



BRITISH
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SOCIETY

INFORMATION

No 35

Feb '85

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* Members of the Brick Section of the B.A.A. are affiliated to the British Brick Society.

Secretary's Supplement

Subscriptions

If you have not yet paid your 1985 subscription please do so now to Marie Laurence, the Membership Secretary - her address is on the inside cover of "Information". Note that at the last A.G.M. it was agreed that the subscription be raised and the new rate is £3 per annum.

1985 A.G.M.

As noted in the last mailing (November 1984) the 1985 A.G.M. will be at the Avoncroft Museum of Building at Bromsgrove on Saturday, 22nd June. Full details will be sent later but you may like to consider local accommodation and perhaps stay on a day or so extra. The adjacent Avoncroft College might be able to accommodate a few people with due notice. Accommodation is in single or double rooms, B. & B is £8 per person (plus V.A.T.) - please let me know if you are interested as booking must be through the Society only.

Alternatively, a local Guest House "The Country Girl" is within an attractive 1½ mile country walk of the Museum. Mr. Hardman is offering members of the Society a special 30% discount, i.e. £10 per person for B & B (including V.A.T.). Accommodation is limited to 10 persons (2 single, 2 twin and 2 double bedded rooms) so it will be first come first served - telephone Hanbury 265 . and make your own booking mentioning B.B.S. for the special reduction.

Martin Hammond's Book Reprinted

Members will be pleased to hear that Shire Publications have reprinted Martin Hammond's book "Bricks and Brickmaking" - Shire album No. 75. The price is £1.25 (plus postage) from Shire Publications but for a limited period members may obtain copies direct from our Publications Officer, Ann Los (address inside "Information" cover) for £1.25 including postage. Money with order please by 1st April to Ann Los . Delivery should be completed by the end of April.

The following is taken from a review by Geoffrey Hines when the book was originally published in 1981.

Martin Hammond, known to B.B.S. members for his studies of brickworks and brick kilns, has produced what is likely to become the authoritative history of brickmaking for many years.

It is a comprehensive and compact account of the whole craft. 32 pages, 40 photographs and 22 drawings splendidly evoke the essence of the action. The text derived from careful research, leads us through the making processes and delineates the history of each stage to include the latest innovations. There are passages on Calcium Silicate brickmaking; transport; 'The Brick Itself' and 'The Geology of Brickearths' - in tabulated form. This last has a - mainly typographical - error. The Cenozoic Era is not named but its Tertiary and Quaternary Periods are printed as if they were 'Eras' and the Eocene, Pleistocene and Holocene Divisions are printed as if they were 'Periods' in their own right. However, geologists do dispute these terms among themselves!

Kilns and firing, Hammond's speciality, occupy a quarter of the book. He has chosen the technical term for process or tool most commonly in use. There has been, alas, no space for the rich local variations of these words.

I found that the book 'glowed like a Fletton'. It opened my eyes to much.

An Old Favourite

For several years, John Woodforde's "Bricks to Build a House" has been out of print but we have found an overlooked stock. This is a hard-backed book originally published in 1976. It has 208 pages and 112 coloured and monochrome illustrations and chronicles the history of bricks and brickmaking from ancient to modern times showing the architecture characteristic of each phase of development. It is excellent value at £3.50 (including postage and packing) and copies are obtainable from Suzanne Dix, Public Relations Officer, London Brick Company, Stewartby, Bedford.

And Another

George Smeed was a master brickmaker, cement manufacturer, hop factor and a ship and barge builder in the 19th century. His empire produced the materials for many of London's important buildings (Tower Bridge and Buckingham Palace to name but two), the Underground Railway and many of the Docks. The story is told in "George Bargebrick Esquire" (70 pages, 70 black and white illustrations, many of historical interest) price £3.25 (including P & P) from Meresborough Books, 7 Station Road, Rainham, Gillingham, Kent, ME8 7RS.

INFORMATION

BRITISH BRICK SOCIETY

INFORMATION 35
FEBRUARY 1985

EDITORIAL

As mentioned in my previous editorial, this issue of Information contains a number of articles concerned with the use of brick in churches. The original intention was to use this editorial to sketch in the background to these studies with an outline history of brick churches in England - with a glance at some of the continental material too. The amount of other material in this issue, however, necessitated some pruning, and it was the editorial which was dispensed with - doubtless to everyone's advantage! Suffice it to say, therefore, that there is an abundance of material for study here, from the early Middle Ages through to the twentieth century: in our next issue, indeed, I hope to include an account of three fine brick churches from our own century, all by Sir Giles Gilbert Scott (1880-1960).

Meanwhile, I should like to thank all those members who have contributed to these pages and to repeat my plea for yet further material - especially from those members who have not yet found time to put pen to paper (!).

Terence Paul Smith
Editor

FOURTEENTH-CENTURY BRICKWORK IN ALL SAINTS' CHURCH, MALDON, ESSEX

Patricia M. Ryan

In January 1984 members of Maldon Archaeological Group investigated the crypt below the early fourteenth-century south aisle of All Saints' Church, Maldon, Essex. The discovery of brick fragments of an unfamiliar type in the blockings of the bone-chutes led to a search for more brick. Over the years the walls and vaults of the crypt and stairwell have been covered with many coats of limewash, but close examination revealed a great deal of hitherto unsuspected brick. Whilst the rubble walling included a considerable quantity of brick, the west wall and lower vault of the stairwell were built entirely of the material. Several bricks of the same type were found in the exterior faces of the west and south walls of the aisle. The bricks measure approximately $10\frac{1}{2}$ by $5\frac{1}{2}$ by $2\frac{1}{2}$ -3 inches (265 by 140 by 75 mm.) and vary in colour from cream through yellow to purple and dark brown. Some have a marbled appearance. The crypt and aisle are contemporaneous and as the brickwork is an integral part of the fabric it must be of fourteenth-century date.

Brickwork of this date has been identified in a number of churches close to the Essex coast, for instance at Dengie, Lawford Asheldham, and Purleigh. Whilst in all cases the bricks are cream grading through yellow to pink, the majority being yellow, those in the fourteenth-century tower of All Saints', Stanway are pinkish red and similar in dimensions and in general appearance to those in All Saints', Maldon. When Purleigh Church was examined it was found that although most of the fourteenth-century bricks are yellow and measure 8 by 4 by 2 inches (200 by 100 by 50 mm.), a number of the All Saints' type are incorporated in the rubble walling of the chancel and north aisle. To date, two further instances of these bricks have been found in Maldon - in the Friary wall (a re-used situation) and in the Lloyds Bank site excavation in the High Street (1977).

Examples of fourteenth-century brickwork have been recognised in Norfolk and Suffolk. Although most are undercroft vaults, brick was also used quite extensively in the town defences of Norwich and Great Yarmouth, more often than not for inside work as at All Saints', Maldon. Plastering or numerous coats of limewash conceal the interior wall fabric of many buildings and it is possible that fourteenth-century brickwork may be more common than was previously thought.

Bibliography

- Royal Commission on Historical Monuments, An Inventory of ... Essex, vols. 3 and 4, London, 1921-3.
- P.J.Drury, 'Brick and Tile', in F.Williams, Pleshey Castle, Essex (XII-XVI Century): Excavations in the Bailey, 1959-1963, British Archaeological Reports 42, Oxford, 1977, pp.82sqq.
- J.A.Wight, Brick Building in England from the Middle Ages to 1550, London, 1972.

CHURCH TOWERS OF BRICK

David H. Kennett

Introduction

Medieval churches in England have two principal plan forms. The majority have a west tower, nave, and chancel. The division is clear between that part of the building provided for by the greater, or rectorial, tithes and that part whose upkeep fell to the parishioners. The rector, who may have been the incumbent, was statutorily obliged to repair that section of the church east of the chancel arch.

The other principal form of English medieval churches has a central tower with a nave to the west and a chancel to the east. Here there could be confusion as to where the responsibility of the parishioners ended and that of the rector began. A central tower has an arch both to the east and to the west. Most churches with a central tower included the tower within the ambit of the chancel. This was certainly the monastic practice, where the two easternmost bays of the nave might also be part of the monks' portion of the church, especially where the church was shared with a parish, as at Dunstable Priory, Beds. and Binham and Wymondham Priories, Norfolk. It is clearly the case also in a number of Norfolk churches which retain or once had a central tower: All Saints', Newton-by-Castle Acre; St Andrew's, South Lopham; the Church of the Assumption, West Barsham. The possession of transepts giving a cruciform plan did not preclude the inclusion of the crossing space within the area liturgically reserved to the officiant. This is so at St Mary's Church, Meppershall, Beds.¹

There are some churches with a crossing where the arrangements now make it seem that this was within the parish's rather than the priest's area of the church. Three Bedfordshire town churches can be instanced: St Paul's, Bedford; All Saints', Leighton Buzzard; and St Mary the Virgin, Luton. The evidence is clearest at the last named. The church now has a west tower, of early fourteenth-century date, built following the collapse of the former central tower. There is an arch only to the east of the crossing, and it is at the east that the stairs to the former rood loft are situated. However, this is the fourteenth-century arrangement created after the construction of manorial chapels east of both transepts. The earlier division was the west arch of the crossing space. The church has transepts which were heightened in the fifteenth century. These were integral to the original plan as were the aisles to the nave. But in the original plan the west walls of the transepts were not pierced to permit access from the aisles: this was only achieved around 1200 for the south aisle and slightly later in the case of the north aisle. Solid walls at the east end of the parish portion defined the limits of responsibility. As the Middle Ages progressed, so parish activities, particularly of gilds, required more space within the church building. The dynamics of human interaction, combined with the growing restriction of the Mass to a priestly function, thus requiring less space for its celebration, suggests that where possible within existing buildings the parishioners were determined to utilise as much space as they could for themselves. Thus, when St Paul's, Bedford was rebuilt, largely after 1416, the crossing space and the transepts equally were appropriated to the parish portion of the church. The thirteenth-century rebuilding of Leighton Buzzard church was followed by refenestration in the

fifteenth century, the same general period to which the surviving screenwork to the aisled chancel belongs.²

Brick Towers

Church towers built of brick are all west towers. Thus churches with a brick tower conform to the pattern of tower, nave, and chancel, with the area liturgically reserved to the priest clearly defined at the east end of the church.

The present plan of some churches with brick west towers can be shown to be a radical re-arrangement of the primary plan. One has been previously published; two others have been examined by the author.

(i) St Peter's Church, Ubbeston, Suffolk

The church dedicated to St Peter at Ubbeston, Suffolk has been declared redundant. Prior to its conversion to a private dwelling in 1976, it was surveyed by R.D.Carr and members of the Suffolk Archaeological Unit. They found that the present church with a west tower of brick was originally a three-cell structure consisting of a nave, an axial tower, and an apsidal chancel. It is suggested that a fourteenth-century window in the nave wall is to be connected with the demise of the central tower. At that time, or perhaps later, the nave walls were reduced in height; the present roof is an addition to an existing structure. Perhaps for as long as two hundred years the church may have functioned without a tower. Wills dating to 1529 and 1541 record the approximate date of the building of the brick tower.³

(ii) St Peter's Church, Carlton, Suffolk

St Peter's church is to the south-west of the few grouped houses of the hamlet of Carlton, itself now relegated to a junior position in the civil parish of Kelsale-cum-Carlton, north of the small market town of Saxmundham. Sir Nikolaus Pevsner accurately describes the church: 'W tower of brick, Cl6. Traces of dark blue diapering. Nave and chancel with Norman masonry and fenestration of c.1300.'⁴ What is not recorded is that the chancel is exceptionally long, as long indeed as the nave. This in itself is suggestive: the priestly function of the celebration of Mass does not require a great space. The exterior of the flint wall structure has two vertical rows of squared stones, one corresponding to the position of the chancel arch, the other approximately 4 metres to the east. This would suggest that originally the church at Carlton had a central tower. This was replaced in the sixteenth century by the present west tower of brick. There is also a brick porch at this church.⁵

(iii) St Nicholas' Church, Castle Hedingham, Essex

The church at Castle Hedingham is essentially of twelfth-century date with fifteenth-century fenestration except for the east window of the chancel, which is one of five rose-windows of Romanesque style in England. There is a west tower of brick, dated to 1616 but from the arch between the tower and the nave more probably of early sixteenth-century date. It is likely that the date-stone relates to repairs, not to the original building of the tower. There is also a brick porch and much brick is used in the clerestory and the battlements.

The present nave has six bays, alternately circular and octagonal piers dividing the nave from the aisles. Above the easternmost pier of the north arcade is a doorway. From its position and height it was clearly intended to give access to a rood loft crossing the nave. If this be the case, then what is now the eastern bay of the nave and of both aisles was initially within the area reserved for priestly

functions, with the easternmost bays of the aisles functioning as quasi-transepts. They may, of course, have been built as transepts and the plan then modified. Supporting evidence for an original crossing space comes from the chancel arch, rich in zig-zag ornament though pointed. It is here that the fifteenth-century rood screen was placed.

In its present appearance, St Nicholas' church has the whole of the nave and aisles within the parish area. At least when built, around 1180, this was not the case. But it is improbable that the church belonging to the village which possessed the stronghold of so powerful a Norman baron as the Earl of Oxford would have been built as late as the last two decades of the twelfth century. It is tempting to suggest a primary, large cruciform church, the crossing (and tower) of which occupied the position of the eastern bay of the present nave. There is evidence to indicate that the late twelfth-century church had a west tower, replaced by the present brick tower; its eleventh-century predecessor seems to have been of a different plan.⁶

Plan Change in Medieval Churches

This note has drawn attention to two certain cases of brick west towers being an alteration to the plan form of the village church. At both Carlton and Ubbeston, the churches originally possessed a central tower. Today there is a west tower. Similarly at Castle Hedingham, no less than with the documented change to the church at Luton, the remnant indications of a central crossing space in a church with a prominent west tower, designed to be a showpiece, suggest a complex series of changes in the church plan.

In the Appendix, brick church towers are listed, together with examples of stone towers since these too may indicate where a change of plan has taken place.⁷

Notes and References

1. These problems are examined in depth in D.H.Kennett, The Making of East Anglia, forthcoming, 1985, chapter 3. For individual churches noted in these paragraphs see: N.Pevsner, The Buildings of England: North-East Norfolk and Norwich, Harmondsworth, 1962; idem, ...North-West and South Norfolk, Harmondsworth, 1962; idem, ...Bedfordshire, Huntingdon and Peterborough, Harmondsworth, 1968, sub nom.
2. For these churches: Pevsner, op.cit. (1968), sub nom.
3. R.D.Carr, 'A Survey of the Church of St Peter, Ubbeston', East Anglian Archaeology, 3, 1976, 155-69.
4. N.Pevsner, The Buildings of England: Suffolk, 2nd ed. revised E. Radcliffe, Harmondsworth, 1974, p.159.
5. Personal observation by the author, August 1982.
6. N.Pevsner, The Buildings of England: Essex, 2nd ed., revised E. Radcliffe, Harmondsworth, 1965, pp.111-13; personal observation by the author, May 1983.
7. Paper completed 1 June 1984.

(Appendix overleaf)

Appendix: Medieval and Tudor Brick Tower

<u>Bedfordshire</u>	
Whipsnade	C16; body of church C18.
<u>Berkshire</u>	
Bradfield	?C15; interior of church C12 and C14.
<u>Buckinghamshire</u>	
Dorney	c.1430; C17 south porch of brick.
Hitcham	Tudor.
<u>Essex</u>	
Abberton	Early C16.
Berechurch	C16.
Billericay	Late C16.
Castle Hedingham	C16, repaired 1616; nave arcades C12. (See text)
Colne Engaine	Early C16; stone base; Norman nave; C13 chancel.
Downham	c.1500; body of church 1871 (Street).
Earl's Colne	c.1500; body of church 1884 with C14 south aisle.
Fryerning	Late C15/early C16; nave C11/C12.
Gestingthorpe	1498 (bequest); nave C11/C12 and C14.
Great Holland	?C16; body of church 1886 (Blomfield).
Ingatstone	C15; body of church C11/C12; much C16 brickwork.
Laver Marney	Late C15/early C16; rest of church contemporary.
Leyton	C16 with buttresses of 1658; church C17.
Liston	Early C16; body of church C11/C12.
Little Oakley	c.1500, incomplete; nave C11/C12; chancel c.1330.
Nazeing	C15/early C16; nave C11/C12.
North Weald Fassett	Tudor; nave C14.
Ramsey	C15; body of church C12 and later.
Rayne	c.1510; body of church 1840.
Rochford	Tudor, pre-1515; contemporary church.
Sandon	Tudor, ?1502 or 1505 or perhaps 1520; nave and chancel C11/C12 with C14 north aisle.
Theydon Garnon	1520 (inscription); north aisle red brick, 1644; nave C18 and 1885.
Thorpe-le-Soken	Early C16; body of church 1876 (White).
Tilbury-juxta-Clare	1519; nave and chancel C15.
Tollleshunt Major	Prob. c.1540-45.
Ugley	Early C16; start of nave south wall in brick; re-building 1866.
Weeley	Early C16; body of church 1881 (E.C. Robins).
Wickham St Paul	c.1505 (bequest).

<u>Huntingdonshire</u>	
Diddington	Early C16; north arcade and chancel C13; rest later rebuilding.
Southoe	Late C15/early C16 (north-west tower); rest of building C11/C12 to C15.
<u>Lincolnshire</u>	
Tydd St Mary	C15 on stone base; stone spire; nave C11/C12; chancel c.1300.
<u>Middlesex</u>	
Harmondsworth	c.1500, (Now London Borough of Hillingdon)
Littleton	c.1500. (Now Surrey)
<u>Norfolk</u>	
Burgh St Peter	Early C16, upper part rebuilt C18; nave and chancel C11/C12. (Also known as Wheatacre Burgh)
Claxton	C16, rebuilt from C14; nave C11/C12; chancel 1867.
Walpole St Andrew	C15; body of church C14 and C15; tower probably last in building sequence.
Wheatacre All Saints	Early C16, chequerwork in flint and red brick with stepped buttresses; body of church C19.
<u>Nottinghamshire</u>	
Edwalton	Early C16; nave earlier with C14 arcade; chancel 1894.
<u>Suffolk</u>	
Ashbocking	Early C16; nave C14; chancel late C13.
Boulge	Early C16; body of church Victorian.
Carlton	Early C16; nave and chancel C11/C12 with C13/C14 fenestration. (Now Kelsale) (See text)
Charsfield (i.e. Akenfield)	c.1500; nave and chancel in one C11/C12 with later fenestration.
Chilton	C16; south chapel C16 brick.
East Bergholt	C16, possibly 1525, incomplete, attributed to Thomas Wolsey; body of church late C15; ref. to new aisle 1442-3.
Hargrave	Tudor; nave C11/C12; chancel includes C13 work.
Hemley	C16; body of church 1889 but retains font of C12.
Hoo	C16; nave and chancel in one, C14 fenestration.
Ipswich: St Mary-at-the-Elms	C16; cruciform plan now lacking south transept; nave C11/C12 rebuilt in C14 with brick north aisle.
Kesgrave	C16 but flint base could be earlier; nave and chancel in one, fenestration of c.1270.
Shipmeadow	C16 brick with flints; nave and chancel C11/C12 with windows c.1300.
Ubbeston	C16; nave and chancel C11/C12. (See text)
Waldringfield	Early C16; nave and chancel in one, over-restored 1864.

Sussex

Twineham

Early Tudor; much of church is brick.

Yorkshire East Riding (now Humberside)

Kingston-upon-Hull C14 brick and later upper part of stone; main body of church C14 brick or early C15 stone.

(i.e. Hull)

Sutton

C15; body of church post-1346.

STONE TOWERS

Bedfordshire

Luton: St Mary

Cruciform plan with chapels east of transepts; chequered flint and freestone tower of C14 following collapse of central tower.

Essex

Little Wakering

Tower by Bishop Wakering of Norwich (1416-25); nave and chancel C11/C12.

Suffolk

Framlingham

Church of C15/C16 retains chancel arch of C12; bases to piers are substantial enough to take a former central tower.

Henley

Tower 1505 (inscription); nave C12 with C16 terracotta window in south wall of nave; chancel C13.

Henstead

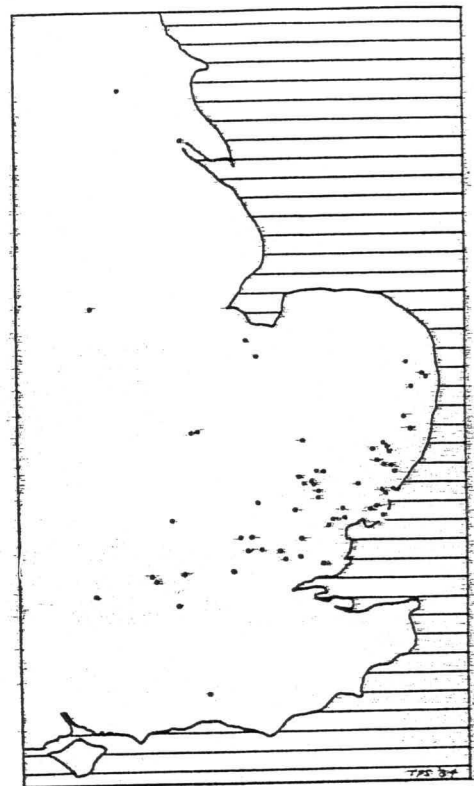
Tower 1470; nave and chancel in one C11/C12.

Orford

Tower C14 to nave and aisles C14; chancel C12 (begun 1166) with east wall of north transept contemporary; south aisle full width of transept; north aisle cuts east wall of transept which retains C12 work. Piers to C12 chancel arch on substantial bases.

South Elmham Holy Cross

C14 tower and chancel; nave C11/C12.



Medieval and Tudor Brick Church Towers

SOUTH PORCH, BAPCHILD CHURCH, KENT

terence Paul Smith

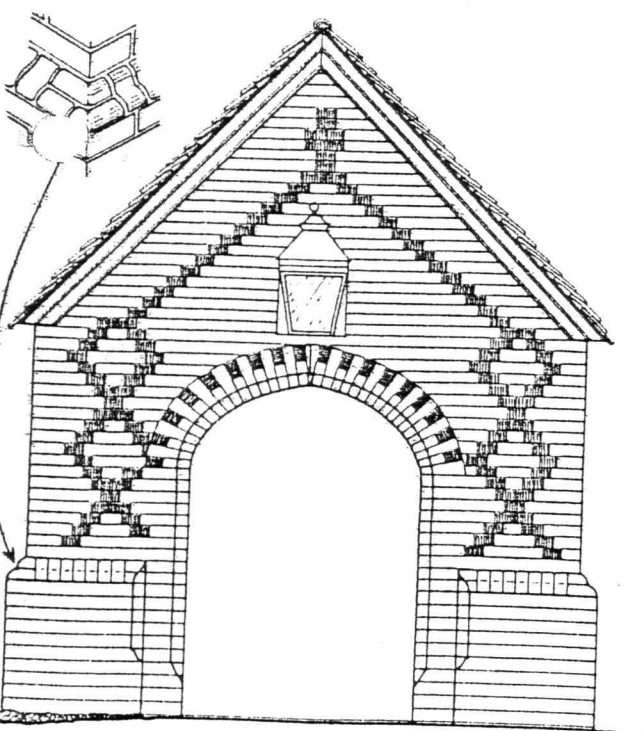
Although there is a little very early brickwork in Kent, for example at Grench Manor, Gillingham of c.1378, and although Sandwich possessed a municipal brickyard in the fifteenth century, the county is far less well endowed than East Anglia with brick buildings of the formative years, say up to c.1450. Even the Dent-de-Lion gatehouse at Garlinge, near Margate - of before 1445 - mixes flint with the bricks. At Canterbury Cathedral, from 1494, brick was extensively used in the central ('Bell Harry') tower, though faced with ashlar and so not visible from the exterior. From the sixteenth century, however, there are a number of major uses, such as ecclesiastical palaces at Bekesbourne or Otford; the complete church at Smallhythe (c.1516) and more minor additions to churches, such as the Roper Chapel at St Dunstan's, Canterbury; and increasing secular use, as at Lullingstone Castle gatehouse or the largely demolished royal palace built by Henry VIII on the site of the former Dartford Priory.

The building noted here (fig.1) is a minor use. It was studied in June 1984, and I am grateful to Mr G.J.Walder for help with measuring. The south porch was added to the Norman church of St Lawrence, Bapchild, near Sittingbourne c.1533. It is of red bricks (9½-9¾ by 4¼-4½ by 2-2¼ in/

241-8 by 108-14 by 51-7 mm) laid in English Bond, on a low foundation of flint. The porch measures some 10 ft (3 m) north-south by 11 ft 4 in (3.5 m) east-west. On the front face, above the arch, is a relatively recent lamp. Around the base, about 3 ft (0.9 m) high, is a plinth whose top is made up of specially moulded bricks laid on edge; the corners of this are constructed from large purpose-made units laid flat. There are further special bricks towards the entry in the front face, where the off-set drops vertically to a stop. The entry arch itself is four-centred and made up of squinchons; the number of 'voussoirs' each side is not the same. The plain chamfers have simple stops close to ground level. Squinchons are also used for the small windows, one in each side wall (the eastern one blocked), which are of a single light and have equilateral-pointed heads.

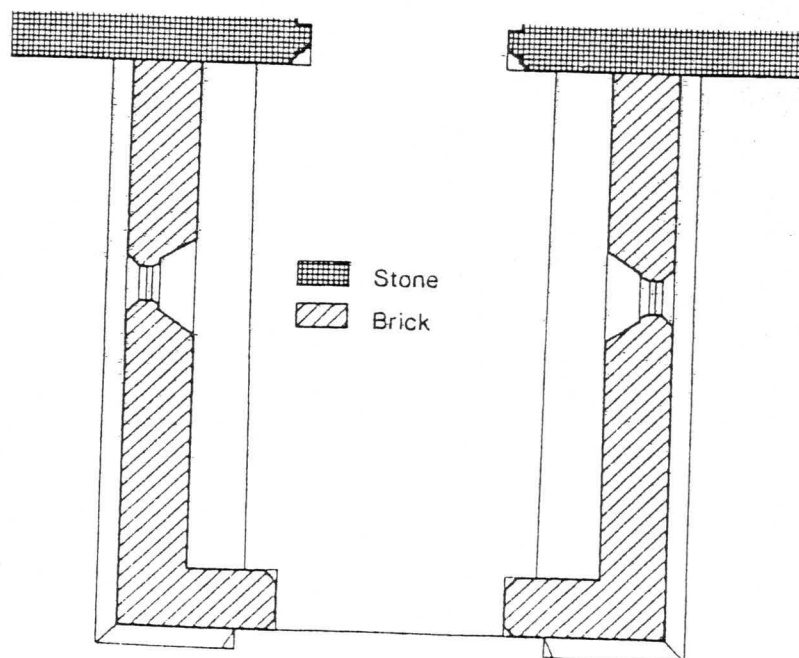
The front face is decorated with diaper work in black bricks. Each side of the entrance arch is a pair of vertically linked lozenges with an inverted-V at its foot. From the tops of the upper lozenges rises a large inverted-V topped by a cross; the pattern, though symmetrical, is not quite centrally placed, the top being deflected somewhat to the east. The cross is presumably a deliberate creation, appropriate to the entrance to a church. (Cf., e.g., the large cross on the church tower at Sandon, Essex.) Alternate black headers are also used in the arch-head, to give a banded effect - not an especially common device in English brick buildings, though found some seventy or eighty years earlier in the window-heads at Hussey Tower, Boston, Lincs., and c.1520 on the brick church at Layer Marney, Essex and on the demolished Bradfield Hall, Essex of the same date; the sixteenth-century palace at Otford, Kent also has them.

The gable verges are straight-sided and masked by moulded barge-boards. The almost flush ends of the wall-plates are also visible here. The interior of the porch is plastered and little is visible apart from the moulded wall-plates. There are two side-benches, of solid brick construction with wooden seats.



SOUTH ELEVATION

0 5 Feet



PLAN

0 2 Metres

BAPCHILD, KENT

ENGLISH BOND AT CARDINGTON, BEDFORDSHIRE

David H. Kennett

English Bond is attractive and distinctive with its alternate courses of headers and stretchers. Three barns of varying dates at Chapel End, Cardington, Bedfordshire are worthy of note. Two belong to the farm adjacent to the chapel (NGR: TL093482); the third is to the south-west (NGR: TL092481). Neither of the farms has a visible name.

Barn A is adjacent to the Cople Road, Cardington, on the west side of a public footpath adjacent to the Wesleyan Chapel of 1823. This is a large barn of several sections forming an oblong series of buildings grouped round a courtyard. The south wing is two storeyed with a gable from the east wing at the east end of the south face. This is approximately 75 ft (22 m.) in length. There is a gable-end to the west wall; the east end is hipped within the gable of the east wing. This barn is of brick on the south, west, and north sides, except for openings for doors and windows on the north side. The whole of this wing is built of good quality red bricks, of standard nineteenth-century size, and laid in English Bond.

The remaining wings of the barn have low walls of brick in English Bond; the upper parts of the walls are clapboarded on a timber-frame. Parts are single-storey, viz. the east and west ranges; these have pantiles. The north range and part of the east range have two storeys; these, like the south range, have plain tiles.

There is a date-stone of '1897' on the adjacent farmhouse, which is part of the Whitbread estate in Cardington. This may provide an indication of the date of this barn.

Barn B is to the north of Barn A, along the public path which runs to the east of the latter. Barn B is of the twentieth century, roofed with corrugated iron and with the walls of the centre section also in corrugated iron. The northern section is brick and in Flemish Bond. The southern section of Fletton bricks has been laid in English Bond.

Barn C is on the other side of the road and is associated with a large, unnamed house, for which it now serves as a garage. The bricks of Barn C are dull red except for the uppermost five courses, which are of a yellow brick. The level of discolouration suggests that the building is of early nineteenth-century date. The bond is English Bond.

Magnetic Intensity Research Project. (I have received the following request for help from the Research Laboratory for Archaeology and the History of Art in the University of Oxford. Members may be able to help, and should contact Gill Bussell direct at the address given below. TPS)

The above named project, which is under way at this Laboratory, is concerned with the past history of the earth's magnetic field intensity which we are investigating by means of measuring the magnetization 'recorded' in bricks, tiles, and pottery when they cool down after firing.

We are interested in buildings containing well dated bricks from the sixteenth to the nineteenth centuries, as this is a period from

which we are particularly keen to obtain material. Bricks of earlier dates are also of interest to us, since we are keen to extend our reference data as far back as possible.

Our measurements are made on small samples removed with the use of a corer and a hand-held, battery-operated drill. The material thus removed is in the shape of a cylinder approximately 3mm by 3mm. Ideally we like to take two such cylinders from approximately four bricks (dated at c.25-year intervals), preferably internal ones which have not been exposed to the weather.

Certainty in dating (to within ± 20 years, or better) is an important ingredient for success in our project; consequently we have to avoid any risks of sampling bricks that might be repair replacements or that have undergone reheating, e.g. in a fireplace or oven.

If you have information which you think would be of use to us please write to: Gill Bussell, Research Assistant, Magnetic Intensity Research Project, Research Laboratory for Archaeology and the History of Art, Oxford University, 6 Keble Road, Oxford, OX1 3QJ.

Gill Bussell

More about Bricks with Straw. Information 31, November 1983, 7-8, carried an abstract of an article by

Dr Henry Stern on the use of straw in making early bricks - specifically those made by the Hebrew slaves during the Egyptian captivity. Geoffrey Hines has kindly sent me a copy of a letter which appeared as long ago as 1972; it was written by A.F. and E.M. de Ledesma and appeared in New Scientist, 28 December 1972, 765. Referring to bricks that they have made - 'over a million' of them - in Northern Argentina, they claim that the straw was never used to bind the clay. In their own manufacture, a mud bath was first prepared using top soil with plenty of straw mixed in. After thorough mixing the material was moulded into bricks and left to dry. Later they were restacked 'in lattice-like walls' for further sun-drying. They were then fired in a kind of clamp, and 'if we were lucky' some 60% were good quality bricks. The straw, they maintain, was 'essential to draw the flames into the heart of the bricks so that they might be cooked throughout'.

TPS

Historical Metallurgy and Fire-Bricks. I have received - via Michael Hammett - a letter from Charles R.Blick, Conservation Officer to the Historical Metallurgy Society Ltd. In the course of its work the society sometimes needs to identify fire-bricks from blast-furnaces and asks our help. Although the interests of our own society focus primarily on building bricks and their use, it may be that some members are also interested in fire-bricks and thus may be able to help Mr Blick and the HMS. Any offers of help will be gratefully received and members should contact the HMS direct: Charles R.Blick, Esq., Conservation Officer, The Historical Metallurgy Society Ltd, 123 Maple Way, Burnham-on-Crouch, Essex CM0 8TS. (Those who wish to join the HMS should contact Mrs Kathleen Taylor, Membership Secretary, The Historical Metallurgy Society Ltd, 'Windermere', Maules Lane, Hambrook, Bristol BS16 1QF.)

TPS

BRICK KILNS: AN ILLUSTRATED SURVEY - III

M. D. P. Hammond

Suffolk Kilns

The Suffolk kiln developed from Roman and medieval prototypes. Many disused examples remain in East Anglia, often built into sloping ground. The bricks are usually set on the level floor of the open-topped firing chamber, and the top of the setting sealed with loose burnt bricks. The kiln-burners open and close the gaps between these to control the draught. Flames reach the chamber through slots ('pigeon-holes') in the arches of one or more fire-tunnels below the floor. Coal-fired kilns have grates in the tunnels.

Roman brick and tile kilns¹ varied from 1.8 m. square to 4.9 by 4.7 m. in plan area. Some had only one fire-tunnel but the larger examples had two. The height of the chamber is not known, but the walls may have been low enough to allow tiles to be passed by hand to someone setting inside. Only one showed evidence of a wicket. The length of the fire-tunnel varied according to the type of fuel used, usually wood, but occasionally peat or coal. A long fire-tunnel, measured between the fire-mouth and the front wall of the chamber, gave more chance for the combustion air to combine with the fuel, giving an oxidising atmosphere and a higher temperature. Sometimes there was a block just outside the fire-tunnel, on which the outer ends of logs could rest, allowing air to pass underneath them. Kilns were usually constructed of broken tiles and loam. Tiles seen in surviving buildings are generally well burnt. There must have been variations in temperature, and rejects, and it would seem that the underburnt and overburnt tiles were ground up for use in *opus signinum* mortar. Drains formed of *imbrex* tiles were sometimes put under the floor of the fire-tunnels. As these were usually dug into the ground, the presence of water would affect the kiln's performance. Similar drains were noted as features of several of the East Anglian Suffolk kilns surveyed.

Medieval kilns frequently had two fire-tunnels close together. The kiln at the tileworks at Danbury, Essex, excavated by Crury and Pratt² was 2.2 by 2.0 by 1.5 m. internally. The walls,

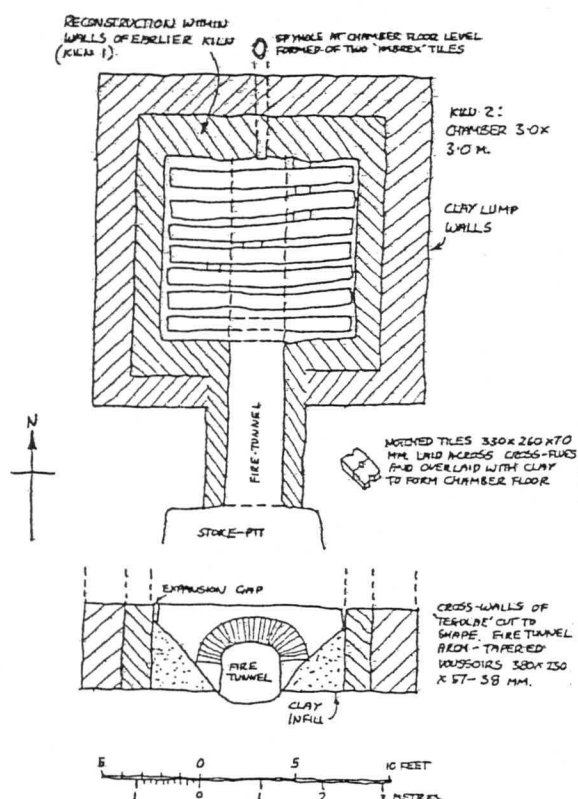


Fig.1 Moat Farm, Lexden, Essex
(Late 1st century)
After McWhirr

built of waste tiles, were 35 cm. thick except the front wall, which was 45 cm. thick, widening to 70 cm. just above the firehole arches. These arches were 90 cm. wide and 50 cm. high, with a 22 cm. pier between. The chamber floor was supported on six arches with 10 cm. slots between. The top of the kiln was estimated to be 75 cm. above

the contemporary ground level. The method of setting and covering the top of the kiln was discussed at length in the excavation report. A complicated temporary roof was suggested to explain the use of the various items of kiln furniture found. The writers conclude that the walls of many medieval kilns were not substantial enough to support a vault, but the stoke pit is likely to have had a tiled roof. The same might be said for Roman kilns. The question whether or not such kilns had vaulted tops has been much debated in the past. In my opinion, the surviving Suffolk kilns have been built in a tradition of more than two thousand years' duration, and only very few of them are vaulted. The only real advantage of a vault is that it keeps the heat in better.

Dobson³ uses the term 'Suffolk kiln' for a rectangular kiln with two arched furnaces under the floor for the whole length of the kiln. They were usually 20 ft. long by 15 ft. wide, and held 40,000 bricks. The fuel consumption for Suffolk Whites was 10 cwt./1000 bricks in a sixty-hour firing, and 7 cwt./1000 bricks in a forty-hour firing for reds. The East Anglian kilns were substantial buildings with covered stoking-pits and a coal-cellar or 'hopper' on one side and a sleeping-room complete with fireplace on the other, all covered with brick vaults or tiled lean-to roofs. The two or three fire-tunnels were vaulted with an equilateral pointed arch of about 80 cm. span. In coal-fired kilns the grate was level with the springing of the arch, and was about 35 cm. wide and 3.6 m. long. During firing the firemouth could be closed with a temporary brick wall supported on the grate, leaving an opening 30 cm. wide by 45 cm. high, closed with a door of 'pamment' tiles in an iron frame, suspended on a chain from a hook above the opening. To open the door a short chain on the side of the frame was pulled aside and fastened to a hook at the side of the opening.

The pointed arch appears to be universal throughout the London area and East Anglia. Unlike a semi-circular arch, it can sustain the conditions of intense heat and heavy load without distortion, and this fact appears to have been appreciated in Roman times. However, in those kilns in Dorset through to Sussex and Surrey semi-circular arches are invariably used. The flames tend to be drawn towards the far end of the fire-tunnel, so even though the fire is maintained at the front end the back of the kiln is usually hotter than the front. I have noticed this in my own kiln, and it is confirmed by tests done on the Ashburnham kiln (see below). Very rarely in a coal-fired kiln did the grate extend the full length of the fire-tunnel. There are other limitations such as the size of the fire-irons, and how far

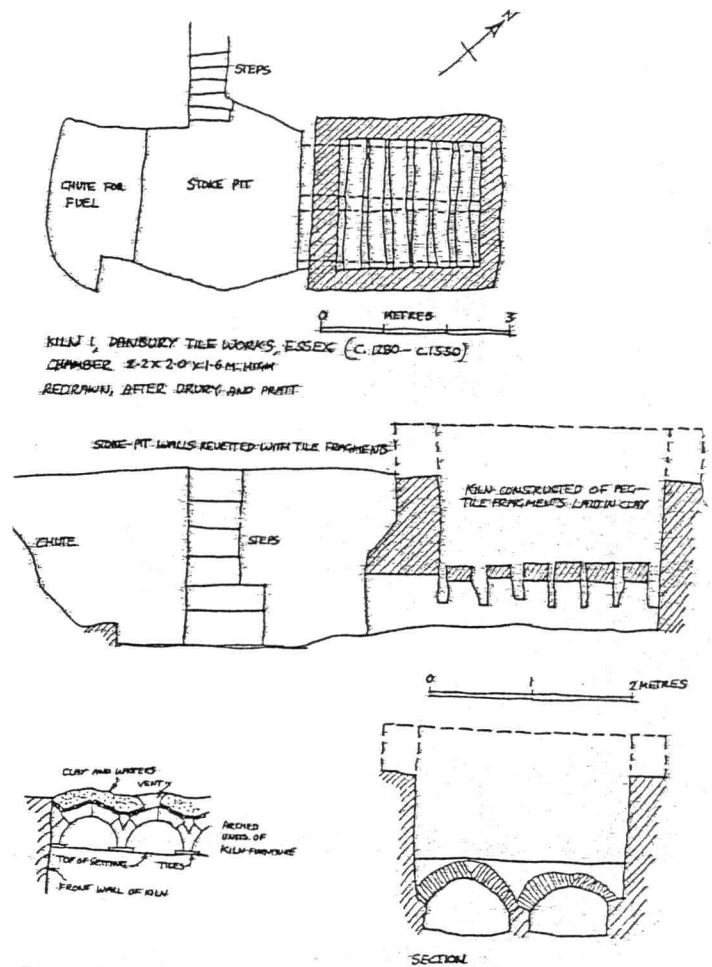


Fig. 2 Danbury, Essex

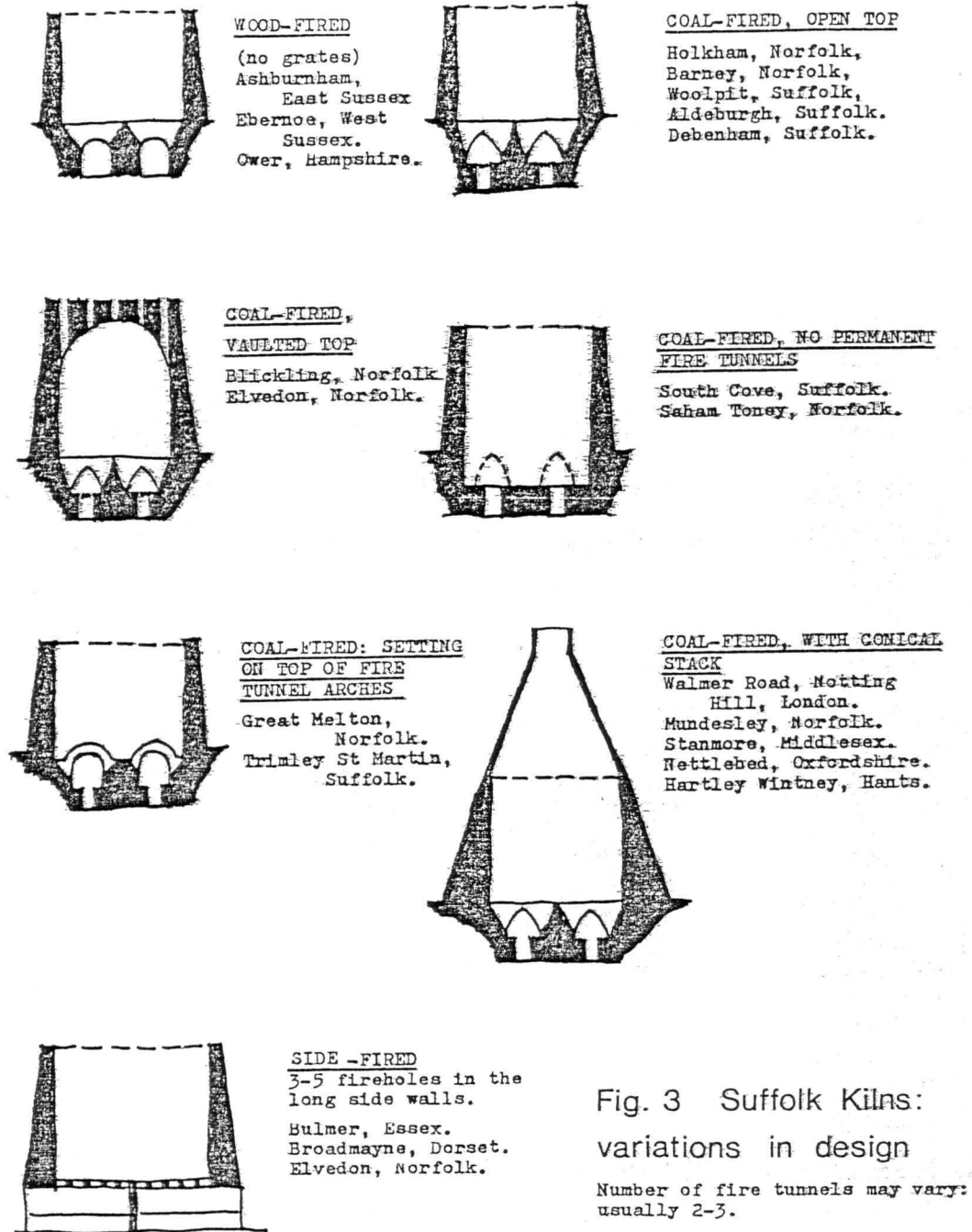


Fig. 3 Suffolk Kilns:
variations in design

Number of fire tunnels may vary:
usually 2-3.

it is possible to throw a shovelful of coal.

The fire-irons for a Suffolk kiln comprised a 'hoe' or fire-rake, a 'dust pan' or ash scoop of sheet metal with a wooden handle, and a shovel. The handles of the two former were of a length to suit that of the grate. At Ashburnham a wooden rake called a 'revel' (Latin: *Rutabulum*) was used for raking out the ashes every six hours. It was soaked in a nearby stream between firings to keep it wet. An ordinary shovel was used for stoking, but at the Cove Bottom brickyard at South Cove near Lowestoft, where the grate was 5.4 m. (18 ft.) long, a shovel with a flat blade in line with the handle was used. With it the coal could be shot to the far end of the grate with considerable speed and accuracy through the narrow firehole. The hoe was over 20 ft. long and needed two men to use it, one on the handle whilst the other

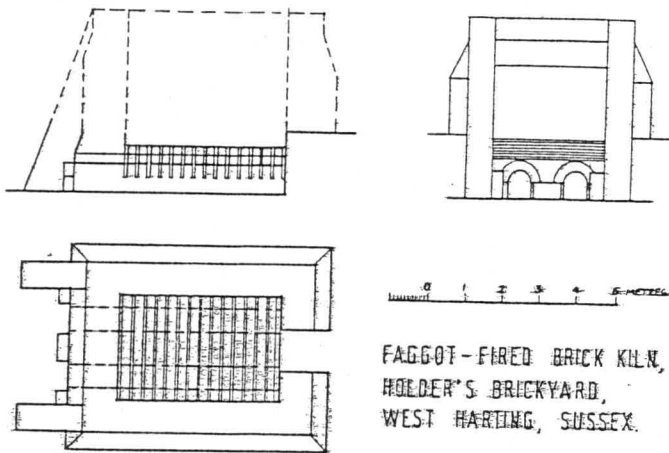
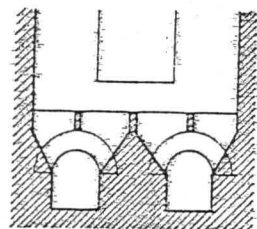


Fig. 4

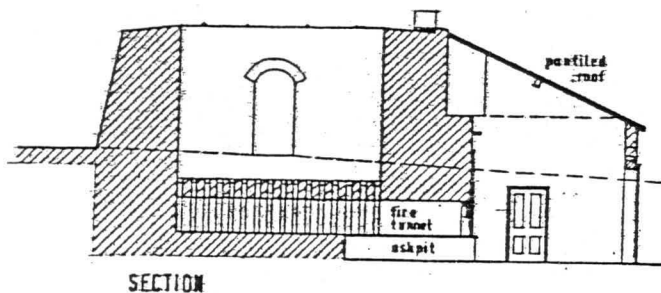


Section through fire tunnels

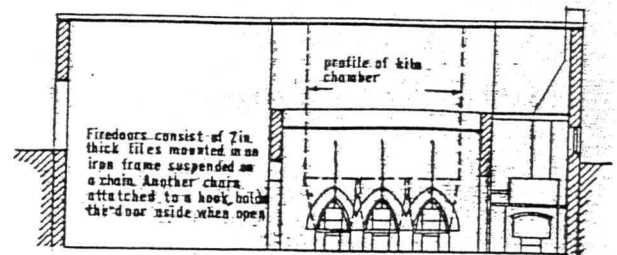
supported it on the blade of the shovel. It was often red hot when withdrawn from the fire, and it could be partly supported on the front end of the grate, with the blade turned upwards so as not to dislodge the firebars.

Another design feature of some East Anglian kiln chambers is the rounded corners (usually about 30 cm. radius) in place of an angle. This apparently resists distortion of the walls caused by expansion and contraction.

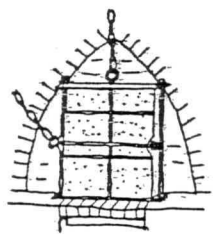
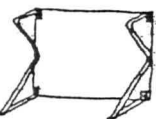
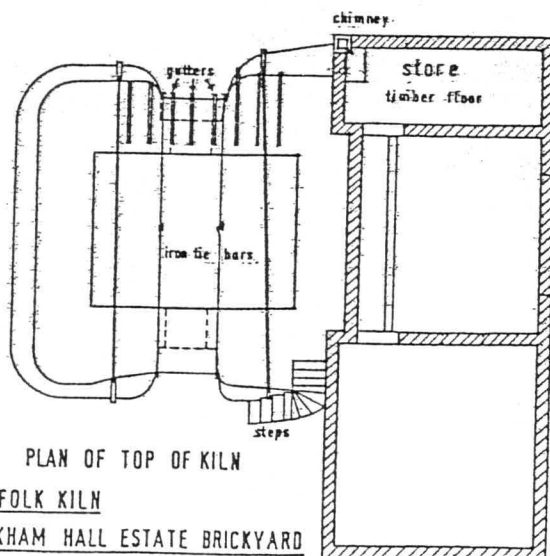
The last commercial wood-fired kiln in Britain, at Ashburnham Manor, near Hastings, Sussex (NGR: TQ 684161) was fired for the last time in November 1968. Firings lasted only 50-54 hours following a 72-hour water-smoking period at a temperature no higher than 240°C . Final temperatures reached were $1000-1200^{\circ}\text{C}$.⁴ Fuel consumption is



SECTION

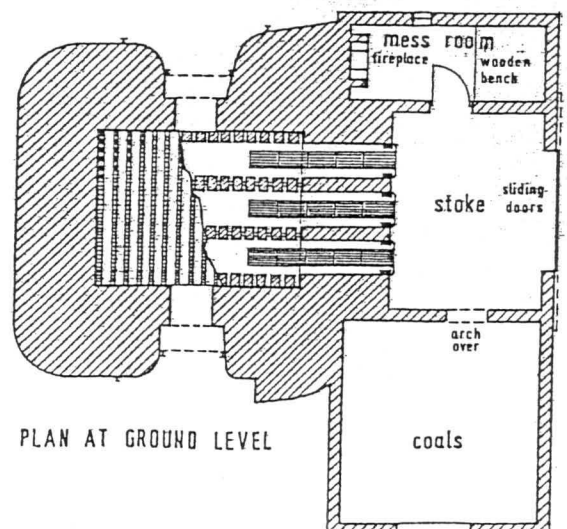


ELEVATION OF FRONT OF KILN

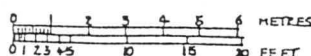
FIREDOOR, HOLKHAM
5' x 8' x 2" YELLOW
'PATENT' TILES IN IRON
FRAMEASHPIT CLOSURE PLATE,
HOLKHAM. SHEET IRON,
FOR CLOSING FRONT OF
THE ASHPIT AT THE END OF
THE FIRING

PLAN OF TOP OF KILN

SUFFOLK KILN

HOLKHAM HALL ESTATE BRICKYARD
HOLKHAM, NORFOLK. built 1865

PLAN AT GROUND LEVEL



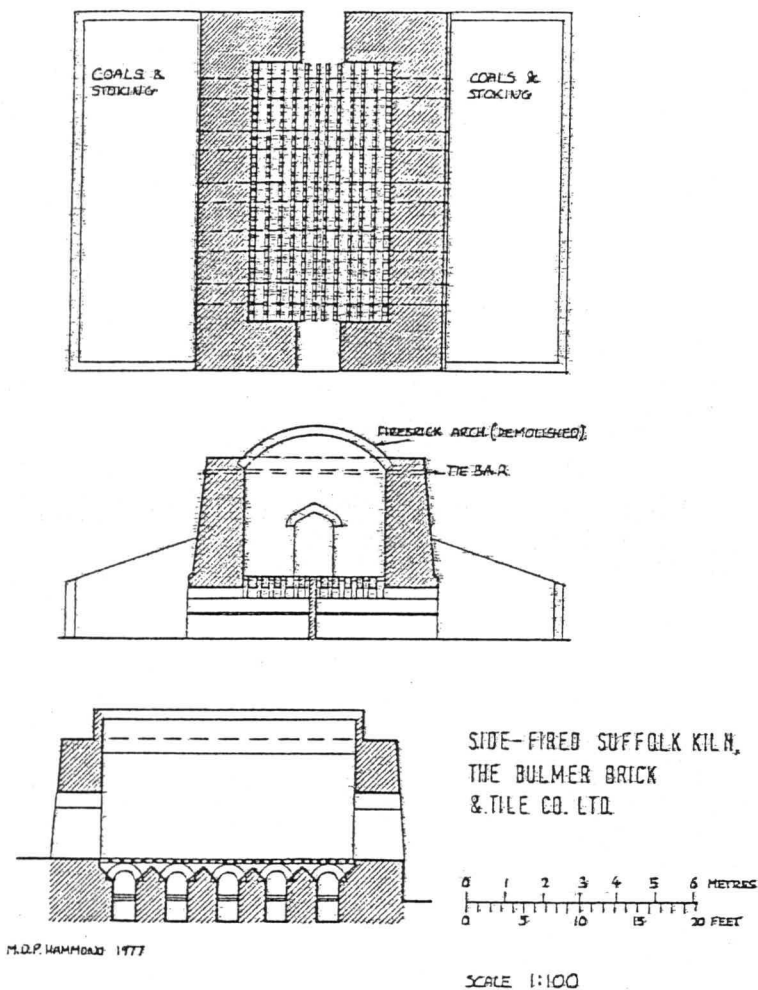


Fig. 6

not recorded as the wood was cut on the estate: it did not have to be purchased from outside and so did not need to be weighed. Silver birch or hornbeam were preferred, but willow, alder, sycamore, Scots pine, and sweet chestnut were also used. Parry⁵ quotes 1 ton/1000 bricks for wood firing in kilns of this type. Brushwood faggots were used before 1930, and were still used later to light the kiln. Logs up to 6 in. diameter and 3 ft long were fed in continually, and the ashes, of which large quantities accumulated, were raked out. The maximum temperature was held for about eight hours, during which time the shrinkage of the bricks was watched by sighting across the top of the kiln. 'Tins' - metal plates - were placed over the fire-tunnel mouths for an hour at a time to restrict the draught and drive the heat to the top of the chamber, and also at the end of firing.

The brickyard at Swanton Novers, near Fakenham, Norfolk manufactured bricks, pantiles and terracotta ware.⁶ The kiln was wood-fired, with a single fire-tunnel under the chamber floor, which was carried on thirteen arches with slots between. The arch was wider where it passed under the front wall: a similar feature can be seen in the wood-fired kiln at Blicking Hall estate yard. Bricks were set first in the chamber, up to 5 feet from the top of the walls, and water-smoked for a day (Monday). Tiles and pottery, coated with a black glaze consisting of red lead, manganese, lamp-black, and flour, were then set in on Tuesday. On Wednesday water-smoking was resumed and kept up until 6 a.m. on Thursday when firing began. By Friday three men were needed: one to watch the top of the kiln and two to stoke as hard as they could. The top of the kiln was covered with two courses of bricks laid flat, and shrinkage of the setting was monitored by watching the settlement of this covering. Various fuels from brushwood faggots to small tree trunks were used. The latter were manoeuvred into the fire-tunnel by four men, two in front and two behind, and placed in the middle of the fire. Smaller stuff, up to 3 in. diameter, was piled around them. The firing was considered finished when the required amount of shrinkage had taken place. This usually happened between 5 a.m. and 11 a.m. on Saturday. Two hours after stoking stopped, the fire-tunnel was sealed with an iron door and loam. On the following Wednesday the top 2 ft. of the wicket clammings were taken down, and a bit more of it on Thursday. On Friday the rest was taken down and the kiln drawn, with three men with barrows and one man inside handing the bricks to them.

cont./

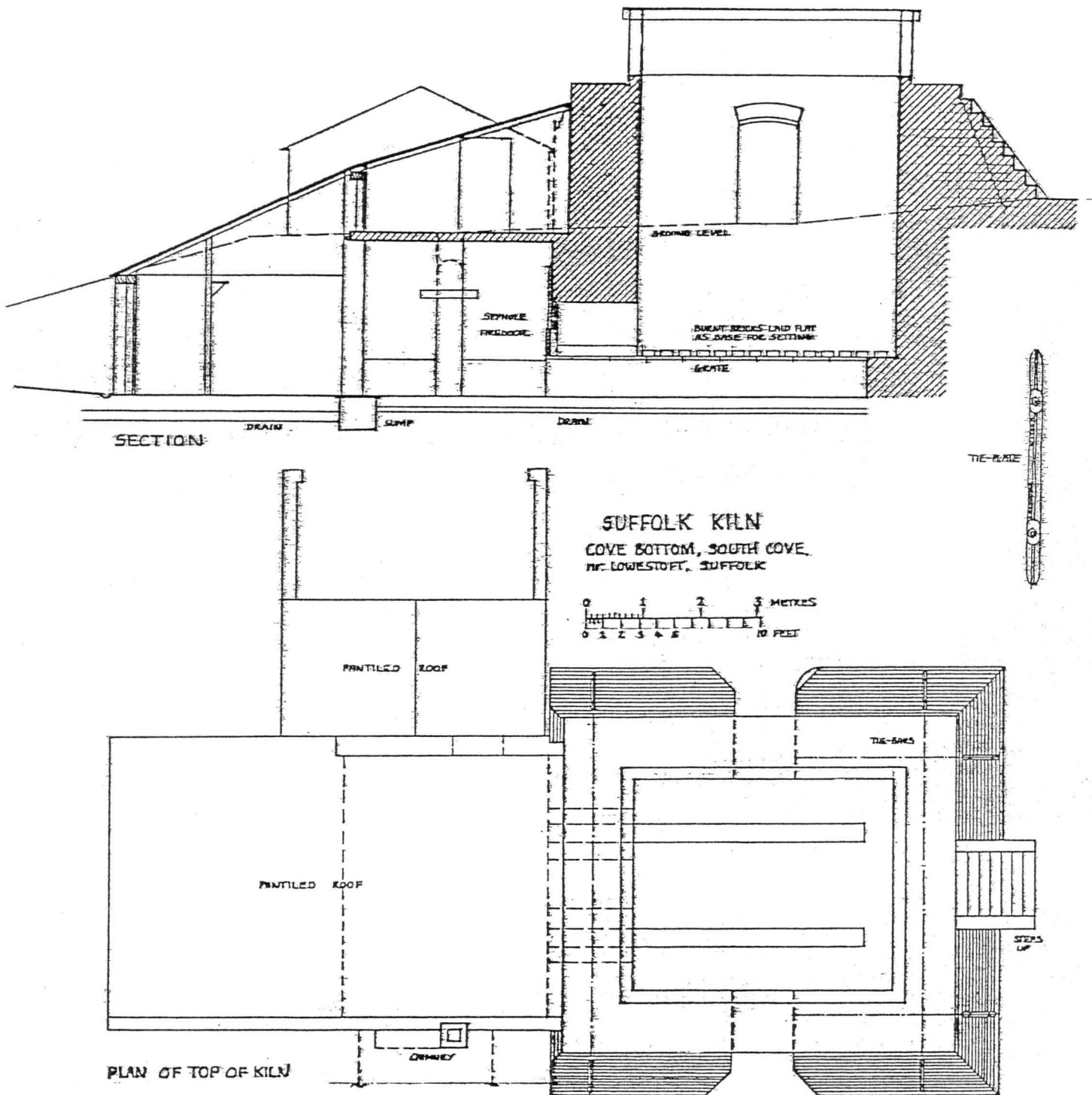


Fig. 7(a)

The kiln was fired once a fortnight during the making season. Four men were retained during the winter to cut the wood for the next season, which amounted to 20 acres of hazel coppice. Adverse winds blowing across the top of the Suffolk kilns can seriously affect their performance. The Swanton Novers kiln had counterweighted wooden shutters which could be raised or lowered outside the walls. The kiln at Barney (near Fakenham) had a permanent wooden fence with brick piers, and that at Great Melton (between Norwich and Wymondham) had a roof which could be trundled away to one side on rails supported on posts. These are exceptions: windbreaks were usually more temporary.

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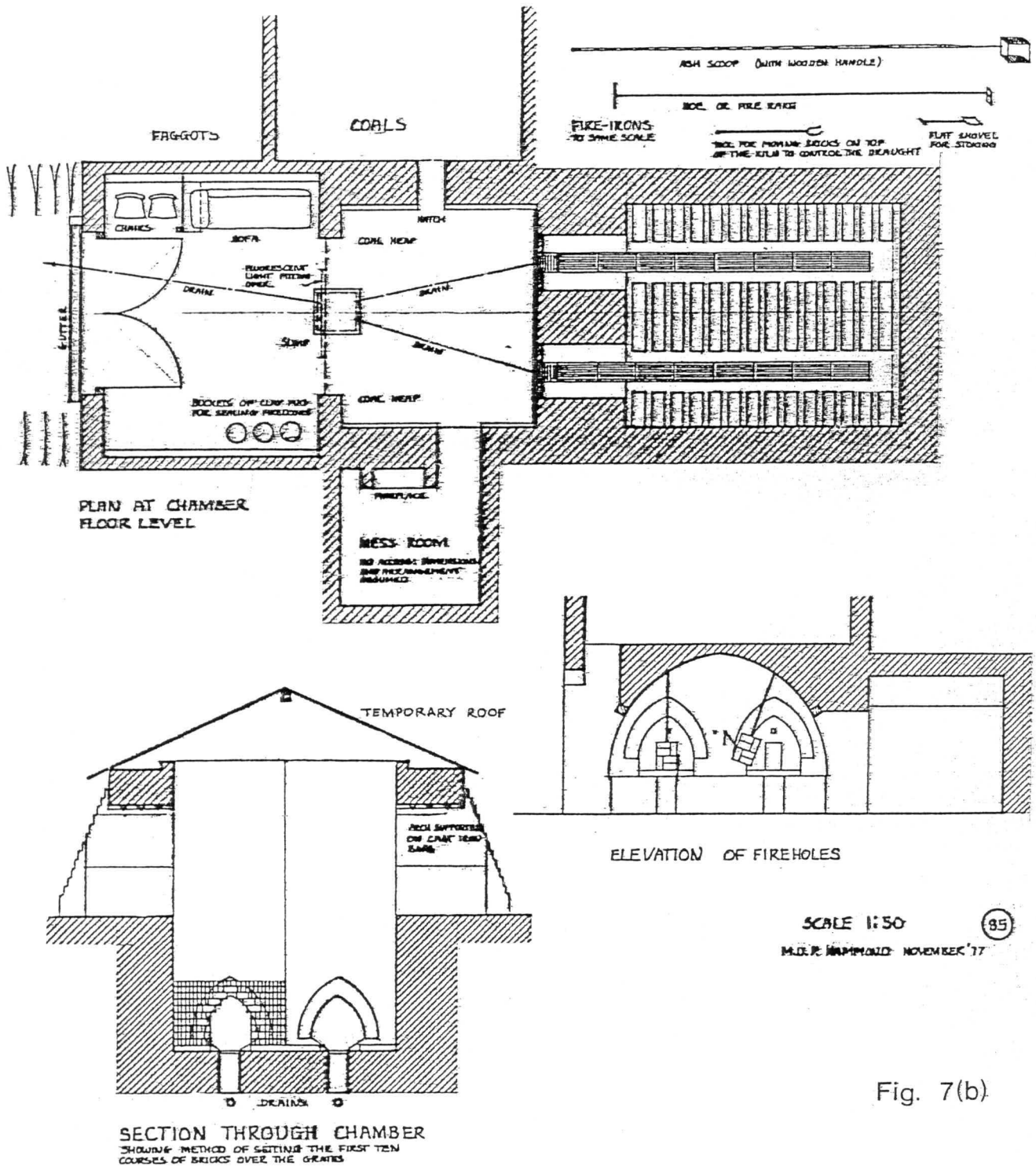


Fig. 7(b)

Coal Firing

The coal-fired kiln at the Peterstone brickyard, Holkham, Norfolk (TF 863427)⁷ held 30,000 bricks, and was built in 1865, apparently replacing an earlier wood-fired kiln. Much ash-glazed brick rubble is incorporated in the outer walls. Both red and yellow bricks were made, as well as pantiles, chimney pots, and land drain pipes. The bricks were set 'five on two' or 'ten on ten', forming blocks two-bricks square and two courses deep, in the lower half of the kiln; tiles, pipes, and pots were set in the upper half of the kiln. In the platting on top of the setting fourteen or fifteen holes, each 1 ft. square, called 'chimneys' were left, and these could be covered or uncovered to regulate the draught. In one at the front of the kiln

and one at the back a 9 in. drainpipe was set on end as a shrinkage gauge. At first it rose slightly as the setting expanded and then sank a total of about half a brick's width. The two wickets were sealed with old bricks plastered with clay pug. Setting took three days.

Coal was brought in by railway and the wagons were emptied into the cellar of 50 tons capacity on side of the stoking area. Opposite it was a smaller room with a fireplace and a raised wooden bench on which the off-duty kiln-burner could take a rest on a paillasse.

A small water-smoking ('tanning') fire was lit at the front end of each of the three grates on Monday morning, and gradually increased to cover the whole grate by Thursday morning, when at 6 a.m. both burners went to the kiln and stayed there until 6 a.m. on Saturday. The mouth of each furnace was partly bricked up and an iron-framed door on a chain put in position to increase the draught. The fires had to be stoked every half-hour. On Friday it was necessary to damp down the top of the kiln with loam to get a more even spread of heat. The fires had to be spread evenly along the length of the grate, and to reach the far end accurately lumps of coal were bowled by hand down the tunnels. The tunnels themselves, built of firebrick, would start to melt, and the bottom few courses of the setting would run together and have to be cut out with a hammer and chisel if the kiln got too hot. When firing finished the kiln was sealed up, the ashpits closed with iron plates, and left until the following Thursday. Drawing could be finished by 11 a.m. on Saturday. Three men did this job on piecework, the wage being £1 2s. 6d. (£1.12½) each. They received the same amount for setting the kiln, and the kiln-burners received £1 6s. 0d. (£1.30) for their forty-eight hour vigil. Drawing included cleaning out the furnaces, which involved crawling inside them. Thirteen tons of coal were used.

The last working Suffolk kiln in Britain was at South Cove, mentioned above. It had a capacity of 35,000 red handmade facings and some tiles. As there are no permanent fire-tunnels, the bricks have to be built in a corbelled arch over the grates in the chamber floor. The first 4000 bricks went in building these, forming ten courses, then 'ten on ten' setting up to the full height of forty-six courses. Tiles were put in three courses below the top. The fires were lit on Monday morning with faggots or brushwood with a core of bracken. They died down during Monday night but were made up again on Tuesday. Full firing was from Wednesday to Friday, and twelve tons of Nottinghamshire coal were consumed. The bricks from the arches were distorted and discoloured, but there were usually 8500 each of dark, medium, and light reds, and 1000 commons for interior work.⁸

References

1. A.McWhirr, 'Roman Tile Kilns in Britain', in A.McWhirr, ed., Roman Brick and Tile, British Archaeological Reports, International Series, 68, 1979.
2. P.J.Drury and G.D.Pratt, 'A Late 13th- and Early 14th-Century Tile Factory at Danbury, Essex', Medieval Archaeology, 19, 1975, 92-164.
3. E.Dobson, A Rudimentary Treatise on the Manufacture of Bricks and Tiles, London, 1850; reprinted, ed. F.Celoria, as Journal of Ceramic History, whole no.5, with original pagination, vol.1, pp.39-41; vol.2, p.95.
4. K.C.Leslie, 'The Ashburnham Estate Brickworks, 1840-1968', Sussex Industrial History, 1, Winter 1970-71, 2-22.
5. J.P.M.Parry, Brickmaking in Developing Countries, Building Research Establishment, 1979, p.4.

6. Ex inf. George Rook, via D.W.Durst of Holt, Norfolk.
7. R.Ives, 'The Peterstone Brickyard; an Account of the Processes of Brick and Tile Making There, between 1924 and 1938', copy, provenance and publication date unknown, in author's possession.
8. The cast iron buckstaves supporting the walls of the South Cove kiln have 'J.Graystone, Witham' cast on them. Any information relating to this ironfounder, kiln-builder (or whatever) would give some idea of the construction date of the kiln. The kiln has now been replaced since 1980 by an oil-fired Scotch kiln.

Terra Cotta Panels. With reference to A.Hulme's enquiry (Information 29, February 1983, 5) concerning terra cotta panels, I was interested to see the reference to Samuel Bardfield of Leicester. For the first fifty years of my life I lived near Leicester but had not previously heard or seen mention of him. Having taken an interest in heraldry I used to admire the Midland Railway's coat-of-arms built into the parapet of the London Road bridge opposite the station which must have been built at about the same time. The heraldic display was composed of a number of terra cotta panels and that medium was used for the copings and dressings of the bridge as also in the construction of the station with moulded 'Arrival' and 'Departure' over the major entrances. 'London Road Station, Leicester was opened in 1892 and built to the design of the Midland Co's architect, C.Trubshaw.... The decorations are insipid, but if the façade were disencumbered of the crude advertisements by which it is now defaced, the station could be ranked among the more satisfactory buildings of the city.' (V.C.H.Leicestershire, vol.3, 1955, p.126) I have not come across another Midland Railway coat-of-arms in terra cotta but it may not be unique. However, I believe the frieze, depicting an early railway train, above the window of Thomas Cook's travel shop near the Clock Tower, Leicester was also in terra cotta. That must surely have been a one-off job but I fear it has possibly now been demolished since according to the telephone directory the firm now operates from a different address. They may, of course, have taken it with them or donated it to the local museum. (Has any member further information? TPS)

F.S.Cheney

Warm Beds Again! In Information 32, February 1984, 18-19 Mr T.P.Smith asks about the practice of using a hot brick as a bed warmer. I well remember my mother doing this for me in the 1930s on occasions when the hot water bottle had become unserviceable. It was a method which had been used in her younger days - she was one of a family of eleven who lived near Leicester, though her parents were natives of Norfolk and Suffolk.

F.S.Cheney

Hamblet Bricks. Mr G.J.Walder has drawn my attention to a brick found at Twickenham, Middx. It is a dark blue engineering brick measuring $8\frac{3}{4}$ by $4\frac{1}{4}$ by 3 inches (222 by 108 by 76 mm.). There is a shallow frog (about $\frac{1}{4}$ in; 6 mm.) with a decorative outline as shown in the accompanying sketch. This contains the name 'HAMBLET' together



with the tiny 'bosses' shown at one end. I assume that this brick is the work of Joseph Hamblet of Piercy Brickyard, Oak Road, West Bromwich, mentioned in Kelly's Directory of Staffordshire for 1872. But any further information would be appreciated. What, for example, was the purpose of the small 'bosses'?

TPS