

MALT KILN TILES IN GLOUCESTERSHIRE

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This paper is based on the perforated malt kiln tiles in my possession from the old county of Gloucestershire (that is the current county, as well as South Gloucestershire and Bristol), and on malthouses and kilns where I know what type of tile was used even though I do not have a sample.

Introduction

The drying of malt in a kiln necessitated a surface on which the green (damp) malt could be placed so that it was dried evenly, given flavour, and the moisture content reduced to provide a good grain for grinding in the grist or malt mill in the brewing process.

Early malt kilns, of a 16th or 17th date, usually included a kiln hair, a woven horse hair cloth on which the malt to be dried was placed. Although the earliest kiln tile patent was registered in 1699, it is unlikely that the use of perforated ceramic tiles became widespread until the later 18th century. With the malt being placed directly on perforated ceramic tiles the use of kiln hairs gradually ceased. Malt continued to be dried on perforated ceramic tiles until the last decade of the 20th century despite the fact that woven wire floors were in use from the late 18th century, and wedge wire floors (1) were used from the later 19th century.

The perforated tiles on which the malt was dried vary from locally made examples to tiles from large commercial producers such as Stanley Bros of Nuneaton, Warwickshire, Fisons of Stowmarket, Suffolk, and the brick and tile firms in the Bridgwater area of Somerset. Both locally produced and commercial examples were in use in Gloucestershire, and have survived in some of the county's maltings.

A typology of perforated tile patterns has been developed by Peter Crew. It is largely based on a study of whole tiles. The majority of tiles considered here are incomplete and in consequence they have not been put into the typology. However, readers may wish to see if they can fit them into the typology (2).

The various types of tiles and their development

All perforated ceramic kiln tiles were designed to allow the hot air from the furnace fire through the hole or holes but not let the grain fall through and so onto the spark plate or the furnace fire. In consequence the size of the hole at the surface, where the grain rested, was smaller than the corresponding hole underneath.

The earliest tiles had only one tapering hole which was not very efficient in that there was a lot of tile surface and not much hot air passing through the hole. These tiles were, however, relatively thin being sometimes only $\frac{3}{4}$ in (19mm) thick, and the whole ones which have survived measuring approximately $9\frac{3}{8}$ in (238mm) by $9\frac{3}{8}$ in (238mm). This design of kiln tile may have been used with a kiln hair, but wear patterns on some of the tiles indicates that the green malt was placed directly on them.

The next development in kiln drying tiles was a large hole to the underside of the tile with a number of small holes to it on the top surface of the tile. The part of the tile with the small holes was relatively thin when compared with the thickness of the tile as a whole. This meant that more hot air reached the drying grain. These multi-hole tiles can be divided into three broad categories: earlier, middle and later types.

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MALT KILN TILES.



No. 1 Pattern.

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No. 2 Pattern.

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Advertisement from The Brewer and Wine Merchant and Brewers' Guardian
of March 1926

The earlier tiles, which may have been made in the locality of the kiln, had fewer small holes per large hole: usually four or five small holes per large hole which might be either round, square or diamond shaped. These tiles vary in thickness from 1.5 in (39mm) to 1.75 in (44mm) and in size from 12 to 13 in square (300mm to 330mm square) and with at least one example which was only 9½ in (241mm) square. All these variations in size and thickness are indicative of different or local manufacture, but apparently to a fairly standard design.

The later tiles had more small holes, from eight or nine to as many as 16 per large hole, which might be round, diamond shaped, or more rarely square. They were usually commercially produced at well established brick and tile works. The tiles were usually 2 in (50mm) thick and 12 in (300mm) square. In this category are three main suppliers: Stanley Bros of Nuneaton in Warwickshire, Fisons of Stowmarket in Suffolk, and the brick and tile companies in the Bridgwater area of Somerset. Brewing trade journals and trades directories indicate other commercial suppliers, but their products are not easily identifiable as few have survived with a maker's name stamped on them.

The early tiles in Gloucestershire

Single hole tiles have been found at several sites in Gloucestershire: at the malhouses in Chipping Campden, Frampton-on-Severn, Marshfield, Tirley and Wickwar.

None of these single hole tiles were found *in situ*. At Chipping Campden, Marshfield and Wickwar they had dropped into the kiln furnace and at Frampton-on-Severn they were in the walls of the kiln room. This indicates that in all these kilns the single hole tiles were probably part of an earlier kiln drying floor which was replaced at a later date possibly in the late 18th

but more probably in the early to mid 19th century. At the Tirley malthouse there was no evidence of the kiln which may indicate that the kiln went out of use before the kiln drying floor was replaced.

At Chipping Campden the holes form rows diagonally across the tiles and they vary in size giving a hand made appearance. The undersides of the tiles are soot blackened. The tops are smooth and there is no evidence of wear around the holes but they are darkened probably indicating very high temperature air has passed through them. The Wickwar tiles have their holes in rows square on to two opposite edges. The tiles are glazed and there is evidence of wear both around the holes and on the surface as a whole. (The evidence for this is that the sides of the tiles which are also glazed are shiny as are some of the holes on the underside.) This indicates that the green malt was placed directly on the tiles. The Marshfield tile has been plastered over on its upper surface so it is no longer possible to determine whether there was any wear pattern. It is well blackened and therefore had been well used. Its holes appeared to be near the edge. The Tirley tiles are also in rows square on to two opposite edges. There is little sign of wear but this may be due to limited use. These tiles are also slightly bowed.

All these tiles are slightly different in both colour (as result of the clays having different properties) and design (layout of the holes) it is probable that they were made in the locality of the malt kiln. Certainly they appear to have been made at different brickworks.

Middle date tiles in the county

This is the most numerous group, and tiles with varying numbers of small holes per large hole have been found at Chipping Campden, Deerhurst, Dursley, Frampton-on-Severn, Littledean, Marshfield, Staverton, Uley and Wickwar. (See appendix for details).

All the malthouses with their kilns, except those at Chipping Campden and Uley, are of a late 18th or early 19th century date. Both Chipping Campden and Uley malthouses have earlier origins, probably being of a late 17th century date, however the kilns of these two are probably of a later date. Of all these malthouses only one can be dated and that is the one at Wightfield Manor, Deerhurst. It has a date stone on the gable wall of the kiln of 1816 although it does not mean that the tiles are necessarily of that date.

There are two types of perforations: five small holes per large hole which was either round or square/diamond shaped, and four small holes per large hole, always square/diamond shaped.

There were four hole tiles from Chipping Campden, Deerhurst, Staverton and Uley. The Chipping Campden, Staverton and Uley examples had diamond holes to the underside whereas the Deerhurst example had a round hole underside. None of the tiles are glazed, although some surfaces are smoother than others. The clays used to make the tiles were apparently different, resulting in tiles ranging in colour from light pinky red at Chipping Campden, Staverton and Uley through a deeper red to almost bluish/purple in colour at Deerhurst. It is possible the diamond hole underside tiles were made at the same brickworks, because although the colours are now slightly different this may in part be due to weathering once removed from the kiln or the temperatures in the kiln itself. The clay bars between the diamonds are broad. The diamond hole tiles had their holes set in rows diagonally across the tiles whereas the Deerhurst tiles had their rows of holes square on to all the edges.

The more interesting collection from this group is the five holes to an underside roundel. They were found at Chipping Campden, Dursley, Frampton-on-Severn (two types), Littledean, Marshfield (both sites), and at Uley. Again the colour of the tiles varied from red at Chipping

Campden, Littledean and Marshfield (both sites), through pinkish at Frampton-on-Severn to creamy buff at Dursley, Frampton and Uley (two types) which ones also have a pink surface. Even those tiles of a similar colour may not have been made at the same site because the layout of the small holes to the roundel varies. The cream tiles of Dursley and Uley have the small holes arranged as a cruciform to the straight edges. However the Uley tile cruciform is more on the diagonal than the Dursley examples. This suggests that the tiles may have been hand punched or made on different sites, or at the same site but at different times. In this context it is worth noting that the cream five hole tile from Frampton and one of the Uley samples had their small holes set so that there were two small holes at the bottom parallel with the tile edges. The rows above returned to the cruciform pattern. To complicate matters further the pink tile from Frampton of cruciform to edge was very slightly thicker than the others 3/16in (5mm) (3). At least some of the Frampton tiles were locally made because at least one of the maltsters there was also a brick maker and it seems very probably that he also made his own tiles especially as they are larger by an inch (25mm) than middle date tiles which are commonly 12 in (300mm) square. The red tiles do not exhibit the same variations as the cream tiles as in three cases (Chipping Campden, Littledean and Marshfield (one site)) the small holes form a cruciform to the tile edge. The fourth tile from Marshfield is neither cruciform to edge nor two small holes to edge being somewhere in between. In consequence it may be reasonable to assume that whilst the five hole pattern was uniform its precise layout varied from maker to maker or time of manufacture.

The Late Kiln Tiles

These were the commercially made tiles from Bridgwater (Somerset) and Stanley Bros of Nuneaton, (Warwickshire). No known Fison tiles have been found in Gloucestershire. There is also one exception, a tile from Chipping Campden.

The Bridgwater tiles found in Gloucestershire which have a maker's stamp on them are those manufactured by Sealy and Sons. (There were other firms in Bridgwater manufacturing perforated kiln tiles.) The only stamped examples so far found in Gloucestershire are those from the Malthouse in the High Street, Newent. There is an un-stamped tile of the same pattern from the malthouse at The Yews, The Street, Uley. It is probably a Bridgwater tile. The Newent and Uley Bridgwater tiles are from malthouses of an 18th century date. However, it seems likely that they were replacements for earlier examples in the case of Uley (See above). A substantially later use of Bridgwater tiles was at Millend Mill, Eastington, Stonehouse. The kiln was a 20th century one. Two types of tile were found, nine and twelve holes to a diamond underside. None were stamped but both are types known to have been made at Bridgwater. It is possible that the tiles came from another malkiln as it would appear that Sealy ceased production in the late 19th century (4). Tiles almost certainly from Bridgwater firms are those from Wickwar. Two types were found one being similar to that from Newent and therefore probably manufactured by Sealy and Sons, although there was another manufacturer making tiles of a similar design: William Thomas & Co of Wellington, Somerset (5). The other tile is of a design similar to two stamped ones found at Coryton, Devon. That manufacturers were Browne, Champion & Co and Browne & Co. (Presumably the company just becoming Browne & Co at a later stage (6)).

The malting firm of Downings built their malthouses on either side of the southern end of Merchants Road, Gloucester. The later malthouses (date to 1901) on the western side of the road, between Merchants Road and the Canal had kiln drying floors of wedge wire, but the earlier malthouse on the eastern side, between Merchants Road and High Orchard Street had kiln drying floors of perforated ceramic tiles, one of which has the name of Stanley Bros stamped on it. Similar un-stamped tiles have also been found at the Stroud Brewery maltings,

and the Cirencester Brewery maltings in Cricklade Street. Kiln tiles which were almost certainly produced by Stanley Bros were also found at Millend Mill, Eastington Stonehouse.

The two tiles from the Nailsworth Brewery maltings are not stamped and both are multi-hole tiles. One appears to be a Stanley Bros type of tile but the other is slightly thicker and may have been produced by a different manufacturer.

Finally there is the tile from Chipping Campden which has seven holes to a roundel, is red in colour and is 12 in square (300mm). It may have been locally made since no other imported tiles were evident at this site.

Other Maltkilns with Perforated Ceramic Tile Floors

At Taylers Farm, Aldsworth one tile survived and was lying on the fire bars of the kiln furnace. There was no makers' name on it but the design indicated that it was a Bridgwater tile.

The malthouse at Brockhampton retains its kiln drying floor of perforated ceramic tiles *in situ* (7). The malthouse is of an 18th century date with later additions and the kiln tiles are part of this later phase. Some are stamped Stanley Bros Nuneaton indicating a later 19th century date. The malthouse and kiln at St Andrews Street, Montpellier, Bristol also had a perforated kiln tile drying floor or later tiles, of a design manufactured by Stanley Bros and therefore they were probably made by them.

Production and Distribution

Our knowledge of the production (8) and distribution of the kiln tiles in Gloucestershire is minimal. It would appear that early and middle date tiles were locally made but there is no certainty that this was the case and there is no evidence either for it or against it. Likewise there is no evidence regarding the distribution of tiles in the county. Certainly later tiles were brought in and it is possible that earlier tiles came from Bridgwater too.

How the Tiles were used

There is one other aspect which is of interest but must also be speculative and that is the way in which the tiles were used. This is not a problem with the middle and the later date kiln tiles. The green malt was placed directly on them and dried accordingly. The greater the number of holes the more effective would be the process.

However, there is considerable difficulty in understanding how the single hole tiles were used. Were they used with a kiln hair? From at least the 18th century perforated tiles could be used as a baffle between the fire and the kiln hair. According to the *London and Country Brewer* (9) these tiles were of stone and had many holes "each being as broad again at Bottom as at Top, over which a Hair-cloth lyes". Such tiles are known to have existed in at least two maltings in Somerset, at Halse (10) and at The Old Malthouse, Stoke Road, North Curry. The *London and Country Brewer* indicates that single small hole perforated ceramic tiles had the green malt placed directly on them, however, it goes on to state that the tiles thus designed were used for the production of brown malt much used by the London market (that is by the London porter brewers). The production of porter beer was not confined to London and was produced in large towns and cities including Bristol and Liverpool and early trade directories indicate that porter was available more extensively in such towns as Portsmouth and Southampton. In Gloucestershire, the Albion Brewery in Cheltenham was a Porter Brewery (11) in 1826, and there were three Ale and Porter Stores in 1845 according to Rowe (12), in Gloucester there was a porter brewer in Lower Northgate. Therefore there was certainly a market albeit probably a small one for brown malt. However, the production of porter also required pale malt as did the beer generally produced for domestic consumption. Therefore the majority of malt produced would still have been pale not brown malt.

It seems relatively unlikely that brown malt was produced at Chipping Campden for the brewing of porter but it cannot be ruled out especially as the darkening of the tiles around the holes indicates the use of a high temperature. At Marshfield there were numerous malthouses and it may be that one of them did produce brown malt and that one was the one with single hole tiles. Likewise at Wickwar there were several malthouses there in the 18th century and one may have produced brown malt and as indicated the wear on the tiles indicates that the green malt was placed directly on them. The malthouse at Tirley could have been producing malt for sale in Bristol (being shipped down the river Severn) but it seems less likely that the malthouse at Frampton-on-Severn was a brown malt producer although in theory any malt could also have been shipped to Bristol and there was at least one other malthouse in the village.

So the questions which arise are firstly were single hole malkiln tiles used solely for the production of brown malt, or were they used for the production of both pale malt and brown malt. Secondly were they used with or without a kiln hair if used for the production of pale malt?

Also, it is known that in some kilns single hole tiles formed sloping skirtings round walls of the kiln drying floor. These single hole tiles appear to have their hole more on the slant and it has been suggested this was to improve draft round the edges. However this cannot have been their sole use because single hole tiles were found at Chipping Campden and there the sloping skirting was part of the upper kiln furnace structure. In the Marshfield example the holes do appear to be slightly more on the slant but it is difficult to be certain.

Finally, there is the need to consider the support structure for single hole tiles. The tiles from Tirley are the only whole ones and they are 9 in (229mm) square, whereas some of the multi-holes tiles are 12 in (300mm) square. The size of the tile has implications for the support structure which with a 9 in (229mm) square tile would be more dense than a 12 in (300mm) square tile. A single hole tile from Wickwar was probably 9 in (229mm) square (a half survives) and the holes are very close to the edge of the tile probably indicating that the support beam was narrow, perhaps the iron bars mentioned in the *London and Country Brewer*. However, the single hole kiln tiles from Chipping Campden had holes $\frac{3}{4}$ in (15mm) from the edge perhaps indicating a wider support beam.

It is worth noting that one of the multi-hole Wickwar tiles was $9\frac{1}{2}$ in (241mm) square, so this too may have had the same support structure as the single hole tiles.

Conclusion

All types of perforated malkiln tile have been found in Gloucestershire ranging from single hole tiles to multi-hole tiles. The single hole tiles and some of the middle date tiles may have been made locally. Also, it would appear that, in particular, in the case of the five holes to a roundel tile, the pattern was a uniform cruciform but its precise layout varied either because of different makers or different times of manufacture at the same site. Therefore it would appear that it was the pattern which may have travelled and not the actual tiles. The later multi-hole tiles were commercially manufactured and imported from Nuneaton if they were manufactured by Stanley Bros or the nearer tile works of Bridgwater. The tiles also range in date from the earliest period of the 18th century to the later 19th century or first half of the 20th century.

It is probable that single hole tiles had a dual use for producing brown malt but since pale malt was also required and in greater quantities the same kiln was probably used with or without the 'softening' effect of a kiln hair. The later tiles would have had the green malt placed directly on them.

More malt kiln tiles may come to light which will enable this study to be extended or even altered.

Notes and References

- (1) Wedge wire floor: this is similar to the perforated tiles in that the gap between the wires is narrower at the top than the bottom. This means the grain does not drop through but as much heat as possible does. To achieve this the strands of wire are wedge shaped being broad at the top and narrow at the bottom.
- (2) British Brick Society's Newsletter 95. Accessed on 1.8.2012
<http://www.arct.cam.ac.uk/Downloads/bbs/bbs-95.pdf> .
- (3) This difference in kiln tile depth has implications for the floor since a smooth surface was needed. Either the whole floor would have had to be of tiles of this depth or they would have had to be padding.
- (4) Murless, B. J. (2000) Somerset Brick and Tile Manufactures, A brief history and Gazetteer, Somerset Industrial Archaeology Society Survey No 13 page 49 - 50.
- (5) Pers com. Peter Crew who also supplied a copy of their catalogue.
- (6) See note 2.
- (7) Ely, S. (1996) The Malt House, The Old Brewery, Brockhampton, Gloucestershire, RCHME, Historic Building Report NBR No 93502.
- (8) The is dealt with by other authors, primarily by: Crew, P. (2004) Perforated Tiles from Corn Driers and Malt Kilns, British Brick Society Information, 95, pages 4 - 12
- (9) The London and Country Brewer, (1738), London, page 10.
- (10) Miles, M. (1989), ' Halse Maltings, Somerset', Industrial Archaeology Review, Volume 11 No 2, pages 136 - 140.
- (11) Bradbury, O. C. (2004) Cheltenham's Lost Heritage, Sutton Publishing, page 26.
- (12) George Rowe's Illustrated Cheltenham Guide 1845 facsimile edition - index.






Malt kiln at Chipping Campden malthouse showing the stone bearers on which the tiles are laid. The tiles on the right hand side of the picture are ready to be laid. Note that their bearers are supported on bigger stones at right angles which in turn are supported by stone and some cases brick pillars.




Kiln at 70 High Street, Wickwar showing construction. The brick piers support iron beams which in turn support the iron bars on which the perforated tiles rested. (Note: timber boards currently lie on the iron bars)

Appendix


Chipping Campden

Chipping Campden	single hole	Corner, red	
Chipping Campden	4 holes to diamond	Corner, red	
Chipping Campden	5 holes to roundel	Red	
Chipping Campden	7 holes to roundel	Red 12 in (300mm) square	


Cirencester

Cirencester Cricklade Street	12 holes to roundel	Buff, ? Stanley Bros	
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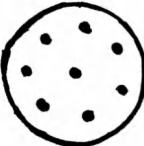
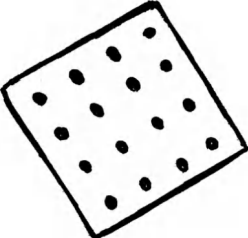
Deerhurst

Deerhurst Wightfield Manor	4 holes to roundel	Two corners, 12 in (300mm) square tile, dark red/purple	
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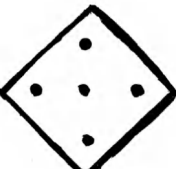

Dursley

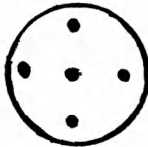
Dursley 19 Woodman- cote	5 holes to roundel	Corner, Creamy with pink surface	
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Eastington, Stonehouse


Eastington, Stonehouse Millend Mill	8 holes to roundel	Corner, buff, ? Stanley Bros	
Eastington, Stonehouse Millend Mill	16 holes to diamond	Red, probably Bridgwater	

Frampton-on-Severn


Frampton- on-Severn Tan House Farm, Church End	5 holes to diamond	Corner, pinky	
Frampton- on-Severn Tan House Farm, Church End	5 holes to roundel	Corner, Creamy with pink surface	

Frampton-on-Severn Tan House Farm, Church End	5 holes to roundel	Two corners, reddish	
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Gloucester

Gloucester Merchant's Road /High Orchard	12 holes to roundel	Glazed stamped Stanley Bros, Nuneaton,	
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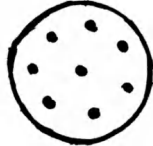
Littledean

Littledean Church Farm	5 holes to roundel	red, centre hole larger than exterior ones	
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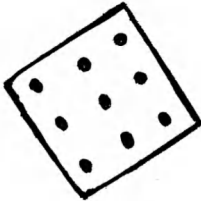
Marshfield

Marshfield 70, High Street	single hole	Corner, reddish	
Marshfield 70, High Street	5 holes to roundel	Corner, reddish, worn surface, at least 10 in (255mm) long	
Marshfield 78, High Street	5 holes to roundel	red	


Nailsworth

Nailsworth Tetbury Lane	12 holes to roundel	glazed, probably Stanley Bros	
Nailsworth Tetbury Lane	8 holes to roundel	Unglazed, probably not Stanley Bros.	



Newent

Newent High Street	9 holes to diamond	Sealy & Sons, Bridgwater, half tile manufactures as such	
Newent High Street	9 holes to diamond	Red probably, Bridgwater, stamped AC	

Staverton

Staverton	4 holes to diamond	Corner, reddish	
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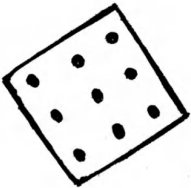

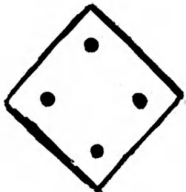
Stroud

Stroud Rowcroft	8 holes to roundel	Pinky, largish holes	
Stroud Rowcroft	12 holes to roundel	Corner, yellow glaze, probably Stanley Bros	

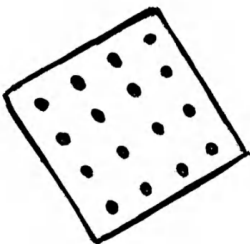
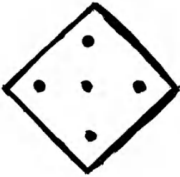
Tirley

Tirley Malthouse Farm	single hole	Reddish 9 in (0.23 m) square
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Uley

Uley 43, The Street	9 holes to diamond	Corner, red? 12 in (0.30m) square	
Uley 43, The Street	5 holes to roundel	Corner, creamy with pink surface	
Uley 43, The Street	4 holes to diamond	Pinky red	

Wickwar

Wickwar, 70 High Street	16 holes to diamond	Red, probably Bridgwater	
Wickwar, 70 High Street	single hole	Pinky dark red, green glaze, 9 in (0.23 m) square, corner	
Wickwar, 70 High Street	5 holes to diamond	dark pinky red, 2 corners - 9½ in (241mm) square	
Wickwar, 70 High Street	16 to square	Red	