Early Malt Kilns in England

by

AMBER PATRICK

This paper summarises the results of the author's study of malt kilns in England from the 18th century to the second half of the 19th century. The paper will look at twenty-three examples across fourteen counties, from Yorkshire in the north to Devon in the south, and from Shropshire in the west to Norfolk in the east. The findings will then be used to assess whether there are any similarities in design, and if so, whether they are specific to a geographical area. The reasons for the better survival of early kilns in some areas than others will be considered. Finally the issue of whether there is any chronological development of these early malt kilns will be discussed. A catalogue of all the sites recorded follows at the end of the paper.

INTRODUCTION

Early malt kilns constitute a type of monument which is rarely considered and is vulnerable to loss without record because of its relative simplicity and perceived insignificance, but they provide important evidence for aspects of the brewing industry during the Industrial Revolution. The dates of the kilns in this study range from the 18th century to the second half of the 19th century, and some were still working well into the 20th century.

The malt kiln is the most essential part of a maltings. Malt is one of the main ingredients in the brewing of beer, the others being water and yeast; hops are used as a preservative and to produce bitterness. Malt is artificially germinated grain with germination arrested by kilning at the critical point, which is when the starch in the grain is turning to sugars which are essential in brewing. In brewing the malt is milled so that the grain is crushed to enable the starch to be extracted easily when it is mashed (mixed with hot water, called liquor in the brewing industry). In this part of the process a sugar extract is produced which is fermentable. Therefore it is essential that the malt is correctly kilned.[1]

The basic components of a malt kiln are a furnace with fire box and, above it, a floor on which the partially germinated grain can be dried, and a flue to take away the hot moist air. The flue was frequently a pyramidal or conical roof structure surmounted by a cowl. Sometimes the flue structure would be hidden under the ordinary roof of the building, but when externally visible it is the most obvious and distinguishing feature of a malting (Figs 1, 2).

Amber Patrick has been studying malthouses and their kilns since the mid-1970s. She is an independent consultant on malthouses and comments on them for the AMS. She also undertakes work for local authorities and English Heritage, for whom she produced *Maltings in England, Strategy for the Historical Environment Report No. 1* (2004).

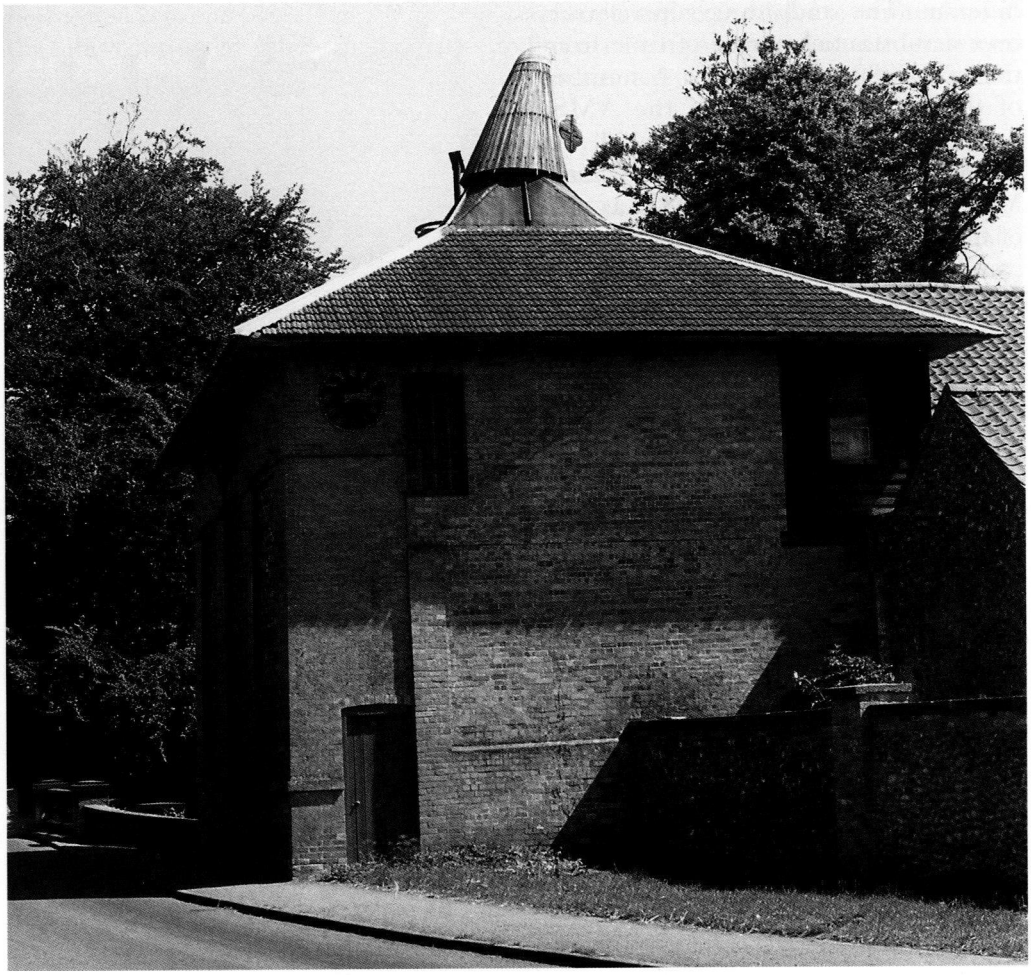


Fig. 1
Letheringsett (Norf.), exterior of the malt kiln facing onto the road; note the cowl and the clock.
Photograph, author 1996

THE BASIS OF THE STUDY

The remains of kilns and their furnaces are known from medieval times and a good series of early examples are to be found in Nottingham's cave system.[2] However, later simple kilns survive from the 18th and 19th centuries, mainly in small maltings, many of which form part of a listed building. These former maltings inevitably need to find new uses and when they come up for conversion, Listed Building Consent and Planning Permission are required. As a statutory consultee on all applications for listed buildings consent in England and Wales, the Ancient Monuments Society (AMS) receives these applications. These referrals have enabled a wider study of mainly early, non-patent malt kilns.[3] The consequence is that non-patent kiln furnaces are usually all slightly

different. The study ranges in referrals over a substantial period of time from the mid-1980s up to 2011. A number of the referrals came via the AMS, and a number were recorded with the former Royal Commission on Historical Monuments England (RCHME) as part of the planning process. Other referrals came privately, in particular those in the author's home county of Gloucestershire. The extent of the recording of any kiln depended on the type of referral and it needs to be pointed out that not all were fully recorded by the author. In some cases only photographs were taken and in others just essential measurements. Some of the results have been published in county archaeological journals, and the reports on those kilns recorded as part of a Listed Building Consent recording condition should be available form the relevant local authority.

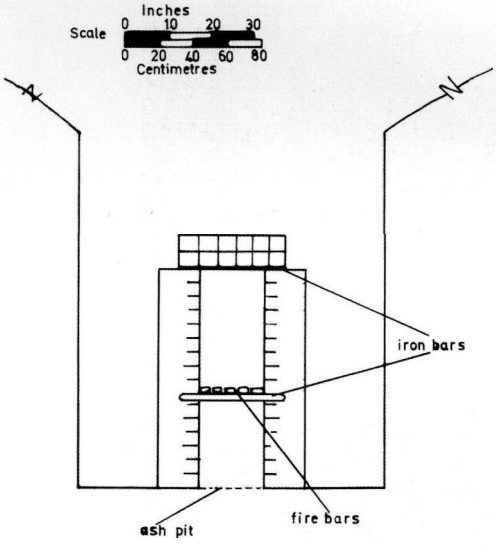


Fig. 3
Brockhampton (Glos.), The Old Brewery, the kiln furnace showing the position of the fire bars and ash pit.
Drawing, author 31/01/1995

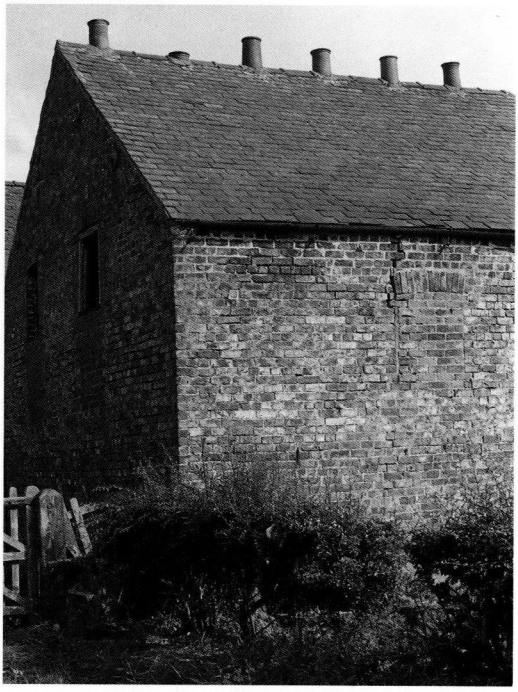


Fig. 2
Alne (N.Yorks.), kiln with chimney pot cowls. The use of chimney pots was always rare, and this is the only surviving example known to the author.
Photograph, author 1993

Twenty-three kilns from fourteen counties will be considered, a reasonable geographic spread but the distribution depends upon their survival and their referral to the author. For each kiln studied, a brief description is given of the exterior of the kiln and whether it is externally recognisable as such. A more detailed description will be given of the interior, including the fabric of the kiln furnace, its fire bars (Fig. 3), or fire box (Fig. 4) and, where visible, the heat diffuser plate (also known as a spark plate, Fig. 5A). In some early kilns, part of the support structure for the kiln drying floor is usually, although not exclusively, of

perforated ceramic tiles (Figs 5B, 6). There are some aspects which are common to all the kilns considered. These include the kiln furnace being at ground or semi-basement level. Also, the majority of kiln furnaces are constructed in whole or part of brick, even when the malthouse is built of stone.

For assistance in following the discussion below, a brief handlist is given here of locations, alphabetically by place-name. Full details, arranged by county, are provided in the catalogue at the end.

Alberbury (Shrops.), Alne (N. Yorks.), Alton (Staffs.), Brockhampton (Glos.), Burghley Park (Cambs.), Charlton Musgrove (Som.), Chetnole (Dorset), Chipping Campden (Glos.), Coryton (Devon), Deerhurst (Glos.), Diss (Norf.), Dursley (Glos.), Frampton-on-Severn (Glos.), Harvington Hall (Worcs.), Letheringsett (Norf.), Mansfield Woodhouse (Notts.), Mistley (Essex), Old Basing (Hants.), Snape (Suff.), Topsham (Devon).[4]

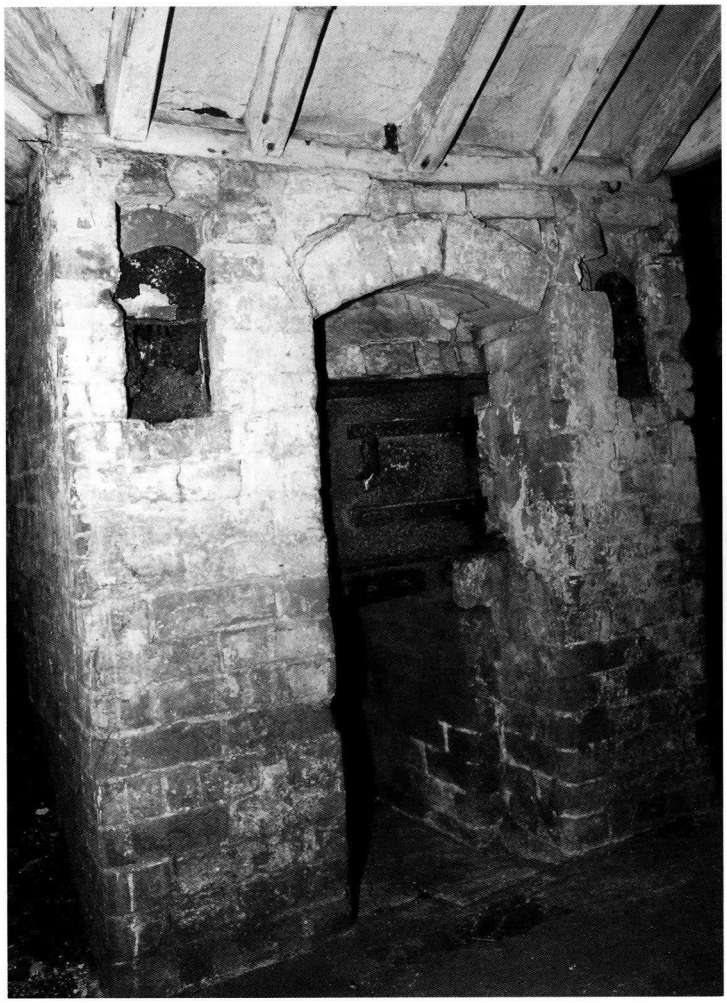


Fig. 4
Chetnole (Dorset), Hamlet House, the kiln furnace front showing the fire box (furnace mouth) with closed door and ventilation slips on either side.
Photograph, author 1986

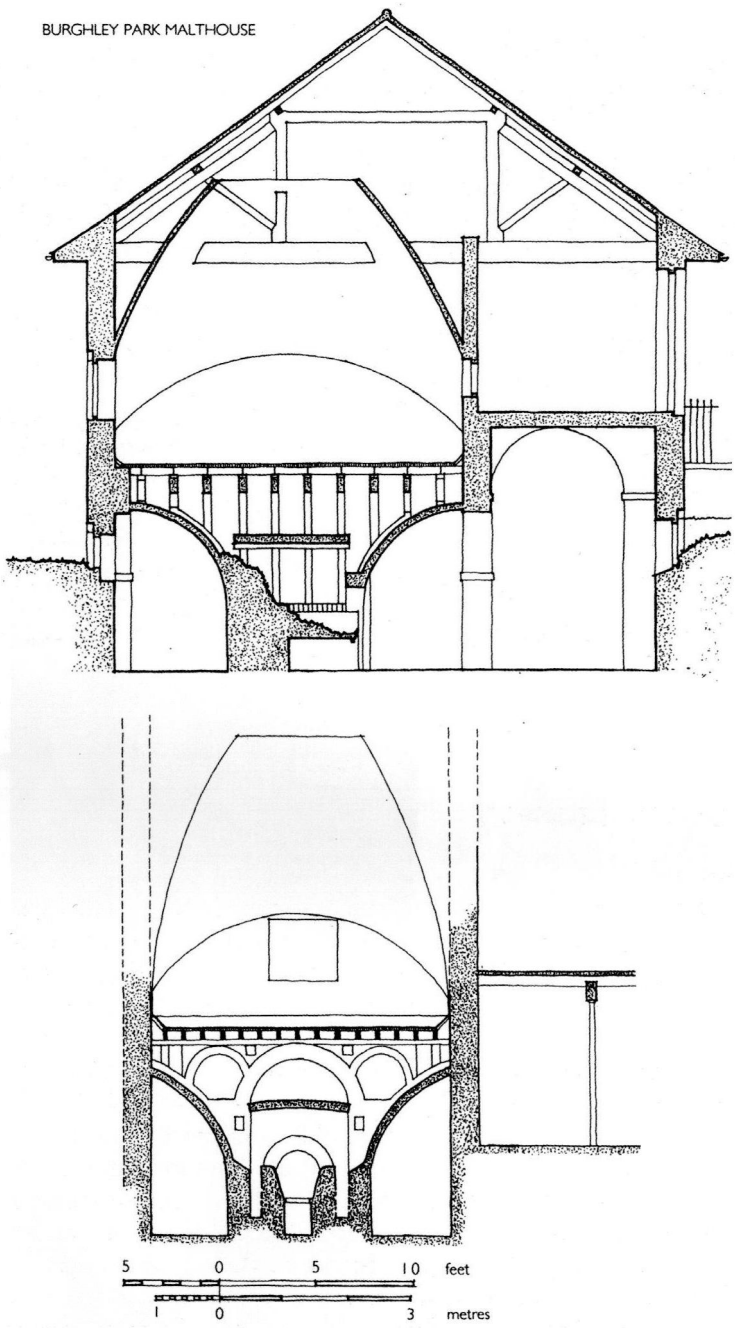


Fig. 5

Burghley Park (Cambs.). A. (top) Cross-section showing the spark plate or heat diffuser plate (centre of the kiln, towards the bottom, horizontal and stippled); also the kiln drying floor support structure and the arches to the outside wall. B. (bottom) Cross-section showing the brick piers and arches supporting the kiln drying floor; they form an integral part of the whole kiln furnace. The arches to the outside wall can also be seen.

Drawings, author and J. Severn 28/03/1996

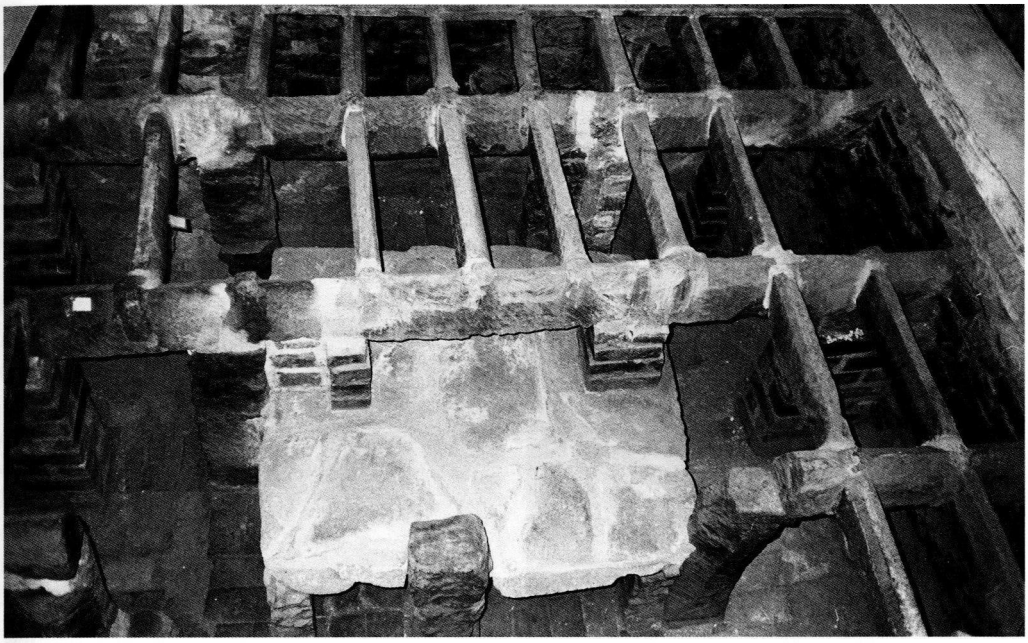


Fig. 6
Chipping Campden (Glos.), The Malthouse, High Street, the kiln tile support structure with the stone spark plate in centre foreground.
Photograph, author 1998

ANALYSIS AND DISCUSSION

Building Materials

The first aspect to consider is the fabric of the malthouse and the fabric of the kiln, and the relationship between the two. Of the twenty-three malthouses considered slightly more are constructed of stone (nine) than of brick (eight). The remaining six are a mixture of building materials.[5] However, when it comes to kiln furnaces, the majority are constructed completely of brick (eighteen). The remaining five are built of stone and brick. All have brick arches or are plastered from the kiln furnace to the outside walls, except Chipping Campden (Glos.),[6] where not only is the furnace base of stone (with the exception of the top of the furnace mouth which has two rows of header bricks) but the 'arches' as such do not exist. Instead there are large stones cantilevered out to form the hot air chamber under the drying floor. A kiln not considered in this survey but which was also entirely stone built was 70 High Street, Marshfield (S. Glos.).[7] Of the others included in the survey with part stone and part brick kiln furnaces, the use of stone is often minimal. At Dursley (Glos.) there is just a stone slab over the kiln mouth; at Letheringsett (Norf.) there is flint amongst the brick of the furnace structure; at Coryton (Devon) and Alton (Staffs.) the furnace sides are of stone, although at Coryton the furnace corners are also of brick (Fig. 7). There is also one other known malt kiln – at the Lamb and Fountain Inn, Frome (Som.) – which used both brick and stone in its construction, but as yet it has not been fully investigated.

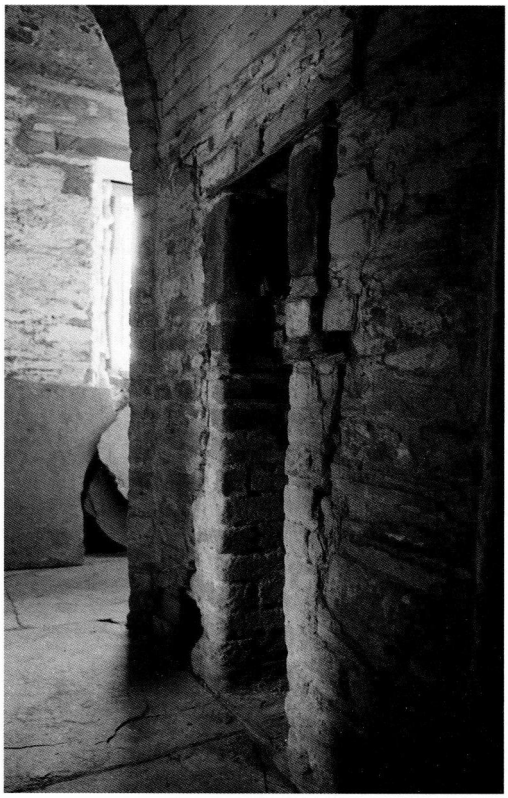


Fig. 7
Coryton (Devon), the kiln furnace with high fire bars set in a brick-lined furnace mouth, and showing the brick corners of the furnace on the left hand side of the furnace shaft.
Photograph, author 1992

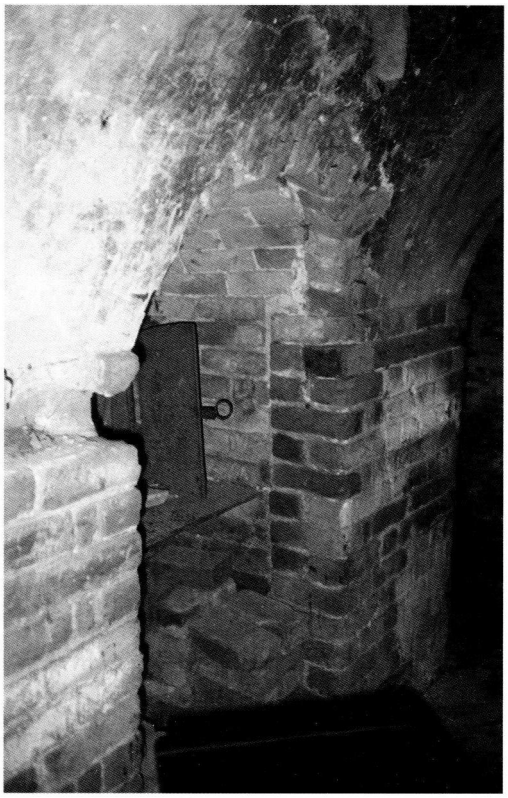


Fig. 8
Alberbury (Shrops.), Red Abbey Farm, the kiln furnace; note the plastered and limewashed upper part of the kiln structure.
Photograph, author 2007

It is also worth noting that in many instances considerable care has been taken in not just the construction of the kiln but also its decoration. In the case of Deerhurst (Glos.), the decoration consisted of false mortar joints painted onto the upper part of the kiln as well as a band of decorative brickwork. At Topsham (Devon.) the mortar joints on the upper part of the kiln are particularly fine, and at Alberbury (Shrops.) the upper part of the kiln was plastered and lime-washed (Fig. 8).

The building material of the malthouse as opposed to the kiln depends more on the geology of the area and local tradition. Thus, in areas such as the Cotswolds a malthouse was more likely to be built of stone, whereas in the Severn Vale brick would be more likely. However, irrespective of the fabric of the malthouse, the kiln furnace was usually constructed completely of brick or, at the very least, the arches to the outside walls of the kiln room.

Location of the Kiln in relation to the rest of the Malthouse

In the majority of cases (fifteen) the kiln furnace is located at one end of the malthouse, either within the same part of the building or in a separate room. In eleven cases the kiln furnace was in a separate room. The four exceptions are Chipping Campden, Deerhurst, Dursley and Old Basing. Although the first three of these are in Gloucestershire (two of them in the Cotswolds), it should not necessarily be assumed that this design was a Gloucestershire type, rather that it is the result of a better survival and study rate of early Gloucestershire malthouses and kilns. In seven cases the kiln furnace was in a room at right angles to the main part of the malthouse, which sometimes resulted in the building being L-shaped (Fig. 9). Alternatively the kiln room was part way down the malthouses for example at Chetnole (Dorset) and Alberbury. Only at Topsham was it not possible to determine the relationship between the kiln and the rest of the malthouse.

Inevitably the layout of the maltings was also a factor in determining the location of the kiln. Sometimes there might not have been sufficient room to have the kiln at one end of the malthouse so it was located on the side, or insufficient space was available to build a kiln room at right angles to the maltings. This was particularly so in the case of maltings constructed on burgage plots, as at Chipping Campden and Dursley. Two further examples of burgage plot malthouses, not in this study, are at 70 and 78 High Street, Marshfield (S. Glos.).

Whether the kiln furnace was in a separate room or at the end of the main part of the malting, it was in all but four cases a freestanding furnace base. In three cases lack of access meant that it was impossible to determine whether the structures were freestanding or not: malthouses Nos 4 and 5 at Diss, and at Alton. Chipping Campden is again unusual, where just a small section of the furnace is attached to the outside wall.

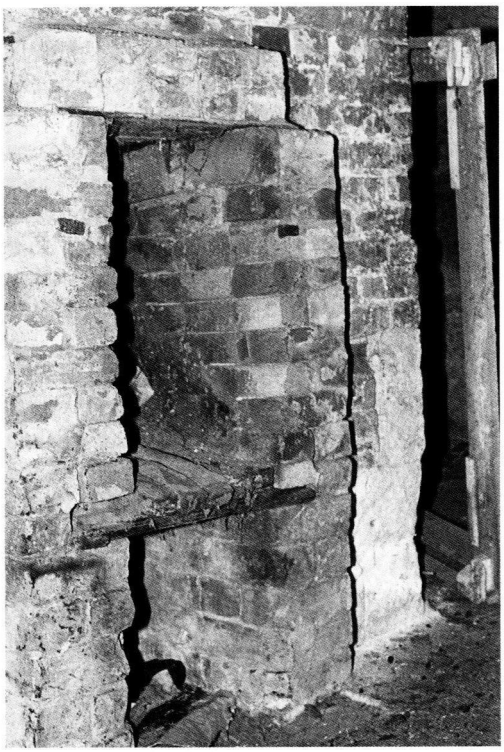
Fire Bars, Furnace Fronts, and Doors

No two kiln furnaces are the same except where they are on the same site or under the same ownership, as at Diss and to a certain extent at Snape (both in Suffolk). However, some similarities are shared between kilns at different locations.

In all early malt kilns the fuel was placed on the fire bars, but how these were situated often varied between kilns. The height at which the fire bars were positioned may reflect local draught conditions. In the majority of cases (thirteen) the fire bars were positioned about halfway up the furnace shaft, irrespective of the height of the shaft (Fig. 10).[8] Harvington Hall and Alne (N. Yorks.) are excluded from this analysis because they have a somewhat different arrangement (see below). There is a slight correlation between the location of the kiln furnace room and the height at which the fire bars are positioned. Three of the four kilns with fire bars higher than the midway point are all located in kiln rooms at the side of the main part of the malting, and this may relate to the ability to provide adequate draw. An equally important factor may be the prevailing wind direction and it has not been possible to investigate this aspect.

Another feature to be noted is the position of the fire bars in relation to the front of the furnace. It was common for either the fire bars to be recessed or the kiln mouth to project out slightly, which was the case in nine of the kilns.[9] In four examples the fire bars are in line with the brickwork of the kiln furnace front. In five cases the fire

Fig. 9
Frampton-on-Severn (Glos.), Tan House Farm, exterior of the malthouse and kiln. The malthouse is the building with the doors and the kiln is to the right of it (centre).
Photograph, author 2000



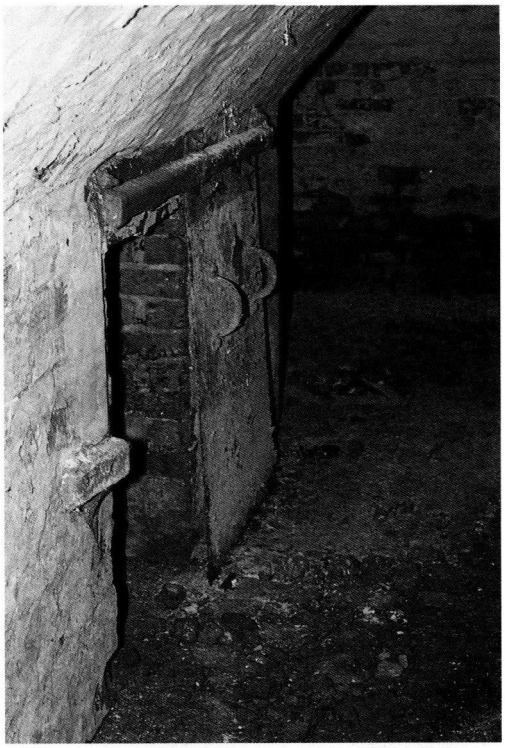


Fig. 10 (top left)
Brockhampton (Glos.), The Old Brewery, the kiln furnace mouth with fire bars in a position slightly below midway.
Photograph, author 1995

Fig. 11 (top right)
Alne (N. Yorks.), sliding door to the kiln furnace.
Photograph, author 1995

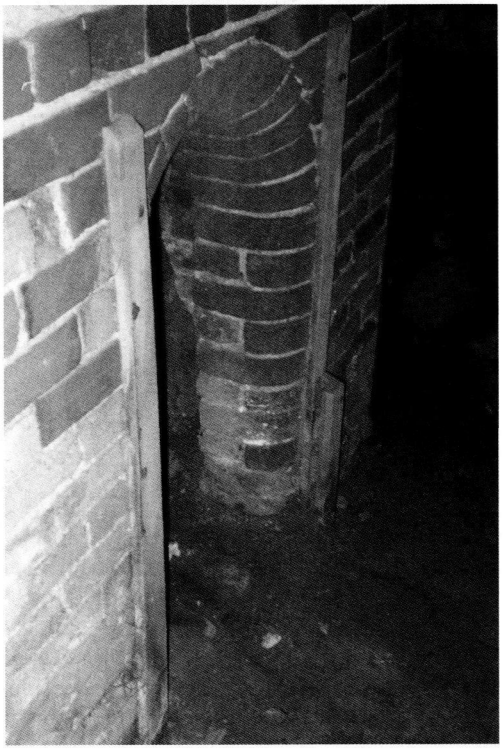


Fig. 12 (right)
Harvington Hall (Worcs.), exterior of the kiln furnace, showing the furnace mouth.
Photograph, author 2008

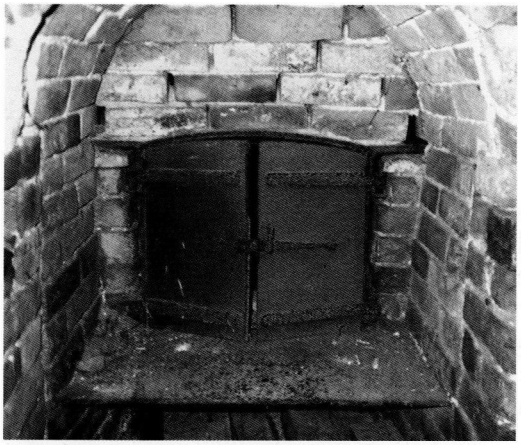


Fig. 13
Alberbury (Shrops.), Red Abbey Farm, detail of the furnace mouth with the iron shelf in front of the fire bars; the doors to the furnace are shut.
Photograph, author 2007

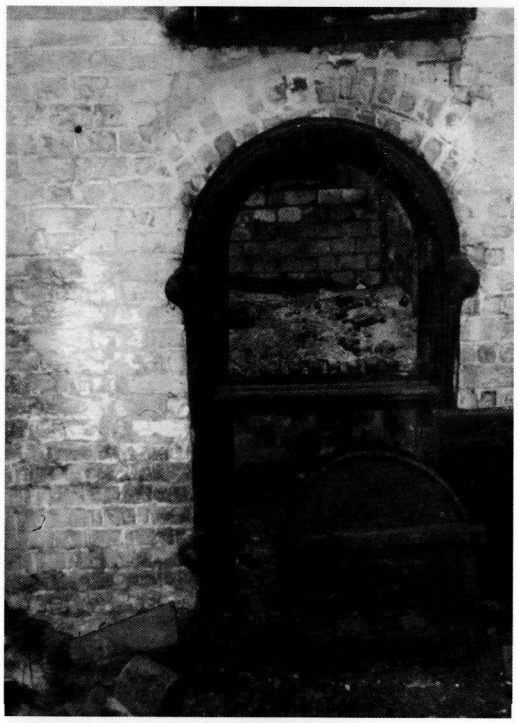


Fig. 14
Mistley (Essex), Malthouse No. 4 (spare kiln), Brooks Site, the kiln furnace upper door removed and on the floor; bottom door open. The last firing on the fire bars.
Photograph, author 1996

bars were no longer extant or it was impossible to see whether they survived (e.g. Alton). Again, this recessing of the fire bars may have been to enable a certain amount of draw to be achieved when the fire was being lit. At two further examples – Harvington Hall and Alne – the arrangement was unusual, in that the fire bars were set in what can best be described as an internal furnace. In the case of Alne there was a sliding door to the outer part of the furnace (Fig. 11), whilst at Harvington there were no doors (Fig. 12). In this internal furnace the fire bars rest on brick piers at either side of the fire so that the ashes fall between them; in theory the fuel could also rest on the piers (Fig. 27). The Harvington Hall kiln is later 18th or early 19th century whereas that at Alne is later 19th century,[10] and they are geographically far apart (Worcestershire and North Yorkshire respectively). Therefore it seems unlikely that there was a transfer of ideas. The same is probably true in two cases where iron shelves were placed in front of the furnace fire bars – at Alberbury and Letheringsett (Figs 13, 26). Again they are geographically far apart (Shropshire and Norfolk), though they may be close in date (early 19th century and '1821' respectively).

In twelve cases the kilns appear never to have had doors. Only two malthouses, Deerhurst and Mistley (Fig. 14), originally had both upper and lower ones, although in both cases one set was missing. In another two cases, at Chipping Campden (Fig. 15) and at Snape (malthouse No. 3), there were doors to the bottom part of the furnace only, whereas top doors survived only at Chetnole and Alberbury (Figs 4, 13). However, there is evidence that originally there had been upper doors

to the kilns at Frampton-on-Severn (Glos.), possibly at Coryton and at all the malthouses at Diss. Although Alne had a door, it covered the whole of the front furnace mouth. The majority of the doors were hinged, with the exception of the sliding doors at Alne. Instead of a hinged door, a sliding plate was sometimes used to shut off the furnace mouth: it was secured by a hook above the furnace mouth and a chain was used to move it up and down. Hooks survived at malthouses Nos 3 and 5 at Diss (Fig. 16). The use of a metal plate or sheet in front of the furnace instead of doors may have been a more common method of drawing the fire than is now evident. This is partly supported by oral history at Brockhampton, where the owner had observed the procedure as a youngster of lighting the furnace with an iron plate held against the upper part of the furnace until the fire had taken – 'just like holding the *Daily Telegraph* in front of a domestic coal fire'! This use of a detached metal plate in front of the furnace may explain why some kilns had no doors.

The structure above the furnace mouth usually consists of arches rising up from the shaft to the walls of the furnace room. Therefore there are usually four arches, as is the case at Burghley Park (Fig. 5A-B). In some cases, there are only three, as at Diss, No. 3, where the front of the furnace is vertical (Fig. 22).[11] This vertical furnace face was also found at Diss No. 5, and No. 2 (not part of this survey). No other such kiln designs are known to the author, suggesting that on an individual site malthouse design may follow

Fig. 15
Chipping Campden (Glos.), The Malthouse, High Street, the kiln furnace with the bottom door in a nearly closed position; note stone is used for the furnace base.
Photograph, author 1990

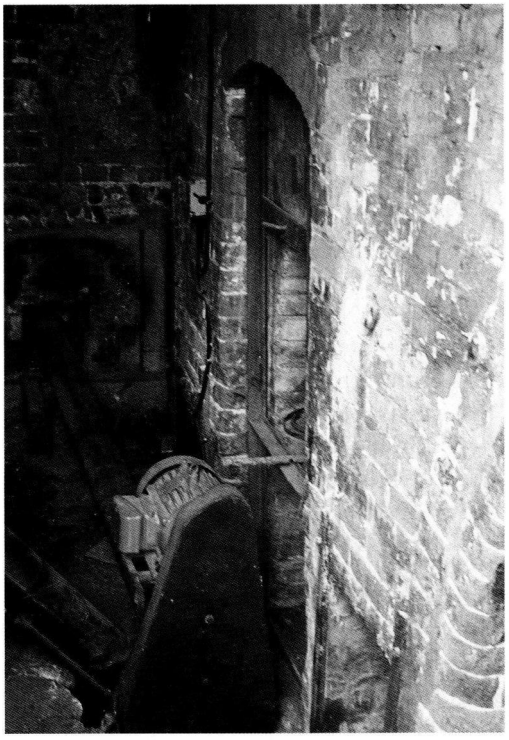


Fig. 16
Diss (Norf.), Cuthbert's Malthouse No. 5, north side of Victoria Road, interior showing the furnace mouth and hook for the plate to be hung in front of the fire bars.
Photograph, author 1994

the same pattern, though it should be noted that Diss malthouse No. 4 does have arches rising up from the furnace front. This may be because this was a later maltings or it may be that the other design was less effective.

Spark Plates and Drying Floors

The internal construction of the spark plate and the supports for the drying floor is important for helping to date malt kilns. There are two types of construction: the integral spark plate and kiln tile support structure, or the kiln tiles supported on a separate structure. The former is usually earlier than the latter. The first type is represented by Burghley Park (Fig. 5B), Chipping Campden (Fig. 6), Frampton-on-Severn, and to some extent Mansfield Woodhouse (Fig. 17), Alton, Harvington Hall and Alne. In the case of the last three the tiles were also supported on iron beams let into the wall of the kiln furnace room as well as brick pillars rising from the spark plate structure. It should be noted that other integral spark plate and kiln support structures, not forming part of this study, are to be found at Boyes Croft, Great Dunmow (Essex), Nos 70 and 78 High Street Marshfield (S. Glos.), 70 High Street Wickwar, (S. Glos.) and at Market Deeping (Lincs.). At Wickwar, the kiln tile drying floor is supported on a combination of brick piers and iron beams similar to Alne and Mansfield Woodhouse. Where the spark plate is of brick resting on piers, there may be an iron bar or plate supporting the edges, as at Mansfield Woodhouse and Alne. The second type is represented by Diss, malthouse No. 3, where the spark plate is supported on slender iron columns (Fig. 21), as well as Coryton and Charlton Musgrove. These three kilns are dated to the second half of the 19th century.

Fig. 17
Mansfield Woodhouse (Notts.), interior of the furnace showing the brick spark plate with brick piers and iron bar support on the left hand side.
Photograph, author 2006

Dating of Kiln Furnaces

Many of the kilns in this survey have been dated by English Heritage and their conclusions have been accepted here unless there is substantial contradictory evidence. However, even a date-stone on a maltings does not mean that all its features are of that date. If the kiln was in use over a long period of time repairs might need to be carried out and sometimes even substantial rebuilding. In some cases the physical features of the kiln can indicate its likely period when there is little documentation available.

The use of iron beams is one such criterion. The 1738 edition of *The London and Country Brewer*, one of the few works to give details of 18th-century kiln construction, refers to the use of 'flat iron bars, supported by common square upright iron ones'.[12] Therefore it might be expected that an iron bar kiln tile support structure is a later means of tile support than an integrated one. However, at Chetnole and Deerhurst, both with date stones of 1816, the tiles were supported on iron bars, whereas the later dated Burghley Park is an all-brick integrated construction. Iron beams were used for the support of the kiln tiles at Brockhampton where, although the malthouse is 18th century, the present kiln floor is probably later and the tiles certainly so. The use of wrought iron at Alton, probably an 18th-century kiln, is the only example which might be said to conform with the description in *The London and Country Brewer.* Also, the relatively simple kiln furnace at Charlton Musgrove (Fig. 18) belongs to the 1870s at the earliest and so was actually constructed at a time when more sophisticated furnaces, including patent furnaces, were being introduced. Clearly kilns using iron beams and columns were constructed from the 18th century onwards, but it is impossible to date a kiln securely by their use (or absence). It is more likely that availability of materials and local tradition influenced how a kiln was constructed.

Fig. 18
Charlton Musgrove (Som.), the kiln furnace mouth (with chimney brush) and ventilation slips on either side of the furnace; part of the bread oven on the extreme right hand side.
Photograph, author 2010

Survival of Kiln Furnaces

Whether or not a kiln has survived is dependent on a number of factors. One is the changes in the malting industry. With the improved transport systems of the 19th century some counties became more important producers of malt, notably the counties in East Anglia and the east Midlands, but not Gloucestershire and Somerset which by the later 19th century were not really maltings counties.[13] Also the repeal of the malt tax in 1880 made larger maltings economic. As a result older kilns may have survived either because they went out of production and just remained unused, or they may have remained in use just to serve the local community and not the expanding market. Being smaller and in more domestic situations, there was less pressure to re-use the site and demolish or change them. In consequence they have survived. It will be noted that many are either part of domestic accommodation or are associated with it or a farm.

CONCLUSIONS

What is clear from the above is that there is no national pattern to the design of malt kilns. Closely similar designs exist only where the kilns are on the same site or in the same ownership. However, there is one aspect which is fairly standard and that is the construction of the kiln arches, which, with few exceptions, are of brick, irrespective of the fabric of the malthouse or the bottom section of the furnace. Moreover, there appears to be some similarity between kilns in the same geographical area. For example, integral furnaces, spark plates and drying floor supports seem to be more common in the old county of Gloucestershire and probably in Somerset too. Another group in Cambridgeshire (Burghley Park) and Lincolnshire (Market Deeping) is interesting because the kilns have similar broad conical kiln roof structures (a feature not considered as part of this paper); this type of roof structure has also been found at a second Market Deeping malting and in Oundle (Northants.). These apparent geographical spreads may be the result of better survival and more recording but probably also reflect traditions in particular areas.

It has also been noted that in other cases there are some similarities between just two kilns, sometimes geographically far apart or from different periods. For example, at Harvington Hall (Worcs.) and Alne (N. Yorks.), where the fire bars are not attached to the furnace front. Also, at Letheringsett (Norf.) and Alberbury (Shrops.), where iron shelves occur in front of the furnace fire bars. And again, at Alne and Mansfield Woodhouse (Notts.), where the kiln tile drying floor is supported on a combination of brick piers and iron beams. For the present, one has to accept this apparently rather random pattern of development, unless further information appears to make more sense of it.

Determining whether there is any chronological development of the kilns in this survey is not easy. One might expect that completely integrated kilns would be earlier than those where iron bars have been used to support the kiln drying floor. However, the integral kiln at Burghley Park is dated to the early 19th century, whereas Chipping Campden is certainly 18th century, and the kilns at Frampton-on-Severn, Marshfield and Dursley have all been dated to the 18th century as well. Moreover, the use of wrought iron beams has been noted in early 19th-century kilns at Chetnole (Dorset) and Deerhurst (Glos.), almost a century after it was described in *The London and Country Brewer* (1738 edition). It might be argued that the descriptions in this work applied to kilns nearer London and that it took time for the design described therein to reach rural areas, but there is no proof of this. Rather, local materials and traditions were probably more important factors than whether a kiln conformed to a specific type. Furthermore, a simple kiln would have been cheaper than a patent one and so the economics of malt production may have had some bearing on the type of kiln constructed at a malting.

Although this survey has considered kilns in fourteen counties, it is only in Gloucestershire, and to a lesser extent Norfolk and Suffolk, where more than one or two kilns have been studied. In Norfolk and Suffolk the kilns were in the same ownership, with one exception. The better survival rate in Gloucestershire, and to a certain extent in Somerset, may reflect the fact that during the 19th century these counties became backwaters for producing malt, in contrast to East Anglia.[14] As a result older kilns seem to have survived better and there have been more available for study. Thus, the only

area to show significant similarities between kilns is Gloucestershire or, perhaps more broadly, the Cotswold spine. It has been shown that similarities exist between other kilns geographically and chronologically distant, but only further research, with the discovery of more examples, will show such similarities are meaningful.

ACKNOWLEDGEMENTS

I am grateful to Matthew Saunders for referring maltings cases as part of the planning process which enabled me to undertake the survey work necessary for this study, and for his continued encouragement of my malthouse work. My thanks also go to the owners, agents, and local authority staff for their assistance in allowing me access to so many sites and help in taking measurements. I have to thank Shane Gould for assistance at Mistley and the late John Severn for assistance with survey work at Burghley Park and Mistley.

CATALOGUE OF THE MALT KILNS (ARRANGED BY COUNTY)

CAMBRIDGESHIRE

Burghley Park[15]

Grade II, referred to AMS but recorded on personal referral and with RCHME (dates of site visits: 5 September 1995, 28 March 1996)

The malthouse and its kiln are built of coursed stone under a Collyweston stone roof which also conceals the conical kiln roof. The kiln room is rectangular in shape with stone outer walls but with brick piers in each corner. It is situated between the malthouse and the adjoining cottage.

The kiln furnace which is square in plan is constructed of brick and has fine brick barrel vaulting to the outer walls of the room (Fig. 5A). The kiln furnace mouth had no doors and there was no evidence that they ever existed. The upper part, above the fire bars, was in the shape of an inverted horseshoe (Fig. 19). There were two small ventilation holes on either side of the furnace mouth. There were six fire bars resting in a brick trough. Above the trough was a brick diffuser plate which was supported by brick piers on either side of the fire bar trough. More brick piers supported arches, and these together with the

Fig. 19
Burghley Park (Cambs.), the kiln furnace mouth showing its horseshoe shape.
Photograph, author 1995

diffuser plate supported the long bricks on which the perforated kiln tiles were placed. Thus the whole underside of the kiln drying floor was supported on this network of brick piers (Fig. 5B).

The drying floor was of perforated ceramic tiles with a sloping skirting board of halved perforated kiln tiles around the whole of the drying floor.

The English Heritage list description states that the malthouse is early 19th century. It has been converted.

DEVON

Coryton

Grade II, personal referral (date of visit, 27 June 1992)

The malthouse and its kiln form an L shaped building which is constructed of stone rubble with a slate roof. The kiln is in the short arm of the L and has a hipped roof but no cowl survives.

The kiln furnace is centrally located in the kiln room. The bottom part of the furnace which is square in plan is constructed of stone but the corners are of brick as is the upper part of the furnace structure of brick arches which rise up to the ceiling of the furnace room. The furnace mouth is narrow and is brick lined with an iron bar to the top (Fig. 7). The six cast iron fire bars are set back slightly from the front of the furnace mouth and are relatively high up. No doors survive to either upper or lower parts of the furnace mouth. There are ventilation slits on either side of the furnace mouth. There is an iron plate which was probably the spark plate.

The kiln drying floor is of perforated ceramic tiles which rest on an iron frame work which is supported by four slender cast iron columns. There was a plain tile skirting round the kiln drying floor.

The English Heritage list description states that the malthouse is late 19th century. The whole building has been converted to a residence.

Topsham, The Bridge Inn[16]

Grade II, as part of the Bridge Inn, personal referral (date of visit, 15 October 2001)

The malthouse is attached to the Bridge Inn at its north-eastern side. The Inn is partly brick built but the malthouse has a cement render exterior, as well as a stone section next to the Inn, also a slate hung section and some timber framing visible to the top floor of the malthouse. The roof is a modern one. The kiln is situated within the buildings in a room next to the Inn. The southern wall of the kiln room is stone but the other walls are of brick.

The kiln furnace is centrally located and is square in plan and is constructed of brick. The brick shaft rises up and forms arches to meet the walls of the kiln room. The shaft is lime washed and the upper part has particularly fine mortar joints. The lower courses are less well finished. The current furnace mouth faces north although there appears to be blocked furnace mouth in the east elevation. The furnace has six fire bars set back from the front of the mouth. There are no doors to either upper or lower parts of the furnace mouth and no evidence that there had ever been any. There is an iron plate to the top of the furnace front. There is a ventilation aperture in the south elevation of the furnace shaft.

The kiln drying floor was not available for inspection and it was not possible to determine whether there was a diffuser plate.

The English Heritage list description states the Bridge Inn is late 18th century with parts of an early 19th-century date. The malthouse and kiln are an integral part of the structure and therefore they can be dated to the late 18th century or early 19th century.

DORSET

Chetnole, Hamlet House

Grade II*, personal referral (dates of visits: 17 January 1986 and 24 May 1986)

The malthouse is attached to the farm house at its north eastern end. The house, malthouse and kiln are built of stone. The kiln is in a square extension on the northern side of the malthouse, at right angles to it and slightly offset from the end and therefore it is not attached to the house. Both the malthouse and the kiln are thatched. The kiln has an internal pyramidal roof structure.

The kiln furnace is centrally located in the kiln room and is constructed of brick up to the plaster board ceiling supported on timber joists instead of the more usual barrel vaulting. The iron fire box is situated in the top of the brick shaft and is slightly recessed. It has a door to the upper part and this closes off the fire bars. The top is arched and of header bricks. There is no door to the lower part of the furnace. There are two ventilation holes on either side of the fire box and therefore high up in the furnace shaft (Fig. 4). There is a diffuser plate of what appears to be stone.

The kiln drying floor is of perforated ceramic tiles resting on an ironwork grid. The tiles appear to be relatively modern ones. There is no skirting board to the kiln drying floor but the walls are plastered.

The malthouse has a date stone of 1816 on it although the farm house is of an earlier date: late 17th century or possibly earlier. A join line between the malthouse and the house indicates that the malthouse was built subsequently to the house. It has been suggested that parts of the malthouse may be earlier than 1816 but it is likely that the kiln is of that date and the kiln tiles are certainly of a late 19th-century date at the earliest.

ESSEX

Mistley, Brooks, No 4 Malthouse[17] **(spare kiln)**

Grade II, AMS referral (dates of visits: 11 July 1993, 12 and 13 February 1996, 27 January 1997)

The old or southern kiln is a brick built structure with a slate covered pyramidal roof structure surmounted by a louvred cowl. It is a southward extension to the malthouse. Access to this kiln furnace room was via an external door. There was no access from the malthouse itself.

The furnace was a centrally located square brick shaft furnace. The furnace aperture was in the western face. There were ventilation slips in the other elevations of the shaft. They were approximately 3ft 4in (1.02m) above the floor level. Immediately above the furnace was an H.J.H. King heat regulator (certainly a later addition). The main furnace was of cast iron and had the maker's name cast in the arched top. It was virtually illegible now but it may have been by Bendall (Lawford Ironworks). The door to the furnace did not survive, but the fire bars did. There were twelve of them in the trough. However, the square door to the bottom of the furnace survived (Fig. 14). The spark plate appeared to be of perforated cast iron tiles, and rested on four round pillars located just beyond the corners of the top of the shaft.

There was no access to the drying floor of this kiln, but it was probably of wedge wire resting on an iron frame work. The wedge wire floor was almost certainly a 20th-century installation. Perforated ceramic kiln tiles were found on site indicating that they had been used on the kiln drying floors at one time.

The malthouse has a date stone of 1828 on it.

GLOUCESTERSHIRE

Brockhampton, The Old Brewery[18]

Grade II, AMS referral (dates of visits: 25 March 1994, 30 January 1995.)

The malthouse has three floors and is constructed of limestone blocks. The bottom part of the walls and the corners of the building are of coursed and dressed stone blocks. The upper parts of the walls are constructed of coursed rubble. The roof is a mixture of modern concrete tiles and some stone tiles. The north and east elevations have hipped roofs, but the western elevation has two plain gables. The kiln is hidden under the hipped eastern facing roof. It is not externally visible. Originally it was probably the only link between the house and the malthouse, although now it is hidden behind a modern single storey garage and therefore is not visible from the west.

The furnace is a centrally located square brick built shaft in an otherwise stone built room. The furnace faces west, that is towards the garage. The furnace mouth projects slightly and there are five iron fire bars which rest on an iron bar at the front of the furnace (Figs 3, 10). There is a flat iron bar at the top of the mouth supporting the slightly projecting two brick course top. There are no doors to either the upper or lower chamber. The furnace shaft rises to arched vaulting where it meets the walls of the room.

Above the furnace is a relatively modern perforated tile drying floor supported on iron beams. A spark plate survived.

The malthouse has a date stone of 1769 but the kiln may be later. The malthouse was in operation until the outbreak of the Second World War in 1939. The kiln was used during the War to dry water-damaged peas and grain.

Chipping Campden, High Street[19]

Grade II, personal referral (dates of visits: 27 October 1995 and regularly from autumn 1997 to autumn 1998 as part of a watching brief on the repair and conversion of the malthouse.)

The malthouse is constructed of stone and had a plain tile roof. The kiln is located between the house and the malthouse, at its eastern end and it is an integral part of it.

The kiln furnace is a robust structure of stone with some brick. The furnace aperture faces south. There are seven fire bars and there is the iron door to the lower opening from which the ash was removed (Fig. 15). There is no evidence that there was ever a door to the upper part of the furnace. The top of the furnace mouth is in the shape of an arch formed of two rows of header bricks. The whole of the mouth is set back slightly from the front of the stone furnace structure. As the furnace structure is of stone it does not form the more usual barrel vaulted arches to the outside walls. Instead the massive stones of which it is constructed are cantilevered out so that the upper part of the structure forms a square of approximately 12ft (3.7m). This is the only kiln to conform to the description of a kiln in *The London and Country Brewer.*[20] The upper western elevation of the kiln is surprisingly stark.

The drying floor, which is of perforated tiles, is square. The inner sides of the structure slope to form a sort of skirting. The tiles rest on stone bearers. The bearers which are wedged shaped with a flat top for the edge of the tiles form a grid. They rest on squared stone columns, although some additional brick piers have been inserted. Many of the stones in the kiln were hand dressed. Some of the stone piers and joists are quite blackened. The piers rest on a brick bed which in turn rested on a bed of lime dust which in turn this rests on the stone structure. The brick shaft of the furnaces rise up into the brick bed and above it is a spark stone or baffle plate of large thin stones rather like roofing tiles. The spark plate was supported on brick piers and on top of it were short brick piers to support the stone work matrix (Fig. 6). There is a slight slope of the floor to the shaft.

The house in front of the malthouse is dated in part to the late 17th century but the malthouse

may be later and of an 18th-century date with subsequent alterations into the 19th century. It is converted.

Deerhurst, Wightfield Manor [21]

Personal referral (dates of visits: 20 April 1985 and 17 February 1992)

The malthouse is a building separated from the main house by the moat. It is constructed of brick with a tile roof. A barn is attached at the western end and the kiln was at the other, eastern, end of the malthouse.

The kiln furnace is a brick built shaft which rises to form graceful arches over the surrounding part of the bottom floor. The brick shaft is square in shape with what may be described as broadly chamfered corners. The sides rise up vertically until they reach a band of decorative brick work which consists of a string course and above that a dentil course and a further string course. Above this the shaft, initially gradually, and then more rapidly flares out to form the arches. The furnace shaft has been painted white to a height of about 2ft 2in (0.66m) above the decorative brick work. Above this there is what appears to be brickwork on the diagonal, however, a closer examination reveals that the bricks and the mortar joins are in fact painted onto the existing horizontal brickwork. The arches of the furnace were only one brick, approximately 4in (10 cm) thick.

The furnace aperture is in the south face. Originally there were upper and lower doors set in an iron frame. The lower door was missing and had been replaced by wooden boarding, however the upper door survived. It has two hinges on the eastern side and an iron latch for securely fastening the door on the western side. The door is a set of double doors kept together by a tie. The fire bars, of which there appear to be five, survived but were covered in the fuel of the last kilning. There was a ventilation aperture above the furnace door in the arched part of the furnace shaft.

The floor of the kiln is of perforated ceramic tiles, supported by iron bars. There is no evidence that there was a spark or heat diffusing plate between the fire and the kiln floor.

The malthouse has a date stone of 1816 on it. It has been converted to a residence.

Dursley, 19 Woodmancote[22]

Listed as part of house Grade II, personal referral (dates of visits: 11 June 1988 and 6 August 1988)

This malthouse was built of stone and was a continuation of the house also built of stone. The malthouse had lost it is original roof and the whole building had been lowered. As a result the top floor of the malthouse is directly under the new roof. The kiln was in the area next to the house.

The furnace was constructed of brick but had a stone slab on top of the projecting furnace mouth brickwork. The brickwork of the main part of the furnace was painted white. The furnace had five iron fire bars which were set back from the furnace mouth. There were no doors to the furnace and there was no evidence that there ever had been. There were ventilation holes on either side of the furnace mouth and a somewhat larger one on the rear elevation of the furnace.

The kiln drying floor was of perforated ceramic tiles which were laid on stone bearers which in turn were supported on stone piers. The upper part of the kiln was in a derelict condition.

The house is dated to the 18th century and the malthouse is a continuation of the house.

Frampton-on-Severn, Tan House Farm[23]

Grade II, AMS referral (dates of visits: 20 March 2000, 25 April 2000 and 1 April 2004)

The malthouse is a separate building from the farm house. The malthouse is built of brick and the kiln was added as an extension to the south west corner. The kiln has a hipped plain tile roof but no cowl survives (Fig. 9).

The furnace is built of brick and is centrally located in the room. The furnace shaft rises to arched vaults to the exterior walls. The furnace has a small mouth with a segmental arched

top of six header bricks. No fire bars survived, although the iron surround of the furnace did and there were no surviving doors but the hinges remained to indicate that there had been an upper door. There is a blocked ventilation hatch above the kiln furnace mouth. There are two ventilation hatches at floor level in the south east elevation.

The spark plate or diffuser plate of flag stone survives and is supported on brick piers rising up from the floor of the hot air chamber. The perforated tile drying floor is supported on brick joists which in turn rest on brick arches which are part of the kiln furnace super structure. There was evidence that the kiln had been re-modelled. All round the edge of the kiln drying floor the perforated tiles form a sloping skirting board.

The malthouse is probably early 18th century (documentary sources) and it was almost certainly in existence by the late 18th century but the kiln in its final form may be early 19th century. It has been converted to holiday accommodation.

HAMPSHIRE

Old Basing

AMS referral (date of visit, 19 February 2009)

The malt kiln is now within the house which is part brick built with some timber framing.

At ground floor level the kiln is partitioned off from the house by various walls but is open to the south west, the upper arch of the kiln furnace on this side being supported only by a main beam as there is no dividing wall between it and the open area. The furnace is brick built and rectangular in shape with a narrow fire bar furnace, which has no door (Fig. 20). The furnace is at the north eastern end and therefore it faces towards the house. There is one squarish ventilation aperture just above the original floor level on the south eastern elevation.

The kiln drying floor is of perforated metal sheets resting on an iron framework at least in part supported by vertical bars running up from the inside of the brickwork of the furnace. No spark plate was evident.

The English Heritage list description refers to the house being late 17th century, but the malthouse which is an integral part may be later, 18th century.

Fig. 20
Old Basing (Hants.), the kiln furnace front with a narrow aperture; note only four fire bars.
Photograph, author 2009

NORFOLK

Diss: Cuthbert's Malthouse No. 3, South Side of Victoria Road[24]

Not listed in its own right, a curtilage building to Malthouse No. 1 which is the listed building. Personal referral (dates of visits: 26 July 1993; 27 June 1994; 19 September 1994; 2 May 2006 and 7 June 2006)

Malthouse No. 3 was located at the western end of the site and aligned north to south. It was built of brick with a pantile roof. The kiln was located at the southern end of the building in a room separated from the main part of the malthouse. The kiln roof is completely hidden under hipped roof. No cowl survived. There was access to the kiln from both the malthouse and the outside.

The furnace is brick built and has a fire bar furnace (Fig. 21). The back and sides of the brick furnace rise up in arches to the outer walls. Immediately below the side arches and apparently supporting them as they are flush with the brick work of the arches are wooden boards supported on short wooden bracing beams extending from the outside walls The front of the furnace rises up straight through the first floor to the inner roof (Fig. 22).

The furnace consists of nine fire bars in a furnace trough of fire bricks and the maker's name is on one, '? & J Pearson Limited, Stourbridge'. The fire bar front is recessed and has an iron L-section framework around it. There is evidence of a door in the form of hinges on the north side of the furnace. There is also a sort of hook in the centre of the bar over the furnace mouth which may have allowed a damper plate to be hung from it. The L-shaped frame post dates the hinges which could not have been used once the frame was in place. The furnace has an arch of brickwork over the fire bars, and behind that it extends into an uncovered brick trough which is robustly constructed. The whole is then under a large spark or baffle plate constructed of corrugated iron and cement with iron bars or beams reinforcing the structure. This plate is supported on four slender cast iron columns which in turn rest on small brick pillars, the western pair of which abut the furnace structure. Additional support is obtained from hangers from the iron framework for the perforated tiles.

The drying floor was floored with perforated ceramic kiln tiles laid on a grid of iron bars. There was a black painted skirting round the drying floor.

The malthouse is mid-19th century. It has been converted to housing.

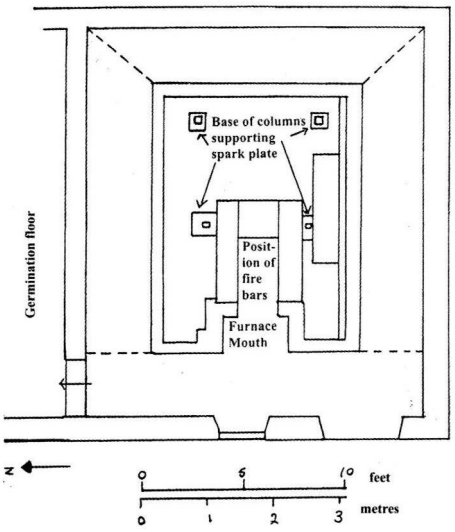


Fig. 21
Diss (Norf.), Cuthbert's Malthouse No. 3, south side of Victoria Road, ground plan of the kiln furnace. This shows the position of the furnace mouth, the fire bars and the base of columns used to support the spark plate.
Drawing, author 02/05/2006

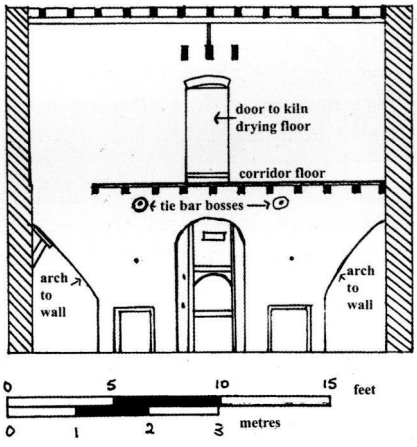


Fig. 22
Diss (Norf.), Cuthbert's Malthouse No. 3, south side of Victoria Road, western elevation of the kiln furnace showing arches on either side of the furnace mouth but the front rising straight up; also the position of the corridor floor in front of the vertical furnace front and the door from the corridor onto the kiln drying floor.
Drawing, author 02/05/2006

Diss: Cuthbert's Malthouse No. 4, North Side of Victoria Road[25]

Not listed, personal referral (dates of visits: 27 June 1994; 19 September 1994 and 7 February 2006)

Malthouse No. 4 is constructed partly of brick and partly of clay lump. This malthouse has a joint wall with Malthouse No. 5 (see below). The roof is of pantiles. The kiln is at the southern end and is an extension. The kiln is part clay lump but has an outer skin of fletton bricks, clearly more modern than the interior (Fig. 23). It has a plain gable and had a corrugated iron roof with a square hat cowl on four legs. There was access to the kiln furnace from both the malthouse and the outside.

The kiln furnace was constructed of brick and faced east. Brick arches rose to the outside wall to the front (east) and sides (north and south) (the back was not available for inspection).

Fig. 23

Diss (Norf.), Cuthbert's Malthouse No. 4, north side of Victoria Road, exterior of the malt kiln with square hat cowl. Note the change in building material, probably at kiln drying floor level, from clay lump to brick.

Photograph, author 1994

The fire bars and doors had been removed. On either side of the furnace were ventilation slips. On the north side it was a horizontally sliding door on an iron runner and of the same height as the furnace mouth. On the south side it was the more usual type of ventilation slip with a vertical sliding panel and hook above. Above the furnace mouth was another aperture with an iron plate to control the ventilation (Fig. 24).

There was a spark stone or diffuser plate constructed of corrugated iron and cement with iron bars or beams reinforcing the structure. This plate was supported on four slender cast iron columns.

The kiln drying floor was of perforated ceramic tiles supported on iron bar joists and cast iron columns.

The malthouse is mid-19th century. It has been converted to housing.

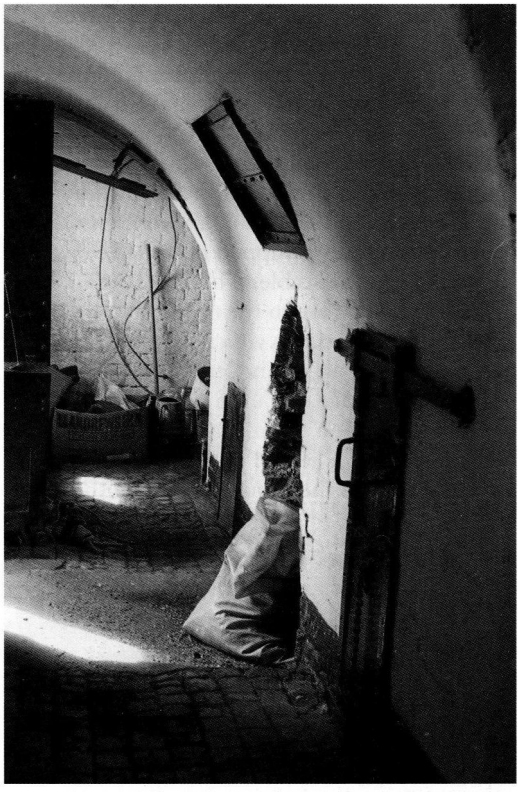


Fig. 24
Diss (Norf.), Cuthbert's Malthouse No. 4, north side of Victoria Road, interior of the malt kiln showing the furnace front removed. Note the two different ventilation slips.
Photograph, author 1994

Diss: Cuthbert's Malthouse No. 5, North Side of Victoria Road[26]

Not listed, personal referral (dates of visits: 27 June 1994; 19 September 1994 and 7 February 2006)

Malthouse No. 5 is a brick building with a pantile roof. It has a joint western wall with Malthouse No. 4. The kiln is at the southern end of the building and is a slightly higher extension. It is built of brick with a slate gabled roof. No cowl survived but it was probably a ridge vent one. There is a brick built lean-to attached to the south end of the kiln and a door in it gave access to the kiln furnace. There was no access to the malthouse from the kiln furnace room.

The sides of the brick furnace had arches to the outer walls. The front of the furnace rose straight up and would have been open to the elements were it not for the lean-to (Fig. 25). The fire bar front was recessed and had an iron L-section framework around it. There was evidence of a door in the form of hinges on the west side of the furnace. There was also a sort of hook in the centre of the bar over the furnace mouth which may have allowed a damper plate to be hung from it (Fig. 16). The furnace had an arch of brickwork over the fire bars. On either side of the furnace front were ventilation apertures. Each had a rectangular iron framework surround into which a metal sheet slip fitted. One ventilation slip survived with its hook on it. There was evidence of a hook in the wall above it. The kiln furnace was virtually identical to that in Malthouse No. 3.

The kiln drying floor was of perforated ceramic tiles supported on iron bar joists.

The malthouse is mid-19th century. It has been converted to housing.

Letheringsett, Letheringsett Brewery

Grade II, AMS referral (dates of visits: 5 August 1996 and 13 May 1997)

The malthouse and kiln formed part of the Letheringsett Brewery. The malt kiln is at the northern end of the malthouse and it fronts onto the road. The kiln is constructed of knapped flint panels of which there are three between gault brick piers on its road elevation, and two panels between the piers on the east and west elevations. There is a deep band of gault bricks under the eaves and in this band on the east and west elevations are clocks at the road ends (Fig. 1). In the north road elevation above the middle flint panel is a set of bells. The roof is of double roman pantiles. It is hipped and so the lower parts of the pyramidal structures are hidden, but the upper part is visible. There are swivel cowls surmounting the kiln roofs. The kilns present an attractive feature to the road.

The kiln furnaces which face south are brick built with a little flint infill. They form a long block of two furnaces and have brick arches with brick ribs to the outside walls (Fig. 26). At the rear of the furnace elevation these brick ribs which descend to floor level and have panels of flint and brick between them. Each furnace which is constructed of brick has its own fire bar grate of six fire bars. The fire bars are set back from the furnace mouth with an iron plate forming the front part to the mouth. The mouth has an arched top of two rows of header bricks which

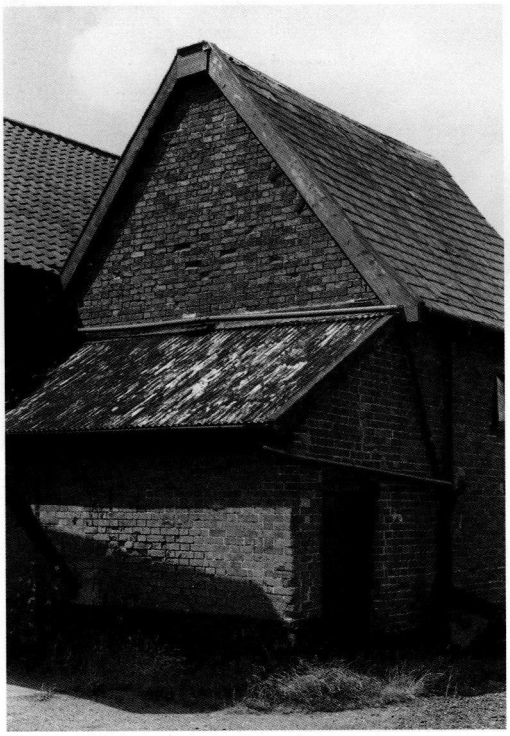


Fig. 25
Diss, Cuthbert's Malthouse No 5, north side of Victoria Road, exterior of the malt kiln. Access to the furnace is through the door in the lean-to. The wall of the furnace face is the wall behind the lean-to.
Photograph, author 1994

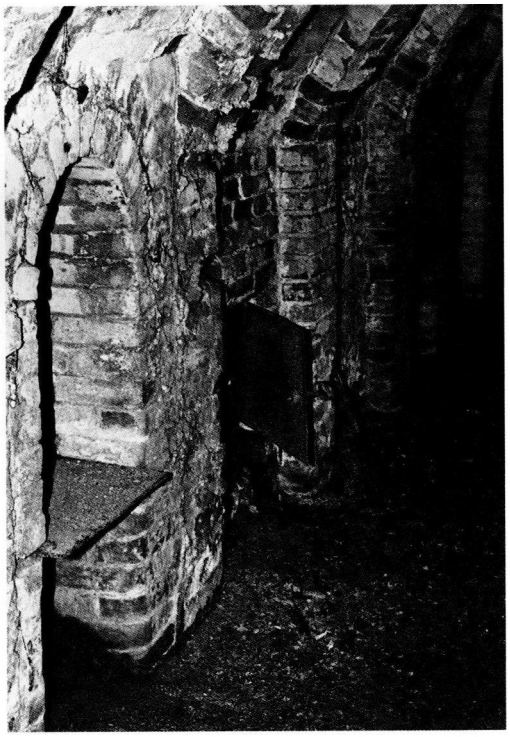


Fig. 26
Letheringsett (Norf.), interior showing the kiln furnace block. Note the shelf in front of the fire bars of the left hand furnace; also the brick ribs.
Photograph, author 1997

run round the whole of the mouth. In between the two furnaces is what may have been an oven or more probably a ventilation hatch with an iron door to it. It is also possible that there was an element of rebuilding of the kiln furnace possibly when the drying floor was changed.

The spark or diffuser plates are of perforated ceramic tiles, probably a re-use when the original kiln drying floor was replaced with one of wedge wire. There is a quarry tile skirting board around the wedge wire drying floor.

It is dated to the early 19th century and was in existence by 1821, but the wedge wire floor is probably of late 19th century and parts of the kiln may have been remodelled then.

NOTTINGHAMSHIRE

Mansfield Woodhouse[27]

Grade II, AMS referral (date of visit, 28 January 2006.)

The malthouse is constructed of stone and the roof is of pantiles. The malt kiln is in a stone built room at the eastern end of the malthouse and therefore under the main roof. There is no cowl.

The furnace is a brick built shaft furnace and joins the outside stone walls by brick arches. The furnace mouth which has been partly blocked by brickwork at the bottom faces south. There is no evidence of any doors to the furnace (Fig. 17). The top of the mouth is arched with a single row of header bricks. Also, although there are two holes in the brickwork, neither appear to be original ventilation apertures. Due to the blocking it was not possible to determine whether any fire bars survived. Above the furnace is an intact brick spark stone or baffle plate. It is curved over the fire bar trough and to the back. It is well constructed of bricks with the outer edge of each side resting on a iron bar. The back also rests on an iron bar and like the sides it rests on brick piers. On the right hand side the middle pier nearest the mouth is missing and appears never to have existed. The two at the back however, do match those on the left hand side. These brick piers are supported by the inner curves of the arch and appear to abut the arches as opposed to be constructed as part of them. On the left hand side there are four piers in total, including one at either end. The whole spark plate has a corbelled effect (Fig. 17). The whole structure is robust and surprisingly attractive.

The perforated tile drying floor was supported on fish bellied iron joists which in turn were supported on another fish bellied joist running at right angles and supported on brick piers There were perforated tiles laid so as to form a sloping skirting round the edge of the outer wall of the kiln

The English Heritage list description refers to the house as being mid-17th century with later alterations. The maltings is probably later, being late 18th century or early 19th century. It has been converted to a residence.

SHROPSHIRE

Alberbury, Red Abbey Farm

Grade II, AMS referral, also referral from Shrewsbury and Atcham Borough Council (date of visit, 26 November 2007)

The malthouse is constructed of breccia stone with a plain tile roof. The kiln room is a rectangular extension on the south western side. The kiln room has a simple gable instead of a pyramidal roof structure. No cowl survives. There is no access to the kiln furnace room from the malthouse. It is reached by a door in its northern elevation. There is a wedge shaped slate roofed porch which has its apex at the junction of the malthouse and the kiln.

Centrally located in the furnace room is the brick built furnace shaft. It is well-constructed

with the upper part having a whitewashed plaster finish (Fig. 8). From the top of the vertical part of the shaft rise brick built arches to the outside walls. There are holes where bricks have been removed but it is not clear whether these holes are the result of damage or whether they were proper ventilation holes. The furnace mouth faces the northern wall. The furnace consists of eight fire bars in a brick built trough. There are no doors under the fire bars but there are iron doors to the furnace mouth, that is in front of the fire bars. There is also what can only be described as an iron shelf in front of the fire bars (Fig. 13). The furnace mouth cuts through the arch and therefore there is a need for in-fill above the furnace mouth and this is in the form of a vertical bricked up section. The inside of the arches are ribbed. There was no spark plate evident but since the kiln could not have functioned without one it must be assumed that it has collapsed.

The drying floor is of perforated ceramic tiles laid on a grid of iron bars. These bars appear to be supported on iron joists. There is a plain tile 'skirting board' around the kiln.

The English Heritage list description states that the malthouse is early 19th century.

SOMERSET

Charlton Musgrove[28]

Grade II, AMS referral and personal referral prior to application (date of visit, 25 March 2010)

The malthouse is constructed of stone rubble with a hipped slate roof. There are in fact two malthouses end to end with one kiln in between them for the use of both. There is now no evidence of the cowl.

The kiln furnace is a squat brick shaft furnace with the furnace mouth in the north west elevation. The shaft rises up and forms arches chamfered at the corners to the outside walls of the room. Unusually there is a bread oven in the south west elevation and there are ventilation apertures on either side of the furnace mouth as well as in the opposite elevation, the south east one, and a further one at a high level in the south west elevation (Fig. 18). The furnace consists of at least ten fire bars resting on iron beam which is built into the brickwork on either side of the furnace mouth. The furnace may best be described as a metal fire box. There is an iron surround but now no evidence of a door to either top or bottom part of the furnace. The ventilation slips on either side have a hook in the top framework probably for adjusting the slip.

The drying floor is laid on fish bellied iron beams. These beams are supported on larger beams running the crosswise. There was no spark plate surviving and the top of the shaft mouth was visible from above. A damper mechanism may have existed. The kiln drying floor is of perforated ceramic tiles. There was no skirting board round the kiln drying floor.

The malthouse is dated to second half of the 19th century (trades directory sources) probably just before or just after 1880, as no couch frame was obvious. It was due for conversion to residential accommodation.

STAFFORDSHIRE

Alton, The Malthouse, Malthouse Road[29]

Grade II*, personal referral and non-active AMS referral (dates of visits: 22 January 1985, 18 March 2002, 27 May 2005 and 5 July 2005.)

The malthouse and kiln are completely concealed under the house and the lawn to the west of the house. The house is brick built as is much of the maltings although part is of stone in that parts utilise the existing stone geology of the site as well using stone block work. The kiln now has no cowl and the hot moist air must have been funnelled up through house to the outside.

This kiln was only partially accessible due to later in fill. The furnace is a brick built structure with barrel vault brick arches to the outside walls. However parts of the kiln were constructed of stone including the arches. The kiln furnace faces south and this part is brick built. It is the northern part which includes stone sections. There was no evidence of doors to the furnace mouth.

No fire bars were visible, although fire bars which may have come from the furnace were found in the rubbish infill. There were limited ventilation holes in the kiln walls. There was evidence of a spark stone in the form of iron hangers on which it would have rested.

The kiln drying floor was of perforated ceramic tiles resting on wrought iron bars which in turn were supported by relatively widely spaced and broad but not flat brick arches and a lattice of brick work support structure.

The English Heritage list description refers to the house being late 17th century. The malthouse is under part of the house but it is probably of a slightly later date, the late 18th century.

SUFFOLK

Snape[30]

Grade II, AMS referral and personal referral (dates of visits: 4 May 1991, 2 November 2004, 26 July 2005 and 20 July 2007)

The Snape Maltings consists of five malthouses, the most famous of which is the Snape Concert Hall which was Malthouse No. 5.

Malthouse No. 1

Malthouse No. 1 is constructed of brick with a slate roof. The kilns are in a block at right angles to the main maltings and have pyramidal roofs with flat hat cowls.

The kiln furnaces, of which there were two pairs of two, were brick structures with shuttered concrete (clearly a later 20th-century replacement) sloping ceilings instead of the more usual brick arches. The furnace mouths were simple fire bar furnaces with no doors to either the top or bottom, although there was a hook for an iron plate to provide draw for the fire. There was an iron bar across the top and supporting brick infill to an arched top. The fire bars, of which there were fourteen, rest on an iron bar at the front. The whole furnace was brick lined. In the side elevations there were ventilation slips which had iron frames and pulleys to move the iron slip to the desired position. There was a further ventilation slip in the rear elevation.

The kiln drying floor was of perforated ceramic tiles supported on an iron grid which in turn was supported by cast iron columns. There was no skirting board to the drying floor.

This malthouse may date to 1846 although parts of the kiln are probably later. It has been converted.

Malthouse No. 3

Malthouse No. 3 is constructed of brick with a slate roof. The kilns are in a block at right angles to the main maltings and have pyramidal roofs with cowls.

The kiln furnaces, of which there are two, are constructed of brick and with brick barrel vaults rising to the outside walls. The furnace mouths, which have a barrel vault arched top, are set back inside what may almost be described as a brick tunnel. There are thirteen fire bars resting on a bar at the front. The whole furnace is brick lined. There are double doors to the bottom of the furnace doors but there are no doors to the upper part of the furnace (and appear never to have been any). There are hot air chambers behind and above the kiln furnace. There is a spark or baffle plate.

The kiln drying floor is of perforated ceramic tiles supported on iron bars which in turn are supported by cast iron columns. There is no skirting board to the drying floor.

This malthouse is probably of 1860/1870s date and the brickwork forming the tunnel to the furnace may be of a later date. The maltings have been converted although the plan was to retain the kiln furnaces.

WORCESTERSHIRE

Harvington Hall

Grade II, AMS referral (dates of visits: 12 June 1995 and 24 September 2008)

This is a small building within the moated grounds of Harvington Hall. The malthouse and its kiln are constructed of red sandstone to first floor level and brick infilled timber framing above. The kiln room is within the malthouse building and therefore under the same roof which is of tile. No cowl survives. Access to the kiln room is from both the malthouse and via an outside door.

The kiln is a brick shaft furnace with brick vaulting rising to the outside walls of the room The furnace mouth faces north west (Fig. 12). The fire bars of which there are ten are behind the mouth and rest on brick piers which are not attached to the furnace mouth (Fig. 27). Unusually they do not run back from the mouth but cross wise and form a small grid with a centre bar. There is evidence that there was a spark plate.

The kiln drying floor is of perforated ceramic tiles laid on iron bar joists which are supported by the brick framework of the kiln and additional iron beams at right angles also supported by the brickwork of the furnace and at least one brick pillar. There is a sloping plain tile skirting to the kiln drying floor.

The building is said to be of a 17th-century date but the malt kiln is later, probably late 18th century or early 19th century. The malthouse has been re-used.

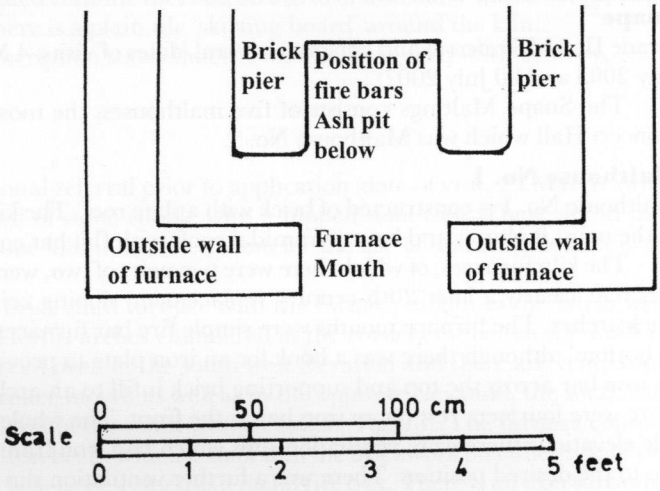


Fig. 27

Harvington Hall (Worcs.): Ground plan of the front section of the kiln furnace mouth, showing the position of the fire bars on the brick piers and the ash pit below. In front is the furnace mouth between the outside walls of the furnace.

Drawing, author and R. Wilson 24/09/2008

YORKSHIRE (NORTH)

Alne

Grade II, AMS referral (dates of visits: 18 June 1993, 2 March 1995, 11 May 1995; and 17 September 2001)

This maltings is two malthouses with a joint central wall. Each had all the malthouse components of steep germination floor, storage and kiln. The whole is a brick built structure with a slate roof. The kilns are at the northern end of each malthouse. The kilns are in separate rooms and the main access is by external door although there was hatch access from the maltings. They have what are now unusual kilns cowls in the form of seven domestic chimney pots (Fig. 2).

Each kiln had a rather squat square brick built furnace with flattish brick arches to the sides of the rooms. The furnace mouths faced towards the rest of the malthouse. There were seven or eight fire bars in a brick trough which was set back from the furnace mouth and not attached to it. At the front of the trough was an iron bar which appeared to be holding the brick

structure together. However, unlike many kiln furnaces there were sliding doors to the furnace mouths and these completely closed the mouth (Fig. 11). The doors had two iron handles on them. Above the fire bars was an arched spark plate or diffuser plate constructed of brick and supported on rather randomly constructed brick piers. These piers supported iron bars on which the brick spark plate rested. On the opposite side of the furnace to the furnace mouth was a vertical sliding iron ventilation slip.

The kiln drying floors were of relatively modern perforated ceramic tiles supported on iron bars which in turn were supported on substantial girders. There was no skirting board.

The English Heritage list description refers to the malthouse being dated to the 1860s and this is confirmed in a report by the Council for British Archaeology.[31] The maltings have been converted to residences.

NOTES

1 For further details on the brewing process, see <http://www.english-heritage.org.uk/publications/brewing-industry/> (accessed 01.12.2012); R. Putman, *Beers and Breweries of Britain* (Shire, 2004).

2 A. MacCormick., 'Nottingham's Underground maltings and other Medieval Caves: Architecture and Dating', *Thoroton Society Trans.*, 105 (2001), 73-99.

3 Non-patent kilns are those not designed by the major malting engineers: E. S. Beaven of Warminster (Wilts.); Robert Boby of Bury St Edmunds (Suff.); Buxton and Thornley of Burton-upon-Trent (Staffs.); Robert Free of Mistley (Essex); H. J. H. King of Nailsworth (Gloucs.); and Suxé anthracite furnaces, the most modern coal-fired type of kiln furnace.

4 In the text that follows, the county is indicated in the first mention of each place, but not thereafter unless appropriate for the discussion.

5 Brick and stone only – Alton (Staffs.); brick and flint – Letheringsett (Norf.); brick and clay lump – Malthouse No. 4, Diss (Norf.); brick and timber-framing – Old Basing (Hants.); brick, stone and timber-framing – Topsham (Devon), Harvington Hall (Worcs.).

6 This also applies to the malthouse at Halse, Somerset (not included in this study).

7 R. Fullagar, 'Malting in Marshfield', *Bristol Industrial Archaeological Soc. Jnl.*, 18 (1990), 4-11.

8 In four cases, the fire bars were located above half way – at Coryton, Chetnole, Dursley and Alberbury; in another four cases, slightly below halfway – Brockhampton, Deerhurst, Old Basing and Alton.

9 It also applied at Nethercott Farm malting (Som.); D. Warren 'Nethercott Farm Malthouse and Mill', *Somerset Industrial Archaeology Bulletin*, 56 (1991).

10 The dating is confirmed by the type of kiln tiles found on both sites.

11 A. Patrick, 'An Historic Building Survey of Cuthbert's Maltings, Victoria Road, Diss, Norfolk', unpublished historic building report (2008), 24-5.

12 *The London and Country Brewer*, (London, 1738 edn), 10. *The London and Country Brewer* was probably the only extensive publication to give details of 18th-century kiln construction as well, of course, details on how to make malt and brew various beers. It is now usually found as a bound volume. The fourth edition is dated 1742, but earlier parts are dated 1738 with a supplement being issued in 1740.

13 A. Patrick, *Maltings in England*, Strategy for the Historical Environment Report No. 1, English Heritage (2004), Appendix A. <http://www.english-heritage.org.uk/content/publications/publicationsNew/maltings/maltings-appendices.pdf> (accessed 01.12.2012). The whole Malting SHIER can be found at <http://www.english-heritage.org.uk/publications/maltings/> (accessed 01.12.2012).

14 Patrick, *Maltings in England*, Appendix A.

15 A. Patrick, 'The Malthouse, Burghley Park, The Parish of St Martin's Without, Cambridgeshire', unpublished historic building report (1996).

16 A. Patrick, 'The Malthouse, The Bridge Inn, Topsham, Devon', unpublished interim historic building report (2001).

17 A. Patrick, 'The Brooks Maltings (Dalgety site), Mistley', *Essex Archaeology and History*, 33 (2002), 340-2.

18 S. Ely, 'The Malt House, The Old Brewery, Brockhampton, Gloucestershire', RCHME Historic

Building Report, NBR 93502 (1996); A. Patrick,'The Malthouse and the Brewhouse, The Old Brewery, Brockhampton, Gloucestershire', *Gloucs. Soc. for Industrial Archaeology Jnl* (2002), 29-36.

19 K. A. Rodwell, 'The Ancient Maltings at Seymour House, High Street, Chipping Campden', unpublished archaeological report (1992); A. Patrick, 'The Malthouse, Seymour House Hotel, Chipping Campden, Gloucestershire', *Gloucs. Soc. for Industrial Archaeology Jnl* (2010), 43-51.

20 *London and Country Brewer* (1738), 10.

21 A. Patrick, 'The Malthouse, Wightfield Manor Farm, Deerhurst, Near Apperley, Gloucestershire', *Gloucs. Soc. for Industrial Archaeology Jnl* (1996), 57-61.

22 A. Patrick, 'The Malthouse, Woodmancote, Dursley', *Gloucs. Soc. for Industrial Archaeology Jnl* (2007), 37-40.

23 S. Ely, 'The Malthouse, Tanhouse Farm, Frampton-on-Severn, Gloucestershire', English Heritage Historic Building Report, NBR No 105512 (2000); A. Patrick, 'The Malthouse, Tanhouse Farm, Church End, Frampton-on-Severn, Gloucestershire', *Gloucs. Soc. for Industrial Archaeology Jnl* (2009), 41-6.

24 Patrick, 'Cuthbert's Maltings', op.cit.

25 A. Patrick, 'E. S. Beaven (Maltings) Ltd, Maltings in Norfolk: Diss and Great Yarmouth', unpublished historic building report (1994).

26 Ibid.

27 R. Sheppard, 'An Historic Building survey of the Maltings, Station Street, Mansfield Woodhouse, Nottinghamshire', unpublished historic building report, Trent and Peak Archaeological Unit (2006).

28 M. Heaton, 'The Maltings, Somerlea Farm, Charlton Musgrove, Somerset, Historic Building Record' (2010), http://www.archaeology.demon.co.uk/3478-lv2.pdf (accessed on 17.05.2012)

29 C. J. Crowe, 'The Malthouse, Alton, Report of a Watching Brief during clearance', unpublished report (2005): A. Patrick, 'The Malthouse, Alton, Staffordshire', unpublished report in conjunction with Crowe's report (2005).

30 A. R. Letch, 'Snape Maltings, Tunstall, Suffolk', unpublished historic building survey, Essex County Council (2005).

31 Proof of Evidence submitted at the Public Inquiry held on 11 May 1995, submitted by the Council for British Archaeology (unpublished), 2-3.