

# A Roman Lime Kiln Near Cardington Mill, Bedford

R.F. WHITE

## SUMMARY

*A 'Periodic' or 'flare' type lime kiln of second century date was excavated prior to destruction by the construction of the Bedford Southern Orbital Sewer.*

## INTRODUCTION

Aerial photographs by Professor J.K.S. St Joseph show a cropmark complex southwest of Mill Farm, Bedford lying on the route of the Southern Orbital Sewer.<sup>1</sup> The field has a relatively level surface (1.27m OD) which slopes very slightly west towards the River Ouse. The soil is classified as a Biggleswade Series gleyed brown earth<sup>2</sup> and was formed on Pleistocene valley gravels underlain by Oxford Clay.<sup>3</sup> No features were apparent at surface level; after approximately 20cm of the surface horizon had been removed by box scraper a pit and a ditch were visible in the 50m working strip. Deeper excavation for the sewer trench itself exposed various other features in section of Iron Age, 'Belgic' and Roman date. One feature contained stem and twig fragments of hazel and a piece of worked oak (9.5 by 2.5 by 1.9 cm) associated with Roman pottery.<sup>4</sup> These features continued in the field south of Mill Lane where a clay layer approached the surface inhibiting the drainage sufficiently to prevent cropmarks.

The lime kiln was first observed as a spread of reddish burnt clay on the east side of the trench at TL08074901 during a routine visit as part of the watching brief carried out by R. White and P. Woodward for Bedfordshire County Council. Initially this material was thought to represent spoil from a nineteenth century brick kiln at TL081492<sup>5</sup> but subsequent cleaning exposed a stone structure sealed by the previously noted ditch. Accordingly a small salvage excavation was staged, principally by members of the Bedfordshire County Council Archaeological Field Team.<sup>6</sup>

## THE EXCAVATION

The remains as excavated comprised some 5m of curved limestone walling with a projection, or throat, to the south.<sup>7</sup> Much of the structure had

been destroyed by the sewer trench.

Roughly shaped Oolitic limestone had been set into the undisturbed gravel to form the wall of which a maximum of 5 courses (60cm) remained. The limestone had evidently been subjected to high temperatures; the clay matrix had been baked red. There were traces of clay lining, approximately 2cms thick, on the internal face particularly against the bottom 2 courses.<sup>8</sup> The throat wall leaned inwardly and was more sound in its construction than the kiln. It is possible that its mouth may have been destroyed during excavation of the sewer trench since the stonework at the stokehole end was irregular and loose.<sup>9</sup> An adjacent layer of hard red and green clay (layer 14) could represent the remains of a moulded funnel shaped mouth as occurred in limestone at Helpston.<sup>10</sup> Alternatively it may simply be material used to cover or seal the external face of the kiln.

The gravel bottom of the kiln had been scorched red to a depth of 15:20cm with a more heavily burnt patch occurring near its centre which perhaps represents the seat of the fire (layer 6). It was covered by an even layer of hard lime some 12cm deep (layer 5) which had been scorched towards the centre as if a later fire had taken place (layer 7). The floor of the throat was slightly lower than that of the kiln, the upward slope being presumably to improve draught during firing. The kiln infill (layer 4) contained hardened fired clay and pieces of burnt limestone.

The area available for examination was too small to determine the former extent and shape of the stoking area which had also been disturbed by the later ditch and the recent sewer trench. A layer of charcoal resting on the undisturbed gravel close to the surviving throat structure (layer 9) was covered by a thin layer of lime (layer 10) with a thicker deposit of charcoal above (layer 11).<sup>11</sup> A number of limestone pieces had been set into this second charcoal layer either to provide a firm surface at an advanced stage of firing or simply deriving from later collapse.

There were no finds from the kiln itself only from the ditch fill above the stoking area from

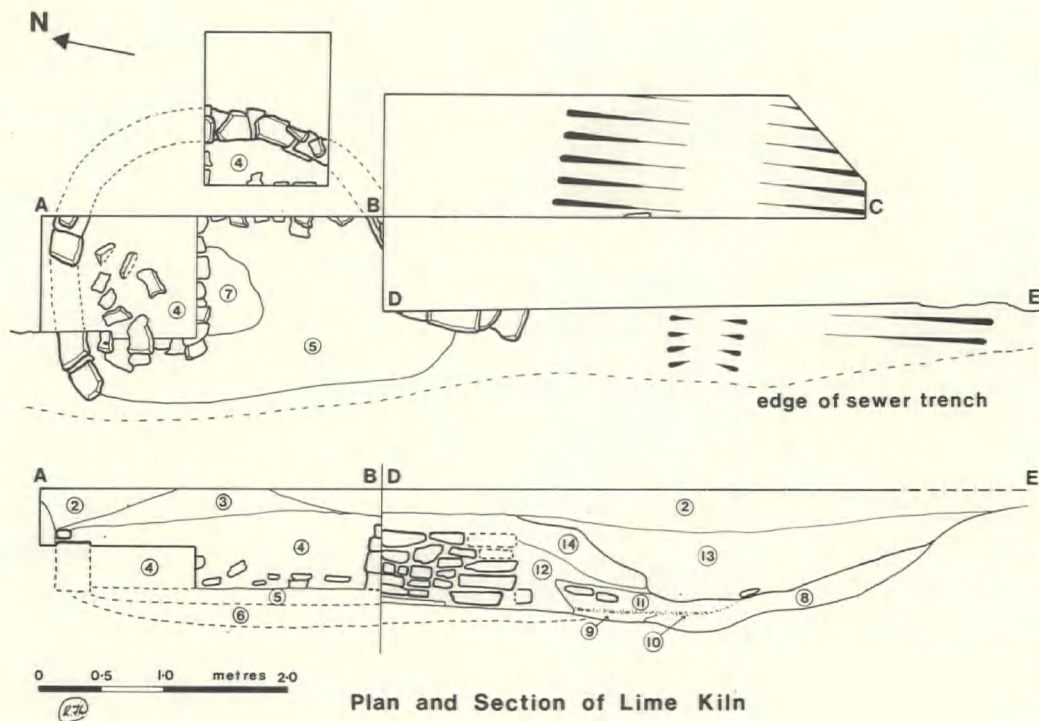


Fig 1 Plan and section of Roman lime kiln at Cardington Mill, Bedford.

which sherds of grey were of the second century AD and a small rim of samian ware, from a plain dish of form 18R, were recovered.

## DISCUSSION

The kiln is a 'Periodic' or 'flare' type designed to produce an evenly burnt, white (charcoal free) lime suitable for plaster and stucco work as well as mortar.<sup>13</sup> The remains as excavated formed only the lower part of such a kiln and it is not possible to determine its former height. However sufficient survived to suggest that the structure was originally of ovoid shape, set into the ground, with an internal diameter of approximately 2.5m.

There was no direct evidence for an internal ledge as has been observed elsewhere,<sup>13</sup> but such a feature could have existed as a recess above the level of the surviving courses. The limestone pieces in the kiln infill were both too small and too random to represent the remains of a free standing ledge such as was present at Weekley (Period 2).<sup>14</sup> They more likely represent the remains of higher courses of the kiln structure.

Fire traces on the lime surface covering the bottom of the kiln combine with the accumulation of charcoal and lime in the throat to suggest that the kiln was used on more than one occasion. It may reasonably be inferred that the charge was either Great Oolite Limestone or Cornbrash which outcrop 6kms upstream. After abandonment, perhaps sometime before the end of the second century AD, the kiln was intentionally demolished; the kiln stonework would have represented a tempting supply of stone despite the possible instability caused by the temperatures experienced during firing. Robbing of the kiln for building stone would explain the infill material above the floor of the kiln and the absence of limestone in the plough soil. The reasons behind the siting of the kiln remain uncertain although a small excavation at TL07984893 in 1958 revealed building debris of brick, tile, mortar and roofing nails associated with 'Romano-British' pottery.<sup>15</sup> The pottery found in the ditch suggests that the kiln dates from before the middle to late second century, a mid-second century date would correspond

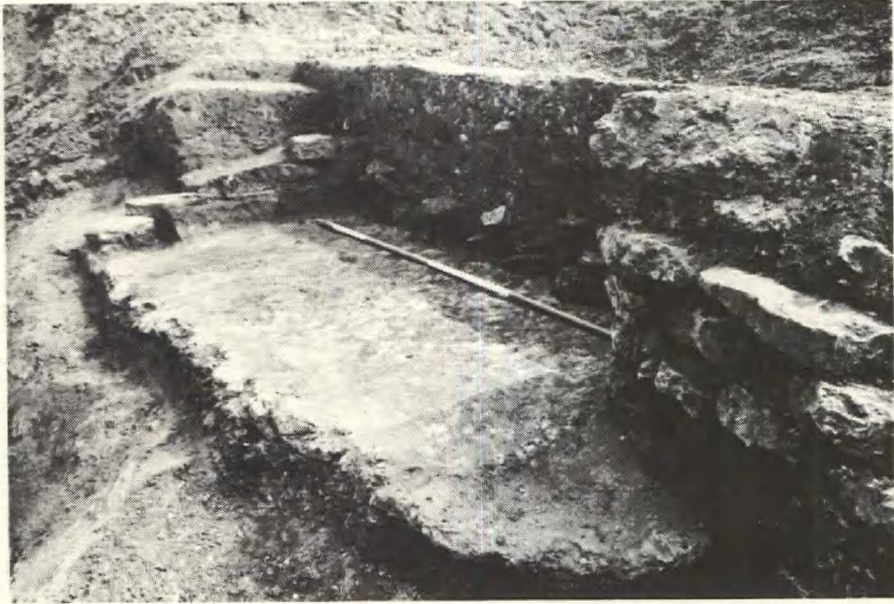


Plate 1a View of lime kiln under excavation from east.  
1b View of lime kiln under excavation from south.

with other known examples of similar kilns in the region.<sup>16</sup>

#### NOTES

- 1 eg AP No. GW0057. The site, Bedfordshire County Council SMR 302, is mentioned in RCHM, *A Matter of Time*, (1960) 54.
- 2 *Soils of the Bedford and Luton District* [Soil Survey of England and Wales (1969)] 20 and map.
- 3 Geological information from *V.C.H. Bedfordshire* Vol. 1, 1-32 and P.C. Sylvester-Bradley and T.D. Ford (eds); *The Geology of the East Midlands*, (1968).
- 4 These and the finds from the kiln will be deposited in Bedford Museum. I am grateful to Richard Thomas for identifying the wood and charcoal.
- 5 Bedfordshire County Council SMR 7200. Shown on the 1835 OS 1 inch map though not on the 1815 survey drawings nor on the 1882 6 inch map.
- 6 The excavation took place during the weekend of 2-3 July 1977. My thanks are due to those friends who helped me with the excavation and in particular to Brian Dix for his helpful post-excavation comments and suggestions. The co-operation of the site engineers, Miller Buckley, is gratefully acknowledged.

- 7 The terminology follows that expressed by L. Biek, 'A Note on Terminology' appendix to D. Jackson, L. Miek and B. Dix, 'A Roman Lime Kiln at Weekley, Northants'; *Britannia* 4 (1973), 128-140.
- 8 A lining of brickearth 5.7cm thick was noted at Northfleet, W.H. Steadman *Excavations on a Roman Site at Northfleet* (Dartford 1913); the interior of the upper section of the Helpston kiln was partially covered with lime and sand rendering about 3m thick, A. Challands 'A Roman Lime-kiln at Helpston', *Durobrivae* 4 (1976), 22.
- 9 Other excavated examples display considerably longer throats, e.g. that at Weekley (Period 1) was over 2m long. Jackson, Biek and Dix, 1973, 131.
- 10 Challands, 1976, 23, fig 16.
- 11 The only identifiable fragments of charcoal recovered were oak (*Quercus spp.*).
- 12 N. Davey 'A History of Building Materials' (1961) 98 ff. B. Dix (1973) 'The Production and Applications of Lime in the Roman World'. BA degree dissertation University of London.
- 13 eg at Weekley and Helpston. Jackson, Biek and Dix, 1973, 130 Challands 1976, 22.
- 14 Jackson, Biek and Dix, 1973, 131.
- 15 D.E. Johnston 'Excavations at Newnham and Mill Farm, Bedford', *Bedfordshire Archaeologist* II (1958), 16-19.
- 16 Paper completed 13 October 1977.

*The Bedfordshire Archaeological Council is indebted to the Department of the Environment for a grant towards the costs of the publication of this paper.*