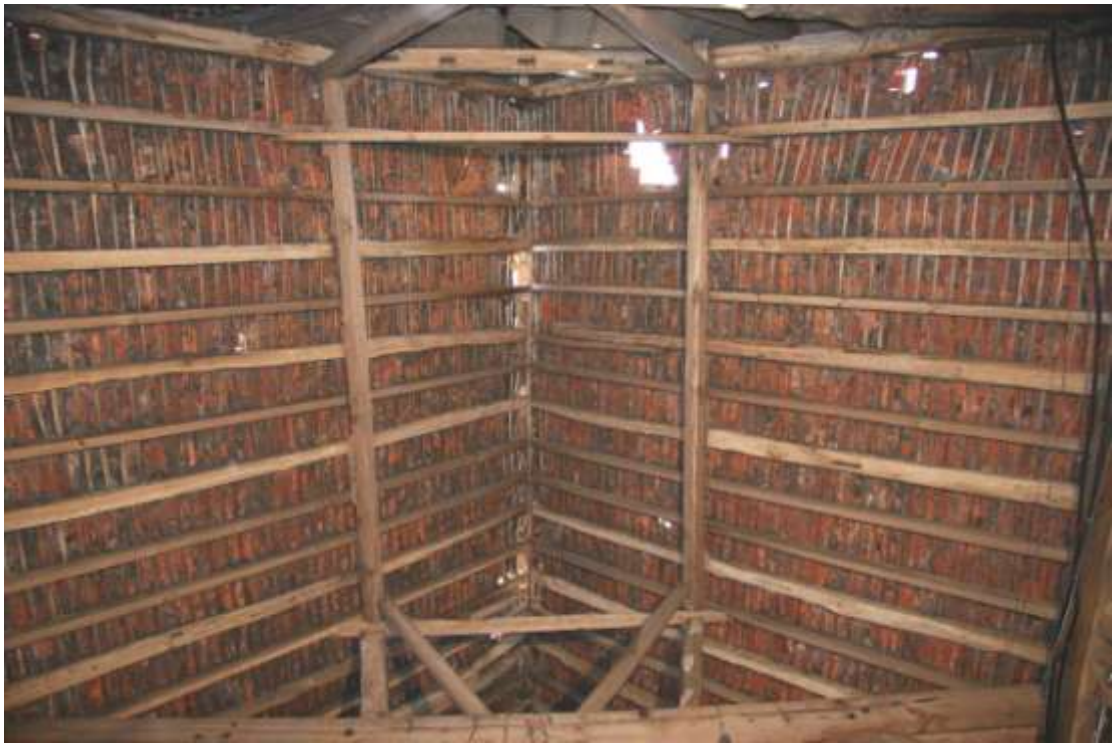
Truss 5 has been highly repaired in the C20th including the replacement of the main tie-beam and the eastern principal post. A secondary principal post has been inserted at the western end to counteract the bowing out of the frame. This is connected with substantial iron bolts passed through large wedges of timber between the two posts.

There are four raking queen struts nailed in position, two of which take up the weight of the side purlins that pass into the southern part of the barn. It is at this point that the roof construction changes its character.

The collar is a reused timber with several out of place mortices including one directly into the principal rafter. It now supports two C20th short raking struts above inserted to arrest the failing principal rafters which have split at this point. There are two empty mortices for a shorter collar immediately above the current one. At this point there is a single strike of a chisel point to represent number I.

There is also a secondary collar nailed across the adjacent rafter pair to further support the purlins. Sacking was nailed to the northern side of the truss so it was drawn from the southern side.

Bays 6-10.

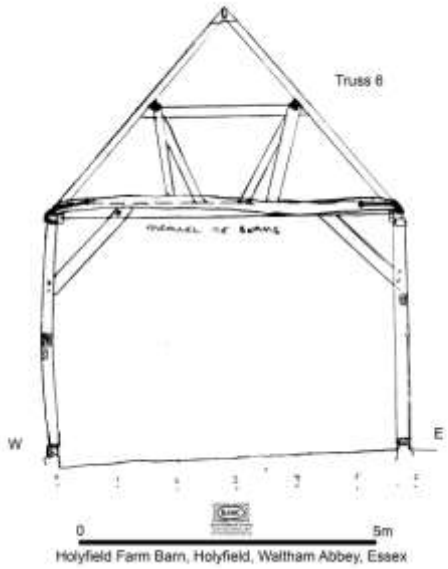


Bay 6 roof structure showing the many softwood replacements made in the C20th.

Bays 6-10 have a different character to Bays 1-5 in that they have a clasped purlin construction roof with full height rafters and no windbraces. The rafters are nailed onto a softwood ridgepiece. All of these bays have been rebuilt in the C20th century and contain much modern machined timber. As it is known the barn was seriously damaged in 1942 by an explosion it seems most likely that this is when the roof was remodelled.

In Bays 6 and 7 about 50% of the rafters have been replaced in C20th machined softwood whilst in Bay 8 the roof has no original timber in its construction. Bays 9 and 10 have C20th rafters and only the tie-beams and collars have been retained as a nod to the past. (See truss descriptions below).

Truss 6.



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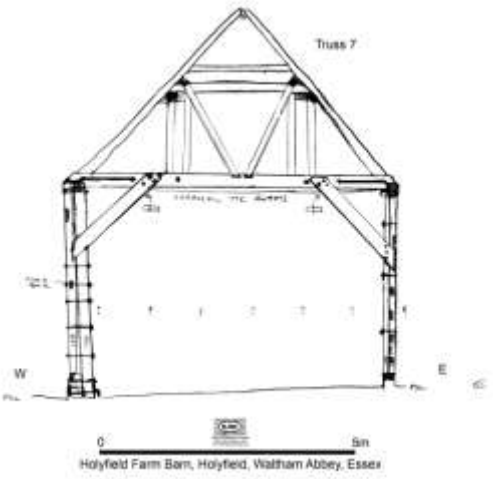
Truss 6 is almost entirely C20th with only the western principal post being retained. The old pole that served as a tie beam runs parallel with the new one and is held in place with C20th mild steel blacksmith's joints. The tie-beam is probably made of elm but it has been whitewashed so It may be any local timber. It does not resemble oak.

Truss 7.



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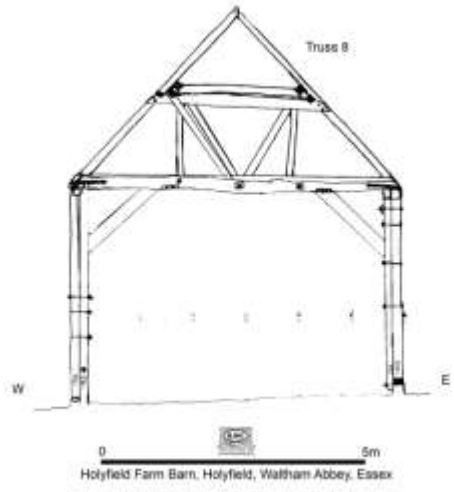
Truss 7 is almost entirely C20th with the principal posts being retained and bolted to new machined softwood ones. The old pole that served as a tie beam has been doubled up with a new one and is held in place with C20th mild steel blacksmith's joints. The tie-beam is probably made of elm but it has been whitewashed so It may be any local timber. It does not resemble oak. There are mortices in the underside for previous braces.

The queen struts have been doubled up and there are two collars, the upper one being nailed across the principal rafters rather than housed. The line of the clasped purlins is changed in this truss by housing that to the south in two short nailed on plates between the upright queen strut pairs. The raking struts serve the northern purlin.

Truss 8.

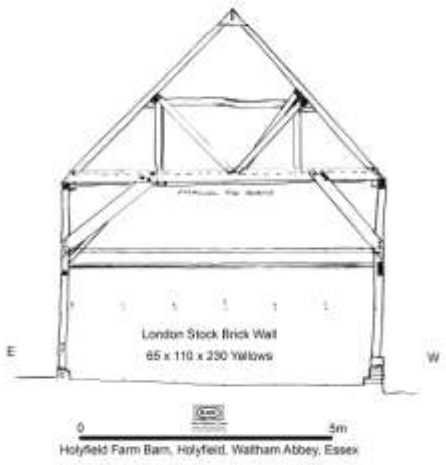


Truss 8 is almost entirely C20th with the principal posts being retained and bolted to new machined softwood ones. The old pole that served as a tie beam has been doubled up with a new one and is held in place with C20th mild steel blacksmith's joints. The tie-beam is probably made of elm but it has been whitewashed so It may be any local timber. It does not resemble oak. There are mortices in the underside for previous braces.

There are two old collars of which the lower is nailed in position rather than housed in the principal rafters. Two collars are required because in Bay 9 two purlins are carried across on the south side of the building. See following photograph.

Bay 9 looking south showing trusses 8 and 9. Note the double purlin to the western side and the old poles doubled up with C20th timber.

Truss 9.



Truss 9 is built flush up against the London Stock brick wall forming the Cleaning Room in Bay 10. The principal posts are quite slight in comparison to all the others at only 140mm thick. Like the previous trusses the whole assembly has been rebuilt with machined softwood and a waney pole placed in parallel with the new main tie beam. The collar is also a waney pole which seems chosen because it fits in with the double purlin arrangement on the west side of the building. Neither of these poles have signs of reuse in the form of vacant mortices and were probably placed there at the same time as the modern timber.

Roof Tiles and Battens.

The roof tiles are all simple clay pegtiles and are mostly red. There is a new section over Bay 3 on the eastern side composed of a variety of colours including blue which was implemented recently. This is denoted by the lack of moss on them. All the tiles are secured with galvanised clout nails and the joints torched with mortar.

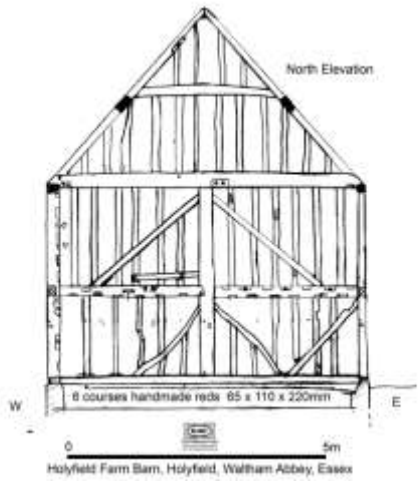
Bays 1 to 5 of the barn has been battened with heavy duty sawn 2in softwood battens whilst the remaining bays have much more slender riven laths which in places have failed. The slender lath is peculiar because it spans the section of the roof repaired after the blast damage of 1942 and one would expect something more contemporary and stronger in construction.

The Floor

The barn floor is entirely of concrete. The section in Bays 1 to 5 is perfectly flat and even and was put in place by Mr David Chapman's father in the late C20th. The other part of the barn has a more uneven pour of concrete which follows the fall of the land and most likely dates to the World War 2 repair scheme when concrete became more readily available.

Wall Elevations.

North Wall



Holyfield Farm Barn, Holyfield, Waltham Abbey, Essex

The northern elevation sets the pattern for the construction of the walls of the entire barn and the form is repeated throughout except where the barn has been remodelled in the C20th.

The principal posts are connected by a top-plate, acting also in this elevation as the main tie-beam. A central post supports the top-plate at its mid point and then carries substantial mid-rails. The frame is braced above the midrails by single diagonal struts from the midrail to the central post. Below the midrails, the central and principal posts are braced against the sole plate with V-braces (the far western one is missing and the studs are replacements).

The studs are tenoned into the horizontal timbers close to the outside face so that the boards may be applied flush to the outside. The studs are then nailed with wrought iron nails to the diagonal braces.

Above the top-plate the studs are tenoned into the plate and the collar or nailed onto the principal rafters. Above the collar the studs are tenoned into the collar and nailed onto the rafters.

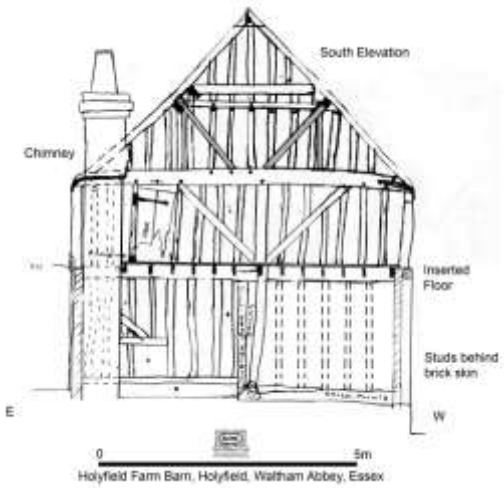
The mortices for the studs are cut to a consistent size of 38 x 89mm (1.5in x 3.5in) while the studs vary in widths around the four inch mark (102mm). Hardly any are fully finished on all four faces.

Reused Timbers.

The northern elevation, in common with most of the rest of the original frame is made almost entirely from reused timber. Virtually every element has some scar of previous use. The western principal post is a very eroded timber reused from a much earlier building and carries the matrices for many studs and two diamond mullions. The top-plate has redundant mortices from a previous use.

The midrails have very many redundant mortices on both sides which either indicates that the timbers have been turned over or that the building was double skinned at some point. The western midrail is actually nailed onto the centre post rather than housed. Several of the midrails have mortices cut horizontally into their faces which are angled for braces and it is evident that they were previously used in an upright position.

The Southern Elevation



Holyfield Farm Barn, Holyfield, Waltham Abbey, Essex

In essence the southern elevation is a reflection of the northern one. It differs in having been highly modified since its original inception. The lower part of the frame below the rail has been rebuilt in brick. To the east of the centre post the panels between the studs have been infilled with brick noggin whilst to the west a brick skin has been built inside the timber one.

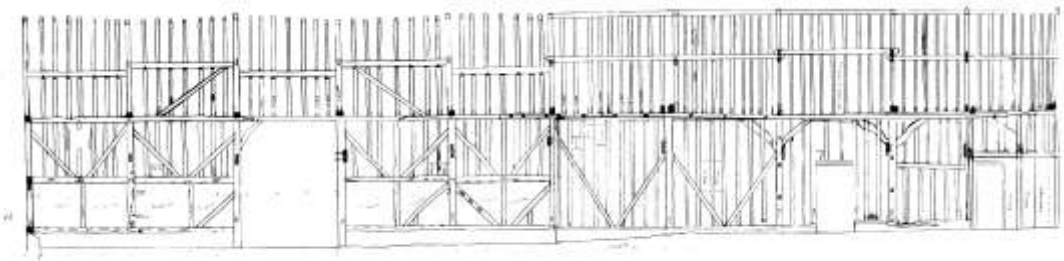
The timbers are visible from the Annexe to the south but it is not possible to determine their originality without removing the C20th cladding previously described.

The arrangement above the midrail is the same as in the northern elevation but it is notable that barely any of the timber shows signs of reuse. The main tie-beam, which still has bark on its surface, does not have any out of place mortices and appears original to the build. Likewise the studs are unblemished, most being quarter poles, faced only on two or sometimes three faces and none particularly straight. Many still have bark on them.

It is noticeable here that the peg holes for the studs have not been bored right through the tie-beam in a consistent manner but only here and there and usually for the main support timbers. This is a feature that can be seen throughout the frame in general.

The diagonal braces and the studs connected to them are fastened with wrought iron nails. There is a single carpenters mark, number IIII, visible on the eastern end of the tie-beam on the southern side. A small two plank door has been inserted by removing a stud. It is hung on a thin wrought T-strap at the top and a now missing pintle strap at the bottom. The pintle is in place in the frame.

The Eastern Elevation



Holyfield Farm Barn - Eastern Elevation

The eastern elevation is the least complete due to its partial destruction by the blast from an explosion in the nearby gunpowder factory during the war in 1942. The walls in Bays 6 - 9 were completely replaced with a modern softwood construction consisting of V braced studwork panels in Bays 6 and 7 and a panel braced by a door frame in Bay 8. Bay 9 has also been replaced but the configuration incorporating a midrail has been retained.

On the principal posts to Trusses 7 and 8 are pairs of waney up-braces to the top-plate but these are now functionless as most of them have been severed to pass the studs through. They do indicate that this section of the barn had a different configuration to the rest and an original one is still in place in Bay 10. However these are not mimicked on the western elevation.

Bays 1 and 2, 4 and 5 resemble the north and south elevations with diagonal downbracing from the principal posts and a central full stud above and below the midrail in each bay. Above the midrail most of the studs are still nailed into position whilst below the midrail nearly all of the studs have been removed leaving only the central ones and the diagonal braces. Here the external cladding is made up of floorboards.

The midrails have redundant mortices on both sides to both faces which are not consistent with the frame and they are evidently re-used.

Bay 3 is open to the full height but there are no visible fixings on the posts for doors. They may be obscured by the external timber wall of the Central Outshot. The principal post of Truss 2 has a curved brace into the underside of the top-plate formed from a halved tree while the principal post of Truss 5 is a modern softwood replacement. From its straight, unblemished and regular appearance it is likely the top-plate is also a replacement. It is scarfed in Bays 3 and 4.

Bay 10 incorporates the Cleaning Room and the section below the mid-rail has brick noggin between the studs and an opening for a back door. The brick chimney is built into the corner. (See seperate chapter on brickwork).

On the sole plate in Bay 6 there are four carpenters race knife marks - II, XXXV, IIII, IIIV all close together by the base of the principal posts of Truss 5. However this is softwood plate used in the construction of the new section and must have been put there post the 1942 explosion.

The Western Elevation

Holyfield Farm Barn - Western Elevation

The western elevation is more complete in its form and the V bracing above and below the midrail is consistent throughout most of its length. However the upper sections in Bays 6 and 7 have been rebuilt with some modern softwood insertions and three of the V braces lost. These bays correspond with the replaced ones in the eastern elevation and were probably remodelled as part of that exercise.

Again there is much reused timber in the construction of the elevation especially in Bays 1 and 2 where the midrails and the diagonal braces and several of the studs have redundant mortices. One diagonal brace in Bay 1 is clearly from a top plate of a much older building and has the indents for 'scotched rafter feet'.

Bay 9 was originally formed with a pedestrian doorway with a lowered plinth to the south of the main barn doors and this has been subsequently blanked off most likely in 1942.
Bay 10 incorporates the Cleaning Room and the section below the mid-rail has brick panels between the studs and an opening for a front door.

The top-plate above Bay 10 continues southwards and is scarfed into a more irregular frame inside the Annexe and this suggests most strongly that the barn was always connected to the Farmhouse barn.

In Bay 3, where the barn doors are, the top plate is marked with the number XXX and there is a face halved and bladed scarf (CBA Practical Handbook in Archaeology 5 F29J) which is secured with a large bolt. The carpenters mark was made with a race knife but resembles closely those on the softwood sole plate in the eastern elevation. The bolt is interesting in itself as the nut is nearly cubic and this indicate a date in the early 1700's. However it must have been reused.

The Brickwork.

There are three brick structures connected to the timber frame. The plinth, the Northern Flatroofed Outshot and the Cleaning Room. There is also a chimney in the Cleaning Room.

The Plinth

Where the plinth is ruptured frogged red bricks and London Stock yellows can be seen.

The plinth is composed mostly of red handmade bricks 65x110x220mm with creased faces, soft arrises and vertical pressure lines. They are set in a bed of lime mortar as mostly stretchers with a soldier course to rest the sole plate on. Where the plinth is ruptured on the western elevation it can be seen that many of the red bricks have shallow frogs and smooth bases.

Also can be seen built into the base of the plinth are some yellow London Stocks identical to those in the Cleaning Room walls and the Flat Roofed Outshot.

The base of the western plinth from Bay 4 to 7 and Bay 9 is made up of a hardcore of stone rubble mortared with the same lime mortar as the rest of the brickwork and must have been

laying about the farm at the time. It may be significant that there is change in the fall of the ground here and the stone was used for extra stability.

The Northern Flatroofed Outshot and the Cleaning Room.

The failing pointing in the northern wall of the Cleaning Room.

The brickwork in the Northern Flatroofed Outshot and the Cleaning Room is composed of yellow London Stock bricks. These bricks are light greeny -yellow in colour with many flecks of dark material which is the brieze waste from old gasworks. The bricks are unfrogged, 65 x 110 x 230mm with regular sharp arrises, creased faces with few horizontal pressure marks and smooth bases. They are laid in stretcher bond with a regular joint of gritty lime mortar which has all but dissolved in one section of the Cleaning Room wall.

The wall supports a timber floor composed of 2inch deep section machined joists set at 18in centres and machined softwood boards.

The chimney in the Cleaning Room is composed of grey gault bricks, 65x110x225mm with creased faces, sharp arrises and bonded with a coarse sandy beige mortar. There are some reused and also a few red bricks in the build. At the base of the flue can be seen a square shadow on the southern wall where the brickwork for a copper has been removed. The copper was used to heat the horses bran mash. (Mr David Chapman - pers comm).

Merchants Timber Marks and Carpenter's Assembly Marks.

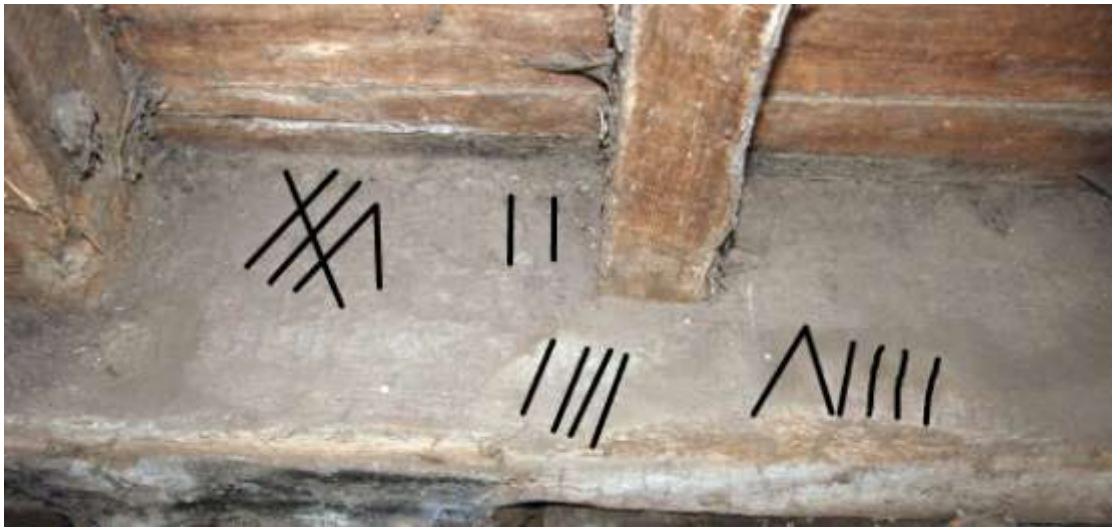
No merchants timber marks were found, even on the modern softwood.

Three styles of carpenter's marks were recorded and their position noted on the drawings and in the text. The main series numbering the trusses were made with a chisel point using roman numerals I to V.

Carpenter's marks on the western elevation.

Similar marks were found on the exterior of the south elevation - number IIII and the exterior of the western elevation - number III. It is highly likely that the frame is numbered throughout with chisel point marks on the exterior beneath the cladding.

Numbers I and II with tags were used on Truss 4 to mark the waney braces.



Carpenter's marks on the softwood sole plate in Bay 6. Enhanced in Photoshop CS2.

Finally race knife numbers II, XXXV, IIII, IIIV and XXX were used to mark the 1942 repairs. Evidently a traditional craftsman was on hand to do the work.

Graffiti

There is surprisingly little graffit present in the building - normally in a barn tally marks can be found but there are none visible. On the brick wall inside the Cleaning Room there are several names and addresses scratched into the limewash. These belong to the ladies and gentlemen who processed the potatoes in the 1960's many of whom are still around. (Mr David Chapman - pers comm).

Ironwork Repairs to the Timber Frame.

Head of a C19th / C20th bolt used to repair the barn.

Virtually all the ironwork repairs date from the C20th. There are a few long bolts with convex square heads and flat square nuts that date to the C19th but they are all in positions that denote reuse. This also applies to a few bolts which have near cubic heads and nuts which stylistically date to the C18th.

The iron ties that secure the tie-beams are all of mild steel and were formed, rather than forged. They again date to the C20th.

Fixtures and Fittings.

Bearing housing for a horse driven grinding machine still operating post 1942.

There is only one fixture inside the barn. This is a bearing housing for a shaft driven machine mounted on blocks on the sole plate in Bay 9 on the eastern side. This is a wholly repaired wall and so its operational use must post-date the repairs. It housed the shaft for a horse driven grinding machine used to grind grain to make animal feed. It was removed to make way for the Chicken House which was erected in 1965. (Mr David Chapman - pers comm).

Phasing the Development of the Building,

Phase 1 - Late C18 to Early C19th Century.

There is nothing in the carpentry of the barn to suggest that the barn is much earlier than about the year AD1800. The uniformity of the western elevation where the midrail construction with diagonal braces and nailed in studs carries through the length of the barn together with that of the north and south elevations suggest most strongly that the barn was built as one unit connected to the other barn that is now a farmhouse. That the top-plate in Bay 10 continues into the Annexe some way also supports this idea.

The roof of Bays 1 to 5 is of the more archaic form of the offset butt purlin but there is nothing to suggest that it is any older than the rest. The rafters are nailed to the diagonal windbraces which are housed in the purlins some of which are red softwood. Some of the principal rafters are knotty red softwood.

The chisel point carpenter's marks on the trusses are contemporary with those in the walls but they could have been put there at any time. It is more significant that there are no older style carpenter's marks.

A considerable amount of the timber is reused but it is from contemporary buildings. There are only a few timbers, denoted by their driftwood appearance and anachronistic features such as diamond mullions, that come from older buildings. The reused main tie beams in Trusses 1 and 2 came from two different buildings.

It is likely that a few local buildings were dismantled for salvage and used to build the barn. It also likely that the Central Outshot was built at the same time as a processing house although only the northern wall now survives from the original structure.

The brick plinth contains frogged red bricks which are normally found in the early C19th onwards.

Phase 2 - Victorian Brick Buildings and Repairs.

In Victorian times the northern outshot was built against the eastern wall most likely as a pigpen with a low roof and brick enclosure. The yellow London Stock bricks have black inclusions called brieze which are a by-product from the gasworks. The first gas works in the U.K. were built for the Gas Light and Coke Company, that was established in 1812 to light the City of Westminster and this gives an earliest possible date for the production of brieze. However gas was not widely available until the 1820's.

The Cleaning Room was partitioned off with identical bricks and a chimney built out of grey gault bricks with a few red ones added in. Grey (and white)gault bricks were quite popular around the 1830's for building fine houses in imitation of stone and for facing up timber-framed ones to look Georgian in style. The machined joists in the platform roof however would suggest a much later date as they are very narrow section set on edge at 18 inch centres.

The yellow London Stocks are found in the base of the plinth and suggest that it was rebuilt in the late Victorian period.

Phase 3 - Post 1942 Blast Damage.

It is remembered that the Royal Gunpowder Mills at Waltham Abbey had an explosion in 1942 and that the blast wrecked the barn across the road. The RGM website timeline shows two seperate explosions that killed ten men in 1940 so it was a regular occurrence.

http://www.royalgunpowdermills.com/wargm_chronology.htm

The result was that a significant proportion of the barn was replaced and repaired. The eastern walls in Bays 6 to 9 were replaced and Trusses 5 to 9 were heavily remodelled, repaired and strengthened. On the western side Bays 6 and 7 were repaired in their upper parts and it is likely the top-plates over Bay 3 were replaced on both sides.

In Bays 6 and 7 about 50% of the rafters have been replaced in C20th machined softwood whilst in Bay 8 the roof has no original timber in its construction. Bays 9 and 10 have C20th rafters and only the tie-beams and collars have been retained as a reminder of the past. All of the roof over Bays 6 to 10 was rebattened with slender riven laths and retiled.

Much of the Central Outshot was also replaced with an entire new roof and southern section.

A poured concrete floor was put inside the barn.

Phase 4 - The Chapman Period - Late C20th.

The Chicken House was erected circa 1965. The flat concrete floor in Bays 1 to 5 was put in place. A ramshackle division was put in the southern barn doorway blocking off the Central Outshot. The eastern elevation lower section was reboarded with floorboards in Bays 1 to 5. The pigpen was turned into the Flat-roofed Outshot in November 1994. Repairs were made to the roof over Bay 3.

The barn was latterly used to store and process potatoes but the blockwork structures associated with this have been completely removed leaving only fragments of concrete shuttering against the brick plinth.

FIN

Barry Hillman-Crouch 27 March 2009.

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