Brick Kiln near Wormingford Lodge

A J White with R G Marriott

Kiln from the East, with stoking tunnels and remains of firing floor

Site of the Kiln Excavation, 2012

Introduction

In 1961 Jim Brackenborough and John Jackson were ploughing the field on the West slope of Lodge Hills, East of Commolions field, for the Wormingford Hall Estate. At one point the plough ran into a brick structure which broke open to reveal a cavity beneath. This was identified by Colchester Museum as part of a Tudor brick kiln. The site was recorded by Miss Winifred Beaumont, a local historian.

Stoke hole of kiln in 1961

On learning their find was not a secret tunnel the finders rather lost interest, so they inserted a time-capsule and closed the structure in October 1961.

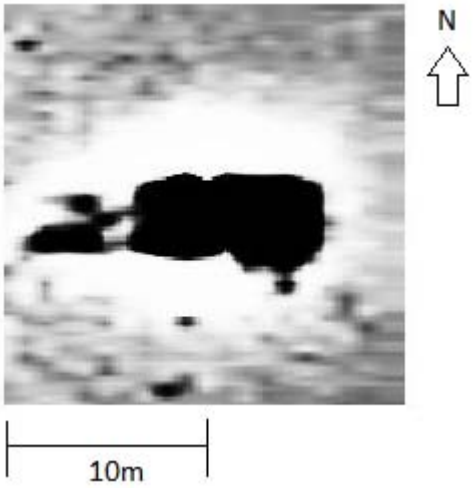
From the time capsule (rediscovered)

The letter says: *"11th October 1961 This Tudor Kiln was discovered in Sept. 1961 by Mr James William Brackenborough and Mr John Jackson and recorded by Miss W Beaumont. Photographs were taken before being closed in October 1961 J W Brackenborough"*

CAG were excavating the nearby Tudor hunting lodge at Lodge Hills, Wormingford and in 2010 were invited by the Estate to relocate and excavate the Kiln.

Rediscovery

Phyllida Tufnell (of Wormingford Hall) had visited the site in 1961. She and John Jackson were separately asked to pinpoint their best guess of the kiln's position. These points coincided, and a magnetometry survey of the area was carried out by A and D Black of CAG. This disclosed a likely structure on the site. The location is at N 51.9564° E 0.8014°, or OS TL 9284 3255.



Magnetometry survey of likely* kiln *site 2010

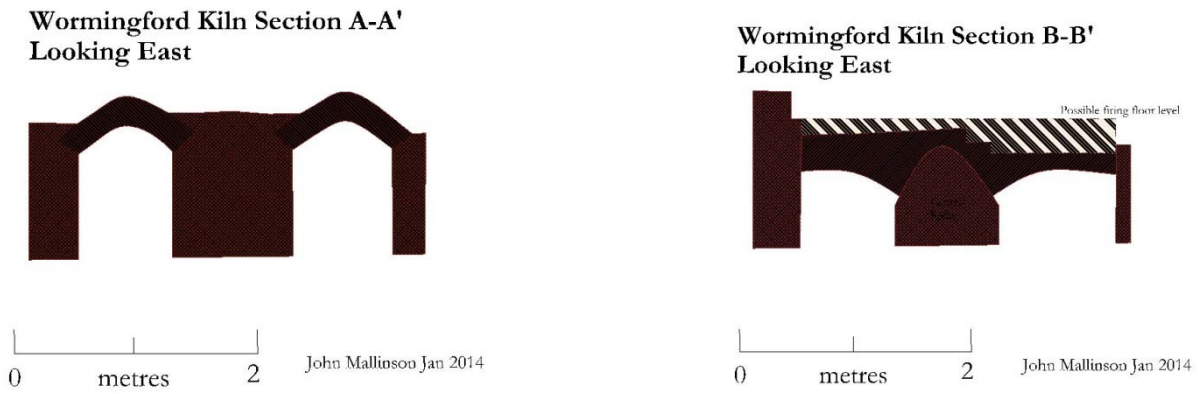
Test trenches were started in 2010 which disclosed a broad scatter of brick rubble matching the outline of the survey. Excavation continued through 2011 to April 2012. Two parallel tunnels of 3m length and 1.2 m apart were uncovered and identified as the stoking holes of a brick kiln. The face of the brickwork showed the effects of the heat. The time capsule, a sealed glass jar placed under a "Snowcem" tin for protection in 1961, was recovered from the Southern tunnel.

The walls of the stoking tunnels were built in English Bond and constructed of dark blue bricks eight courses high. The roof arches sprung from the top layer of brick. The two stoking tunnels were arched with 20 bricks of varying thicknesses, placed end-on, the space between filled with rubble.

To the West of the tunnels was found the tiled floor used to charge the stoking tunnels. To the East was uncovered a rectangular pit dug into the natural clay with sand (brick-earth) soil of the site. This was identified as the firing chamber of the kiln, where the raw bricks would have been stacked. Further excavation of this pit revealed a wall of 3 bricks' width on the N, an apparent wall of just half a brick width to the S, a back wall of ½ brick width. All walls were somewhat bowed inwards from the pressure of the surrounding soil. There was a brick plinth of 1.2 m width running E W along the centre, providing the base for two sets of arches, one on each side. Four extant arches were found, together with the springing points of all 13 arches on each side. Each arch was of one brick width and there was a gap of half a brick between each arch. The arches were misshapen, apparently by the heat of the firing. Their existing top surface was some 30cm or more below the top of the stoke hole openings.

Excavation

Plan of the kiln site



Sections through the kiln

The whole site had been filled with rubble consisting of numerous brick and tile bats, soil and natural clay. It also contained pieces of charcoal and unburnt coal.

Bricks used in the construction.

The kiln is built of bricks of dimensions 215/230mm x 100mm x 50mm, fairly regular with sharp arrises. It is difficult to assign a firm date to the construction. As Nathaniel Lloyd in "The History of English Brickwork" demonstrates, the dimensions of bricks show such variation over a long period

that size alone is not a reliable guide. See also "Tudor brickwork" by Gerard Lynch[1]. Indeed, expert Pat Ryan[2] thinks the bricks were of 16th to early 17th century date, while Peter Minter of Bulmer Bricks[3] suggests a much earlier date, even as early as 1430 to 1480.

The brickwork within the stoke-holes would have become glazed through the heat. Some of the headers in West face of the kiln were also glazed. This is a powerful argument for the presence of an open wood-fired clamp on the site before the kiln was built. A revived wood-fired clamp was fired in 2010 and the headers adjoining the firing tunnel were found to be beautifully "flared" or potash glazed, as a direct result of the combination of becoming stained by the potash given off from the adjacent timber fuel and the melting of the silica which forms a protective glaze[4].

The bricks of the stoking tunnels were generally of a good quality and were blue grey glazed. The bricks of the tunnel entrances were bonded with lime mortar. In the rest of the kiln, subject to high temperatures, clay had been used as mortar. The temperatures involved had turned this into a fine red powder.

Finds

Whole bricks found in the fill rubble were measured. They were found to be of a size compatible with those found in the structure of the kiln. This suggests they formed part of the structure rather than later manufacture. Some showed traces of lime mortar, which would not have been subjected to the intense heat of the firing chamber itself. Peg tiles were found to be of the standard size current throughout the life of the kiln. Tiles would have been used to cover the stacked bricks to control heating during firing. It is likely, but not proven, that the kiln was used to make both bricks and tiles.

Several odd shaped blue bricks were found on site with a bloated outer face and a clinker like interior. Peter Minter said these were caused by the use of high oxide clay not being dried out properly at the leather-hard stage. This was sometimes the product of early season brick production with inadequate shelter from damp. The water inside the brick combined with the oxide in an exothermic reaction. The additional heat turned the brick into a crude form of clinker.

A number of curved and trapezoidal bricks were uncovered. The bricks were almost certainly designed for use in the construction of a well and would have used 23 bricks in the circumference, indicating a well of about 1.5m diameter. We have not identified such a well in the locality. They are likely to be of an early date, since one was discovered in the fabric of the structure.

Other Finds

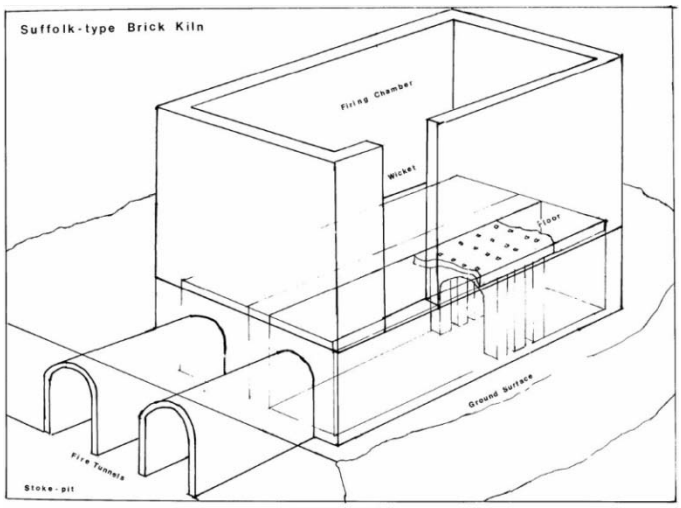
Apart from brick and tile, very little man-made material was discovered. This included a few pipe stems, together with 2 pipe bowls found in the rubble fill, which were dated 1660-1719.

As well as charred wood, small pieces of unburnt coal were found in the stoking tunnels and mixed in with the general fill of the site.

Discussion

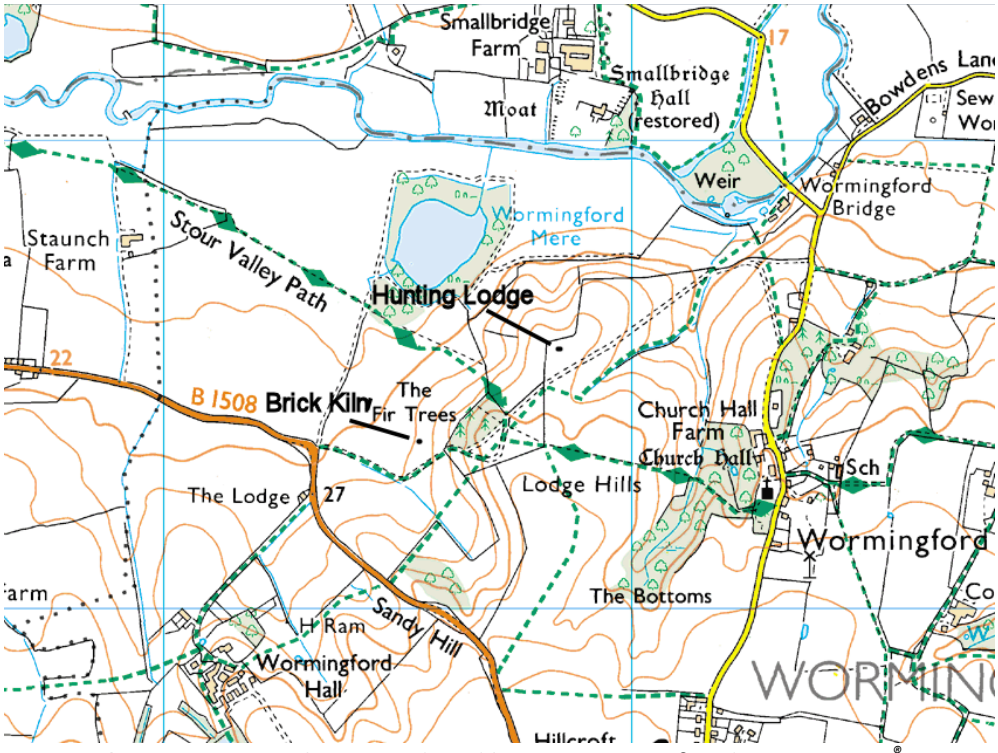
The Kiln

The excavation shows the kiln is a typical example of a "Suffolk" kiln. That is, a brick and tile kiln built into a bank or hillside. Thus the fire and much of the firing chamber was below ground level, providing better insulation for retaining the heat. The kiln would have had an open top and the stacked raw bricks would have been covered with tiles and/or turves. There would have been gaps in the covering, moved around during firing to provide an even heat to all bricks in the stack.



***A Suffolk Brick Kiln*[5]**

Location of kiln and early history



Location of Brick Kiln

Once brick became established as a building material it made sense to establish a brick kiln close to the building works and where clay/sand and firing materials were readily available. The Wormingford kiln is conveniently situated to supply Smallbridge Hall, Wormingford Hall, the Tudor Hunting Lodge on Lodge Hill and eventually other buildings in Wormingford. Given the kiln itself is in an excavated clay pit, it is likely the first firings on the site were made using a simple open clamp of raw bricks. A successful test firing was made using the local clay and sand mixture (brickearth) which formed the pit sides[6]. No traces of other clay pits were found, but these could have been obliterated by ploughing in subsequent centuries.

Rather than being continuously in use, the kiln would have been worked as the need arose, perhaps by itinerant brickmakers. No positive identification of kiln bricks with specific local buildings has yet been made.

Later History of the Kiln

The presence of pipe bowls dated 1660-1720 in the fill rubble strongly suggests the kiln was destroyed during that period. The presence of unburnt coal in the fill suggests the last firing was made using coal. The Stour was used for transport over generations, yet it is unlikely to have been economical to use coal until improvements in the navigation were carried out, following an Act of 1705[7]. This created 13 pound locks and 13 additional flash locks or staunches. Indeed, coal was said to have reached Sudbury in 1707[8]. This brackets the last firing and the destruction of the kiln between 1707 and 1720. It is even tempting to suggest the coal firing, which could have reached much higher temperatures than the wood firing, was unsuccessful, perhaps leading to the deformations found in the arches and the abandonment of the site.

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[1] www.buildingconservation.com/tudor-brickwork Gerard Lynch 2012
[2] Author of "Brick in Essex from the Roman Conquest to the Reformation"; P Ryan; Chelmsford, 1996
[3] Bulmer Brick Co. Ltd, Bulmer, Sudbury, CO10 7EF
[4] "Reviving a Wood-Fired Open Clamp at H.G. Matthews' Traditional Brickworks, Bellingdon, Buckinghamshire, England, in February and May 2010"; Gerard Lynch; Information Bulletin 116 of the British Brick Society; April 2011
[5] From Brick Kiln excavation at Oliver's Orchard, Stanway; J Fawn; CAG Bulletin Vol 27, 1983
[6] Carried out by Andrew White of CAG
[7] "Historical Account of the Navigable Rivers, Canals and Railways, of Great Britain"; Joseph Priestley, 1831
[8] "The Complete Book of Canal and River Navigations"; Edward W Paget-Tomlinson; Paine Research 1978