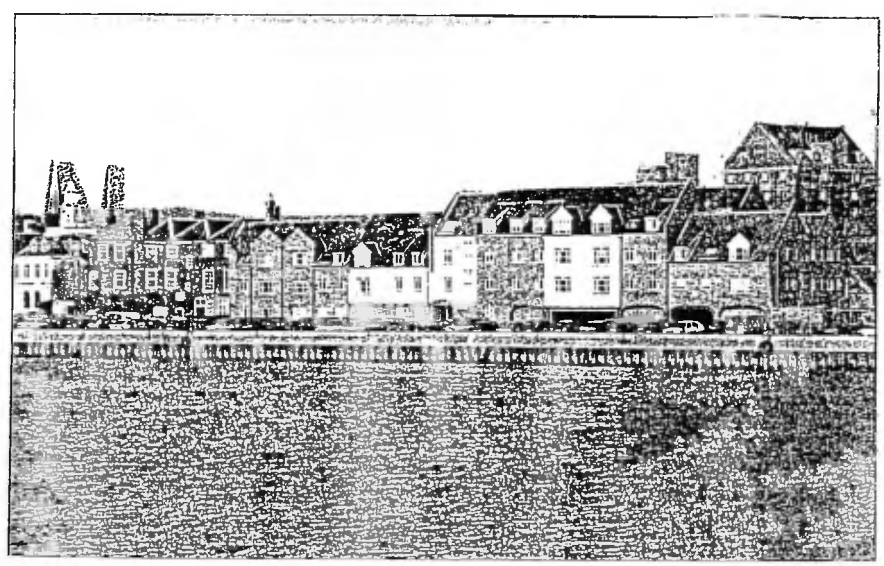
ISSN 0960-7870

BRITISH BRICK SOCIETY

INFORMATION 85

OCTOBER 2001

BRICKS AND WATER ISSUE



OFFICERS OF THE BRITICH BRICK SOCIETY

Chairman	Terence Paul Smith BA, MA, MLitt	Flat 6 6 Hart Hill Drive LUTON Bedfordshire LU2 0AX
Honorary Secretary Tel: 01494-520299 E-mail michael@mhammett.freeserve.co.uk	Michael Hammett ARIBA	9 Bailey Close HIGH WYCOMBE Buckinghamshire HP13 6QA
Membership Secretary *(Receives all direct subscriptions, £7-00 per annum*)* Tel: 01732-358383 E-mail lapwing@tesco.uk	Keith Sanders	24 Woodside Road TONBRIDGE Kent TN9 2PD
Editor of *BBS Information* *(Receives all articles and items for* BBS Information) Tel: 01608-664039	David H. Kennett BA, MSc	7 Watery Lane SHIPSTON-ON-STOUR Warwickshire CV36 4BE
Honorary Treasurer *(For matters concerning annual accounts, expenses)* and Bibliographer	Mrs W. Ann Los	"Peran" 30 Plaxton Bridge Woodmansey BEVERLEY East Yorkshire HU17 0RT
Publications Officer	Mr John Tibbles	Barff House 5 Ash Grove Sigglesthorne HULL East Yorkshire HU11 5QE
Enquiries Secretary (*Written enquiries only)*	Dr Ronald J. Firman	13 Elm Avenue Beeston NOTTINGHAM NG9 1BU

OFFICERS OF THE BRITISH ARCHAEOLOGICAL ASSOCIATION : BRICK SECTION*

Chairman	Terence Paul Smith	Address as above
Honorary Secretary	Michael Hammett	Address as above

* *Members of the BAA may join its brick section and, as such, will be eligible for affiliation to the British Brick Society at a reduced annual subscription of £5-00 per annum; for BAA Life Members, the subscription is waivered: they should inform the BAA:BS secretary of their interest so that they can be included in the Membership List. Telephone numbers of members would be helpful for contact purposes, but will* **not** *be included in the Membership List.*

British Brick Society web site:

http://www.britishbricksoc.free-online.co.uk/index.htm

Contents

Cover Illustration:

The South Quay, King's Lynn, Norfolk, was viewed by the British Brick Society both before and after the AGM on 9 June 2001. In the course of the tour, members were able to view and ascend the brick tower of Clifton House (near right-hand edge of photograph) which was built to allow the owner to see if his ships were returning. The River Great Ouse, the basis of the town's prosperity as an international port in the Middle Ages, when the town was known as *Lynn Episcopi* (Bishop's Lynn).

Editorial:
Bricks and Canals

The long eighteenth century, which extends from about 1660 to about 1837, that is from the Restoration of Charles II to the accession of Queen Victoria, registered two great achievements in transport. Beginning in 1663, the establishment of the turnpike road system provided a means within seventy years whereby a steady ten miles per hour could be maintained by horse-drawn coaches. The other was the creation of artificial waterways linking east and west, *e.g.* Liverpool and Kingston-upon-Hull, and north and south, *e.g.* Liverpool and London.

The artificial waterways or canals have their origins in the straightening of rivers, which involved deliberate embanking and canalization and the building of locks to permit traffic to pass unimpeded, even where water mills were in operation, and the making of weirs and sluices to control water flow. Many of these ideas were readily translated into the building of canals.

The links between canals and the earlier river navigations, both in the realm of ideas and in the practical execution of these ideas seem obvious. Brick was used by canal builders for a number of purposes. Apart from the first-named, the order in which these uses are given implies no greater quantity of bricks was used for one rather than any other.

First use, and by far the major use, is for *actually* enclosing the sides of canals and canal basins. Examples are many. In an urban context, both brick-lined canals and brick-lined canal basins are in use in central Birmingham and in Stratford-upon-Avon. Bricks here are mainly red for the walls of the canal and the basins, but with blue engineering brick with rounded corners used for the coping..

Second use is for locks. Examples are many. In Worcester locks are adjacent to the house known as `The Commandery' and those in Wolverhampton are immediately south of the railway line as it heads west from the station. In rural areas, the famous Foxton Locks in Leicestershire may serve as an example. Bricks again are mainly red or brown for the retaining walls, with blue engineering bricks used for the coping.

Third use is for lining tunnels. The system of tunnels developed for the Bridgewater Canal in the mines on the estates of the Duke of Bridgewater, north and west of Manchester, was in red brick. Later tunnels, *e.g.* Harecastle Tunnel, Staffs., may use blue engineering brick.

Fourth use, particularly on a canal where short sections only would be used, is to provide islands which served as places for canal boatmen to pay their dues for using the canal. Good examples, without any of the buildings surviving, can be seen on the Birmingham to Wolverhampton canal west of Birmingham. These islands could be combined with locks, as at Hillmorton Locks, east of Rugby.

Fifth use is for bridges. These are essential where canals join, providing a three-way or greater junction. They are also found where the towpath crosses from one side to the other of a canal as on the Trent and Mersey Canal at Stone, Staffs., or just west of the incline leading to Fenny Compton kiln on the Oxford Canal. Most canal bridges are of red brick. Either red brick or blue engineering brick may be used for the coping bricks.

Sixth use is for the supports for an iron aqueduct. The most famous aqueduct of all, that at Pontycyllete, on the Llangollen Canal, has stone supports, but on other aqueducts the supporting columns are of red brick. Two superb examples are those on the Stratford-upon-Avon Canal, south of the village of Wootton Wawen but still within that parish. With a (now damaged) date plaque of 1816 a short length of the canal crosses the Stratford to Birmingham turnpike road (now the A3400) and a much longer stretch, to the west, takes the canal over water meadows of

the River Ala, which are crossed at a much lower level by a railway line of 1883. The piers to both these aqueducts are of red brick.

Seventh use of brick is for canalside and dockside buildings. The National Waterways Museum at Gloucester has one surviving group of canal warehouses. But other examples are located around the country. There are major brick warehouses and other buildings at Weedon, Northants., where there are also stone-built structures. At Wortley, Lancs, the Bridgewater Canal had warehouses in brick and other canalside buildings using timber-framing to provide prettiness in an industrial environment. Many cotton mills lined the Bolton to Manchester canal north of Salford.

This is the third themed issue of *British Brick Society Information.* The two earlier ones - *BBS Information,* **71,** June 1997, and *BBS Information,* **77,** June 1999 - have been focused on the use of brick in churches. `Brick and Water' is therefore a new theme. It developed originally from an idea about brick and canals, hence the subject of this editorial. If further material were to be forthcoming `Bricks and Canals' could be made the specific subject of another issue of *BBS Information* at some date in the future.

As editor, I thank those who have contributed and have also made this the largest issue of *British Brick Society Information* so far produced. Unlike the two earlier themed issues, some material of general interest has been included.

The society held a very successful Annual General Meeting in King's Lynn on Saturday 9 June 2001 replete with nostalgic comments from our chairman, Terence Smith, about coming of age as an archaeologist in the town in the mid 1960s, and from Professor Ronald Brunskill about how he had visited King's Lynn as a young architecture student from Manchester in 1949 and because his visit lasted more than five days he had been obliged to surrender his ration book to the Duke's Head Hotel to have coupons docked.

The meeting was followed by an excellent tour of the brick buildings of the centre of this historic town conducted by Edwin Rose of Norfolk Landscape Archaeology, with assistance from Elizabeth James of King's Lynn Museum and Adrian Parker who is Planning Officer for the Borough of King's Lynn and West Norfolk. Walking along South Quay, Queen Street, King Street, and the Tuesday Market Place to St Nicholas' Chapel, the society's Visits Co-ordinator learnt a lot about a town which he had visited a number of times previously but has never actually examined closely. The society's thanks are due to them all. A full report appears elsewhere in this issue of *BBS Information.*

Arising from the Annual General Meeting, members are asked to respond to various items raised. About every eighteen months, the society produces a membership list. The last such list was produced in the year 2000. A new list is likely to be issued within six months, probably for distribution early in 2002. One member has voiced strong objections to the use of Ms rather than the more correct Miss..Lady members are especially requested to check the current list to see that the formal mode of address is correct. The membership list also includes the interests of members; and all members are asked to check with the last list to see if amendments need to be made. In either case please contact the society's Membership Secretary, Keith Sanders at 24 Woodside Road, Tonbridge, Kent TN9 2PD.

Some members paying their subscriptions by standing order from their bank have also sent a cheque. As is the practice in most other societies, the second payment will be considered a donation to the society's funds. Again please check.

The society's officers were all re-elected; however, Dr Ronald Firman has been the society's Enquiries Secretary for seven years and while he is willing to continue, he feels that it

may be time for a younger person to take on the role. Any offers to take on the post or suggestions as to who might be approached should be made to the society's honorary secretary, Michael Hammett.

A further request for a volunteer was also made at the Annual General Meeting and an offer of help should be made to either David H. Kennett or Terence Smith. The British Brick Society will have reached the milestone of thirty years' successful and varied activity in 2002. A long editorial on 'The Society Comes of Age' was published in *British Brick Society Information*, **59,** June 1993. A further account of the society's first twenty-five years was published in *Clay Technology*, **59,** May/June 1998. Both these were written by the same person. It would be more in keeping with the society's wider membership if a hand other than that of David Kennett were to write an account of the last ten years for the issue of *BBS Information* due to be published in June 2002. An archive on the society's publications and a database on its meetings are kept, so no one would have to start from scratch.

DAVID H. KENNETT
Editor, *BBS Information*,
Shipston-on-Stour, 11 June and 23 August 2001

British Brick Society Information: future themed issues

At the Annual General Meeting in King's Lynn, the editor's report contained notification of possible themed issues of *British Brick Society Information* in future years. The editor was asked to include a note in *BBS Information* on these with projected submission dates. While none of these ideas is built into a brick wall, three themed issues are under active consideration.

The society has had two issues of *BBS Information* devoted to 'Brick in Churches', most recently *BBS Information*, **77,** June 1999. For reasons of space, two items were held over, and subsequently three more possible contributions have been received. For this issue, three short notes on 'Brick Churches in the News' have also been submitted. It is hoped to use all of these and any further contributions for a 'Brick Churches' issue to be published in 2003. Members who wish to contribute items to a 'Brick Churches' issue are requested to submit their material, either articles or short notes, by 1 December 2002.

Three articles and two shorter contributions have been received on the topic of bricklayers and bricklaying in historical times. These with similar contributions will also form the basis of a themed issue of *BBS Information* in 2003. Further contributions are welcome and those with such items are asked to submit them by 1 December 2002..

As an ideas for the future, one possibility is to devote an issue to the use of brick by railway companies. For these or other themed issues, the editor may hold material submitted with a view to using it in a themed issue. No publication date has been set for this. In that some articles are available, publication is probable in 2005; however, notice will be given of a final submission date at least twelve months in advance..

If any members have suggestions for other themes for issues of *British Brick Society Information* please contact either David H. Kennett or Terence Smith.

DAVID H. KENNETT
Editor, *British Brick Society Information*, Shipston-on-Stour, 11 June 2001

BRICKS, TILES AND BALLAST: A SCEPTICAL VIEW

Terence Paul Smith

The extensive use of bricks and tiles as *ballast* is one of those mythopœic notions which, once entered into the literature, prove extremely difficult to dislodge. It is, for example, still all too often supposed that medieval English ships trading with the continent "came back in ballast. That ballast was Flemish brick. ..."[1] Thus the late Hugh Braun expressed a view that has remained remarkably tenacious, despite some wise words of caution, three decades ago now, from Jane Wight: "The idea of odd batches of bricks being used for ballast and then being used in England for building seems implausible, whereas speculative or ordered cargoes of brick do not."[2] Yet the implausibility has not impressed all, and the notion of bricks as ballast, albeit as "saleable" ballast, surfaces in the latest (and in many ways valuable) study of the topic by P.C. Buckland and Jon Sadler.[3] They, and others, have extended the claim to other ceramic building materials and beyond the Middle Ages. Thus, the late Alec Clifton-Taylor wrote of the small yellow Dutch bricks, often mistakenly called `clinkers', "which in the last quarter of the seventeenth century were sometime brought *as ballast* in ships coming to load grain or wood [*sic,* for wool]",[4] whilst Buckland and Sadler themselves assert that "saleable ballast imports of brick and tile are likely to have continued into the post-medieval period, when the earliest pantiles in Britain also came from the Low Countries."[5] More surprisingly, the view has even been applied to plain glazed floor tiles, commonly referred to as `Flemish' but in fact coming from the Greater Netherlands as a whole in the fourteenth to early sixteenth centuries, "... tiles of this sort were brought into this country *as ships' ballast* later to be sold. This explains why such easily-manufactured products were exported [from the Netherlands], and why they are so common in the principal ports like London and Southampton."[6]

It may perhaps seem that a dispute on the matter is no more than semantic: bricks or tiles correctly stowed in the hull of a ship otherwise laden with lightweight commodities would, it may be said, have a *ballasting effect*, if present in sufficient quantities. And yet, if those materials were intended for sale at the port of destination, they were not *mere* ballast; indeed, it would be better to put the point by saying that a ship so laden had no *need* of ballast. The dispute is, in other words, more than semantic. It is a question of whether commodities such as bricks and tiles came over as ballast or as proper cargoes: the difference would certainly have been a real one for merchants of the time, and it is a real one for us now.

The purpose of ballast, of course, was to stabilise a ship by lowering her centre of gravity, essential if the ship were unladen, scantily laden, or laden with lightweight goods. In the strict sense, it was of little or no value in its own right, as Dr Johanna Hollestelle emphasises in her study of the Netherlands brick industry in the Middle Ages: materials used for ballast "had practically no value, so that at the port of destination they were simply thrown overboard"[7] The term "saleable ballast", used by Buckland and Sadler, is therefore almost an oxymoron - almost, but not quite perhaps, since with good fortune such materials might sometimes find a buyer and a use. Buckland and Sadler instance the cobbles used for paving in Hull, citing the sixteenth-century writer John Leland. ".... bycause the burden of stokfisch [from Iceland] was light, the shipes were balissid with great coble stone brought out of Isleland, the which yn continuance pavid al the toun of Kingeston thoroughout."[8] Of course, this is hearsay evidence picked up by a Tudor antiquary and to that extent requires a degree of caution: nevertheless, it seems plausible enough. But it should be regarded as indicating the good luck of the Icelandic shipmen, not as reflecting a normal situation - at least as far as ceramic building materials are concerned. In

medieval, Tudor, and even Stuart times, bricks and tiles were too expensive to be regularly employed as mere ballast. They were also intinstically less suited to the purpose than cobbles or the commonly used sand, gravel, and chalk, some of which have greater weight relative to their bulk and all of which have the advantage of packing down in a ship's hold: hence the "ballast-heavers" of Rotherhithe referred to by Charles Dickens in the nineteenth century.[9] Hence too transference of the word to the stone chips in which railway sleepers are bedded and to the aggregate used in concrete.

Buckland and Sadler in particular are too ready to assume that if foreign bricks and tiles appear in England then they could *only* have arrived as ballast. Thus they insist that in the Middle Ages "Dutch brick *must have been* the ballast of many ships engaged in the wool trade with Flanders."[10] In support, they cite Clifton-Taylor's reference to a shipment of over 200,000 bricks to the Tower of London in 1278 and Douglas Knoop and G.P. Jones' reference to the import of Flemish bricks into East Anglia in the fourteenth century. It is clear from the context of Knoop and Jones' text, however, that they were writing of imports proper - that is, commodities exported to a foreign country in order to realise a profit on their sale.[11] Equally, Clifton-Taylor's proximate source is L.F. Salzman's documentary history of medieval building and the ultimate source the Exchequer Accounts: the "202,500" *quarellorum de Flandria* bought for the Tower of London (assuming that they were bricks at all) were purchased from John Bardown of Ieper (Ypres) at a cost of £20 4*s.* 0*d.*, with a further £32 5*s.* 0*d.* being paid to Hugh Bekman of Nieuwpoort for their carriage,[12] so far from having to conclude that such shipments "must have been" ballast, it is clear that they were no such thing: they were proper cargoes sold at a profit.

Like Clifton-Taylor, Buckland and Sadler suppose that seventeenth-century Dutch bricks must also have travelled exclusively as ballast. Misunderstanding the Dutch *Overijsselde Steen* as a placename, they cite 8000 such bricks from that 'locality' (in fact, brick from the province of Overijssel) recovered from the *Vergnulde Draek*, wrecked off Western Australia in 1656 and similar bricks in two Shetland wrecks: the *Haan* of 1640 and the *Kennermerland* of 1664.[13] The presence of bricks in wrecks, however, goes no way at all to showing that they were stowed as *ballast* - simply that they were on board ship; and in the absence of firm evidence to the contrary, the proper conclusion to draw is that they were there as part of the ship's cargo.

Different types of Dutch bricks are not always distinguished in English port books, although there is a tantalising reference to 7000 "brickstones", apart from 20,000 "bricks" coming into the Port of London in March 1669; "brickstones" are also mentioned in the port books of East Anglian harbours,[14] and they were probably the small, hard, yellow bricks (misnamed 'clinkers') already referred to. There can be no doubt that some at least of the bricks known to have come into Kentish ports during the seventeenth century were of the same type.[15] Whatever the nature of the individual batches of bricks, however, the important point is that they were recorded as entering the country. Ballast, by it very nature, typically goes unrecorded, and if bricks are mentioned in lading lists or in port books then *ipso facto* they are not mere ballast but cargoes proper.

The point applies also to seventeenth-century pantiles. Writing at the very end of the century, Joseph Moxon noted that "The best sort of these [pantiles] are brought from *Holland* into *England* and are called *Flemmish Pan-Tiles* ..."[16] He makes no mention of their coming in as ballast, and although arguments *e silencio* are precarious, it needs to be remembered that when we learn of pantiles coming into the country, it is precisely because they are recorded in port books, as they are in a number of eastern ports.[17] Pantiles, moreover, are an awkward shape and required careful stowage if they were to arrive unbroken - hardly a suitable characteristic of what some choose to call "saleable ballast"! Bricks, of course, are a much more convenient shape in this respect, but still needed careful stowage if they were to survive a sea voyage intact -

like the local seventeenth-century red bricks found *in situ* on a shipwreck in the Thames at Blackfriars (and which had to survive only a *river* voyage).[18] Robin Lucas makes the further pertinent point that the quantities of pantiles recorded in port books are usually far too small to have provided the weight required for effective ballast in a ship that needed it: the Yarmouth port books for 1742, for example, "refer to five vessels from Rotterdam with no more than 200 tiles apiece, one vessel with 150 tiles and one with 100 tiles."[19] Again, the same point applies to many - though not all - of the batches of bricks brought over by ship.

In fact, so far as the small yellow Dutch bricks and the Netherlands pantiles are concerned, there is good reason to suppose that they were generally proper cargoes. (Perhaps. occasionally, broken materials or those spoiled during manufacture, were used as ballast, but these are unlikely to be recovered archaeologically - they probably lie at the bottoms of harbours! They are, in any case, easily distinguished from intact or unspoiled products used in building.) Both materials were available in the Netherlands long before their export to England became part of a regular trade. The production of both in the new Dutch Republic then expanded considerably at a time of strikingly rapid population growth from the end of the sixteenth century, due to large-scale immigration from the southern Netherlands. Some towns doubled their population between 1570 and 1600 and Enkhuizen even more than doubled its population - from 7,500 to 17,000 in thirty years.[20] In the early seventeenth century,"production of brick [and tile] became a major industry as one city after another embarked on costly expansion projects."[21] By mid-century, however, the situation had levelled, with some towns in 1647 actually having fewer inhabitants than in 1632. There was thus a building materials industry geared to a building industry which no longer required materials in such large quantities. As early as 1633 the brick and tile makers of Leiden formed a cartel in order to prevent over-production, whilst *c.*1650 those of Woerden, near Utrecht, founded a guild with similar aims.[22] Significantly, it is at this time that both the small Dutch bricks and the pantiles began to be exported in quite large quantities to England (and elsewhere). Pretty clearly, they were not simply being used as ballast but, rather, their producers were seeking new markets - less lucrative than home markets, because of costs of carriage, but better then no markets at all!

The late medieval `Flemish' floor tiles mentioned in the first paragraph above need little discussion since their rôle in proper and regular trade is securely established and not at all open to question: in 1393 alone, for example - the year for which the data are most complete - no fewer than 134,500 floor tiles are recorded as entering the port of Great Yarmouth.[23] The trade in these products was probably a result of an extended *Verkehrsgebiet* consequent upon the great expansion of the Netherlands (including Flanders) brick and tile industry from the fourteenth century.[24] The tiles would have formed a useful return cargo for ships taking goods - especially woollen cloth - to the Continent. That they were competitive with native products is not to be explained by their coming over as ballast, but almost certainly in terms of the low cost of shipping, as a percentage of f.o.b. costs, compared with that or cartage and/or inland waterway transport within England. Those shipping costs, moreover, seem to have decreased during the fourteenth century, at least along well-established sea-lanes.[25]

In conclusion, we may say that far too much has been made on the basis of far too little evidence - indeed, often contrary to the available evidence - for bricks and tiles having been regularly used as ballast. Perhaps they were used as such from time to time, but in most cases consignments coming into English ports were part of real and regular trade. In short, it is best to speak only cautiously, if at all, of bricks and tiles as ballast unless there is unassailable supporting evidence. The *onus probandi* lies squarely with those who continue to talk of such materials as ballast - `saleable' or otherwise.[26]

Notes and References

1 H. Braun, *An Introduction to English Mediæval Architecture*, 2nd edn, London: Faber and Faber, 1968, p.50; of course, *most* bricks used in England, even in the Middle Ages, were also *made* in England. T.P. Smith, *The Medieval Brickmaking Industry in England*, Oxford: British Archaeological Reports, British Series, 138, 1985, pp.22-37.

2. J.A. Wight, *Brick Building in England from the Middle Ages to 1550*, London: John Baker, 1972, p. 31; P.J. Drury, 'The Production of Brick and Tile in Medieval England', in D.W. Crossley ed., *Medieval Industry*, London: CBA Research Report, 40, 1981, p.127 also considers the notion of ballast has been "overstressed", whilst Caroline Barron correctly writes of north European bricks as "imported cargo": C. Barron, 'Introduction: England and the Low Countries 1327-1477', in C. Barron and N. Saul, eds., *England and the Low Countries*, Stroud, Glos.: Alan Sutton Publishing, 1995, pp.17-18.

3. P.C. Buckland and J. Sadler, 'Ballast and Building Stone: a Discussion', in D. Parsons, ed., *Stone: Quarrying and Building in England AD 43-1525*, Chichester: Phillimore & Co., 1990, pp.114-125.

4. A. Clifton-Taylor, *The Pattern of English Building*, London: Faber and Faber, 4th edn, ed., J. Simmons, 1987, p.235 (my italics). J. Hollestelle, *De steenbakkerij in de Nederlanden tot omstreeks 1560*, Arnhem: Gysbers & van Loon, 2nd edn., 1976, pp.121-124. T.P. Smith, 'Following the Yellow Brick Road: the Bricks from Whippingham I.oW.', *BBS Information*, **72**, Oct.1997, 12-15.

5. Buckland and Sadler, 1990, 120.

6. D.M. Jones, 'Floor Tiles', "from comments by Elisabeth [*sic*] Eames", in D.M. Jones, *Excavations at Billingsgate Buildings 'Triangle', Lower Thames Street, 1974*, London: London & Middx Archaeol.Soc. Special Paper no.4, 1980, p.149 (my italics).

7. Hollestelle, 1976, 47 (my translation).

8. L.T. Smith, *The Itinerary of John Leland* ..., pbk. ed., London: Centuar Press, 1964, p.50.

9. C. Dickens, *Oliver Twist*, London, 1837-39, and numerous editions since, chapter 50: chalk was used "as ballast for vessels leaving the port of Rochester unladen" from the Ballast Wharf marked on maps of 1698 and 1742. J.M. Preston, *Industrial Medway: an Historical Survey*, Rochester: J.M. Preston, 1977, p.54.

10. Buckland and Sadler, 1990, 120 (my italics).

11 D. Knoop and G.P. Jones, *The Mediæval Mason*, Manchester: Manchester University Press, 3rd edn., 1967, p.13.

12 L.F. Salzman, *Building in England down to 1540: a Documentary History*, Oxford: the Clarendon Press, 2nd edn., 1967, p.140; since they were actually purchased by the 'long hundred' of 120, the "202,500" *quarellorum* were actually 243,000; that they were the bricks used to line the Beauchamp Tower at the Tower of London, where they are still *in situ*, is suggested in D.F. Renn, 'Early Brickwork in the Tower of London', *BBS Information*, **29**, Feb.1983, 7, citing P. Curnow, 'Some Observations on the Plan and Construction of the West Inner Curtain of the Tower of London', in *Mélanges d'archéologie de l'histoire medièvales en honeur du doyen Michel de Bouard, memoire et documents publies par la Societé de l'École de Charles XXVII*, 1982, pp.65-74.

13. Buckland and Sadler, 1990, 120 with refs.

14 T.F. Reddaway, *The Rebuilding of London after the Great Fire*, London: Edward Arnold, new edn., 1951, p.127 n.2. R. Lucas, 'Dutch Pantiles in the County of Norfolk: Architecture and International Trade in the 17th and 18th Centuries', *Post-Med. Archaeol.*, **32**, 1998, 79, Table I, note.

15. C.W. Chalkin, *Seventeenth-Century Kent - a Social and Economic History*, London: Longmans, 1965, pp.147, 181.

16. J. Moxon, *Mechanick Exercises, or the Doctrine of Handy-Works* ..., London:, 1700, p.4.

17. Lucas, 1998, 75-84; R.W.K. Hinton, *The Port Books of Boston, 1601-1640*, Lincoln: Lincs. Rec. Soc., **50**, 1956, pp.258-259; M.W. Barley, *The English Farmhouse and Cottage*, London: Routledge and Kegan Paul, 1961, pp.190, 191, 225; Reddaway, 1951, p.127 n.2; Chalkin, 1965, p.181; J.H. Andrews, 'The Trade of the Port of Faversham, 1650-1750', *Arch.Cant* **69**, 1955, 127.

18. P. Marsden, *Ships of the Port of London: Twelfth to Seventeenth Centuries AD*, London: English Heritage Archaeological Report 5, 1966, p.154.

19. Lucas, 1998, 87.

20 J.I. Israel, *The Dutch Republic: its Rise, Greatness, and Fall, 1477-1806*, Oxford: Oxford University Press, 1995, p.328, Table 12.

21. J. de Vries, 'The Dutch Rural Economy and Landscape, 1590-1650', in C. Brown, ed., *Dutch Landscape: the Early Years*. London: National Gallery exhibition catalogue, 1986, p.80. For the origins of both materials: Hollestelle, 1976, pp.62-65, 121-124.

22 W. van der Kloot Meyburg, 'Een productiekartel in de Hollandsche steenindustrie in de zeventiende eeuw', *Economisch-Historisch Jaarboek*, **2.** 1916, 208-238 (Leiden); Hollestelle, 1976, p.250 (Woerden), In the Baltic trade during the seventeenth century "[s]and was increasingly replaced by bricks, which were afterwards sold to local merchants", P. Zumthor, *Daily Life in Rembrandt's Holland*. Stanford CA: University of Califomia Press, 1994, p.292. Zumthor sees this as a change in the nature of ballast, but it is more plausibly seen as the replacement of *ballast* by *cargo*, consequent upon the need to seek new markets. (Zumthor's book is ET of *La vie quotidienne en Hollande en temps de Rembrandt*.. Paris: Librairie Hachette, 1959).

23. Hollestelle, 1976, p.131 and general discussion pp.131-132; also L.F. Salzman, *English Trade in the Middle Ages*. Oxford: the Clarendon Press, 1931, p.350. G.E.C. Knapp, 'Flemish Medieval Paving Tiles in Hampshire', *Proc. Hants. Field Club & Archaeol. Soc.*, **20,** 1956, 29-33. L. Keen, 'Medieval Floor-Tiles from Campsea Ash Priory', *Proc. Suffolk Inst. Archaeol.*, **32,** part 2, 1971, 148.

24. A.J. van de Walle, *Het bouwbedrijf in de Lage Landen tijdens de Middeleeuwen*. Antwerpen: Nederlandse Boekhandel, 1959, p.52.

25. M..M. Postan, 'The Trade of Medieval Europe: the North', reprinted in M.M. Postan, *Medieval Trade and Finance*, Cambridge: Cambridge University Press, 1973, p.123.

26. Paper originally submitted November 1999, revised May 2001.

BRICKS AND WATER
A Visit to Thailand in 2000

Martin Hammond

INTRODUCTION

In 2000, I was able to make a long-awaited visit to Thailand. It was timed to coincide with the Songkran water festival, which is celebrated in mid-April with particular enthusiasm in the northern city of Chiang Mai. I stayed for two weeks, including the four-day festival holiday. I was also aware that Chiang Mai was a centre for celadon glazed stoneware production and that there was the possibility of some early brickwork in the area.

Historical Background

I saw only a very small part of Thailand, but in the area around Chiang Mai there is a tradition of brick building which goes back many centuries. Brick is more resistant to the tropical climate. Houses are built of wood, generally teak, and these have long since disappeared.

There are also some effects of wars. The Lanna kingdom was founded by King Mengrai in the late thirteenth century and lasted until it was captured by the Burmese in 1556. Two hundred years passed before the Thais pushed the Burmese back to roughly where the present border is (fig. 1). Ayutthaya, 85 km north of Bangkok, was founded in 1350 and by 1438 had eclipsed Sukhothai in importance. Both cities had brick-built public buildings. Ayutthaya was sacked by the Burmese in 1767. At the same time, Chiang Mai was abandoned for twenty years, after which the city walls were repaired, as will be seen in the notes on the city gates. The king responsible for the repairs was Chao Phya Chakri, in the face of renewed threats of invasion by the Burmese under King Bodawpaya. Chao Phya, who reigned from 1782 to 1809, was the first king of the Chakri dynasty and took the title Rama I. His descendent, the present King Bhumibol, is Rama IX.

The Kingdom of Siam was emerging, and a new capital, Bangkok, more accessible for foreign trade, was founded in 1782. Bricks are said to have been moved down the Chao Phraya river from Ayutthaiya for its construction.

The City of Chiang Mai

The city of Chiang Mai (whose name means "New Town") was founded by King Mengrai in 1296. By then he had established the kingdom of Lanna in northern Thailand and made an alliance with Ruang, the king of Sukhothai in the south. To him, he turned for advice in planning the new capital, based on ancient military and astrological beliefs. Work began on digging the moat enclosing an area two kilometres square at 4.45 a.m. on 12 April 1296 with a labour force of 30,000 and it was completed in four months with a three-day festival to celebrate. It was fed by a 'klong' (canal) at the north-west corner and drained towards the River Ping from the south-east corner. The spoil formed the core of the city walls, which were faced with brick and were generally 4 metres thick and 4 metres high to rampart level. Most of the walls have disappeared but the brick-built gates, heavily restored in recent years, and corner bastions survive. The present moat is about 18 metres (60 ft) wide and between 1.2 and 1.5 metres (4-5 ft) deep, with a gravelly bottom. Sluices to control the level are located at many of the road crossings where large concrete pipes replace the original wooden bridges.

Since 1296 numerous temples ("wats') have been built within the old city and outside it. Some, like the small one in the grounds of the hotel where I stayed, are redundant and maintained as historic monuments. Construction of these appears usually to be stucco or brickwork.

MAP OF THE GREATER MEKONG SUBREGION

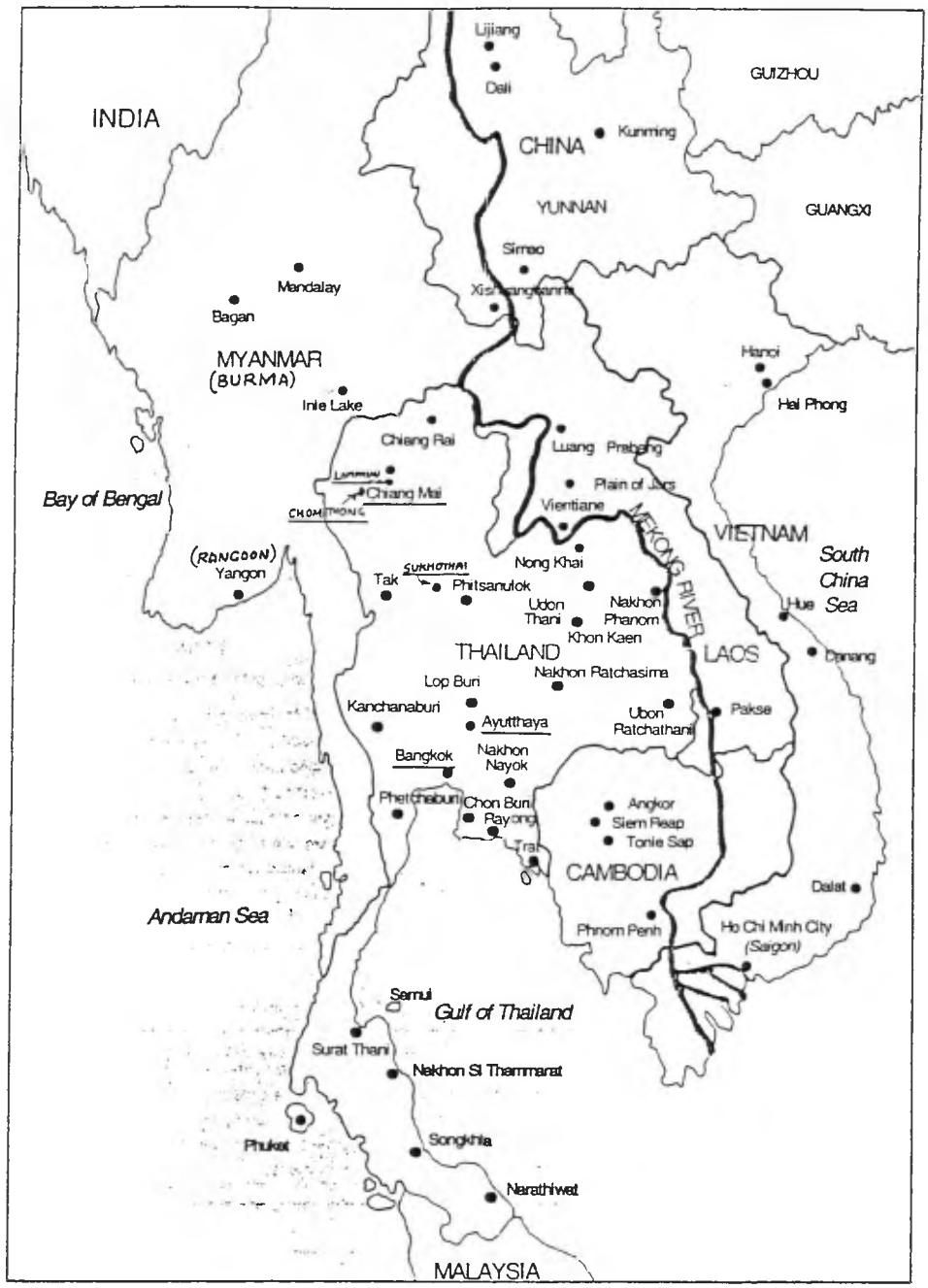


Fig. 1 Map of Thailand and the Greater Mekong subregion of south-east Asia. Places mentioned in the text are underlined.

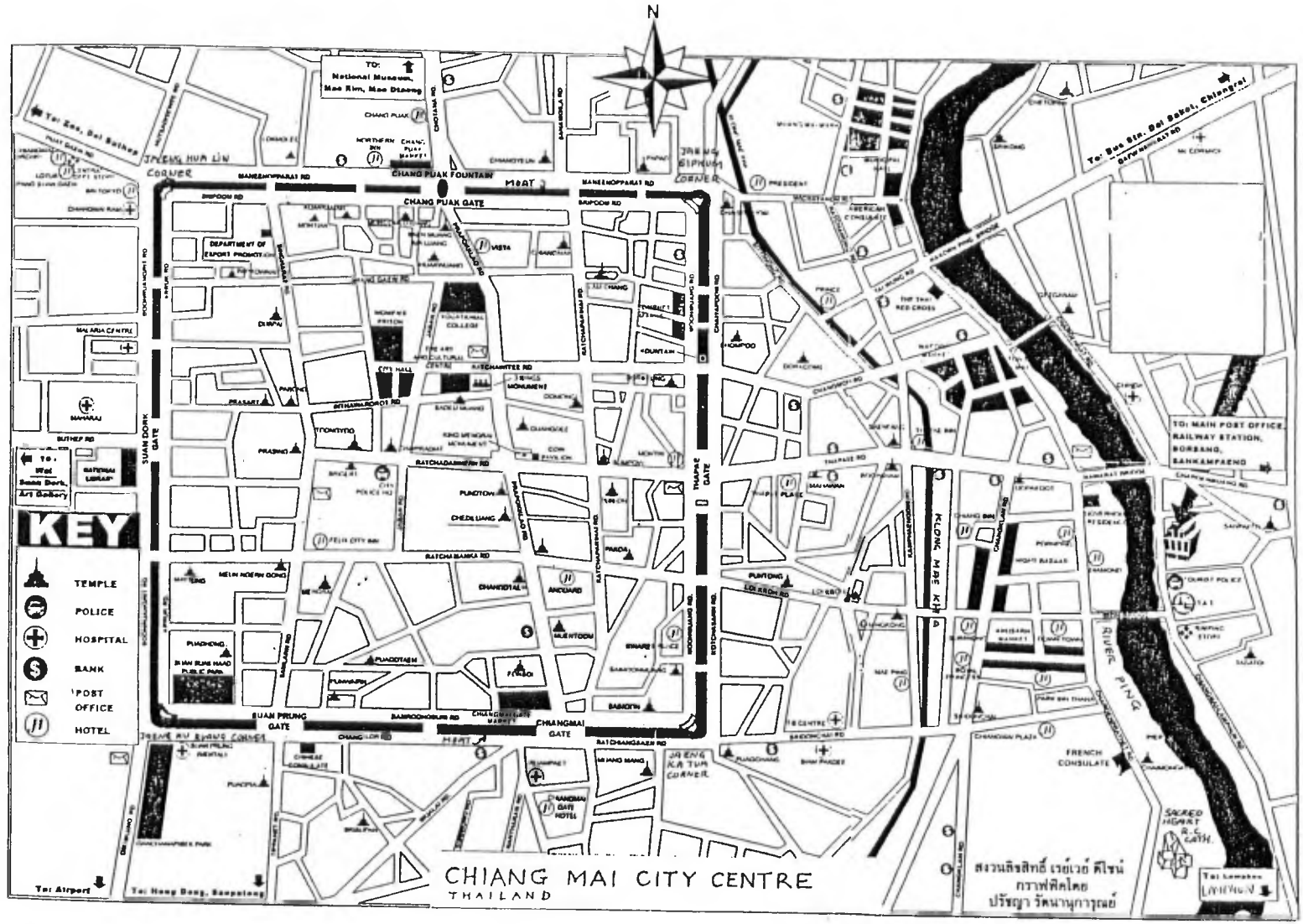


Fig. 2 Plan of the city of Chiang Mai.
showing the moat with city walls and the bastions and gates, temples and other public places.

The Songkran Water Festival

Buddhism is the national religion and Songkran is essentially a Buddhist festival to mark the traditional New Year, the onset of the rains and the start of the rice-planting season. On the first day, the last day of the old year, the images of Buddha are brought out of the temples, ritually washed, and paraded through the streets accompanied by large drums and gongs on carts. Houses are spring-cleaned, gardens tidied, and hair washed. The next day "in between" the old and new years, people should not quarrel or use harsh words. They bring buckets of sand to the temples to replace that inadvertently carried away on their feet during the year. It is shaped into miniature `chedis' (stupas) decorated with flags. On New Year's Day the monks are given food and new robes and respect is shown to one's elders by pouring a little scented water on their shoulder from a silver bowl after asking permission, meanwhile wishing them a happy new year. We visited a village primary school where we each received this traditional Songkran greeting before leaving. Back on the streets of Chiang Mai it is four days of pandemonium. The idea is to wash away the sins of the past year in an amazing water battle. it is hot, around 40℃, and humid too: the hottest time of the year; but the sky is often hazy, sometimes cloudy with light showers. Thousands of young people in smart casual wear and armed with buckets on a rope, water pistols and garden syringes, line the boulevards around the moat, which provides much of the ammunition. Others in pickups and lorries drives round with barrels of iced water in the back to retaliate. From about 10.00 a.m. to dusk no one is safe. Police, officials, monks, and `farangs' (foreigners) are fair game; and with my bucket I gave as good as I got. The Thai concept of `sanuk' (fun) is nowhere better shown than in Songkran. I have always liked watery fun. It is a liberating experience to dowse complete strangers with water, to play like a child and have fun. To walk round in soaking wet clothes all day is refreshing in the heat. Everyone else is doing the same. Join in wholeheartedly, lock yourself in your room, or leave the country. Everyone is at the same time your friend and your enemy. I saw no hooliganism, drunkenness or accidents, just everyone having a good time. All credit to the motorists and motorcyclists who kept control of their vehicles in the constant onslaught.

During Songkran, there was so much water about that the sand-bedded concrete-block paving around the moat was collapsing. A few days later, I saw a team of workmen going round making repairs.

THE CITY GATES OF CHIANG MAI

During the Songkran, I was looking out for features worth closer examination when the mayhem was over. During the festivities, I managed to walk most of the way round the old city perimeter (fig.2). Each of the gates and bastions has a plaque in Thai and English giving a brief history, and these with my own observations are the basis of the following record.

Chiang Mai Gate Original of 1296 repaired *c.*1800 and completely rebuilt 1966-69. Large pinkish-buff slop-moulded bricks with occasional bright red bricks and a solitary ash-glazed specimen at the east end of the stub of wall. Size of the complete bricks up to 400 x 200 x 60 mm, although many are fragmentary and some appear to be of smaller format.

Saen Prung Gate First mentioned 1545, used for funeral processions out of the city, repaired *c.*1899, completely rebuilt 1966-69. Bricks as Chiang Mai Gate.

Jaeng Ku Ruang South-west corner bastion Ku = stupa-like structure, containing the ashes of Ruang. Khrua, son of King Mengrai, was kept prisoner here 1321-25. Rebuilt *c.*1800.

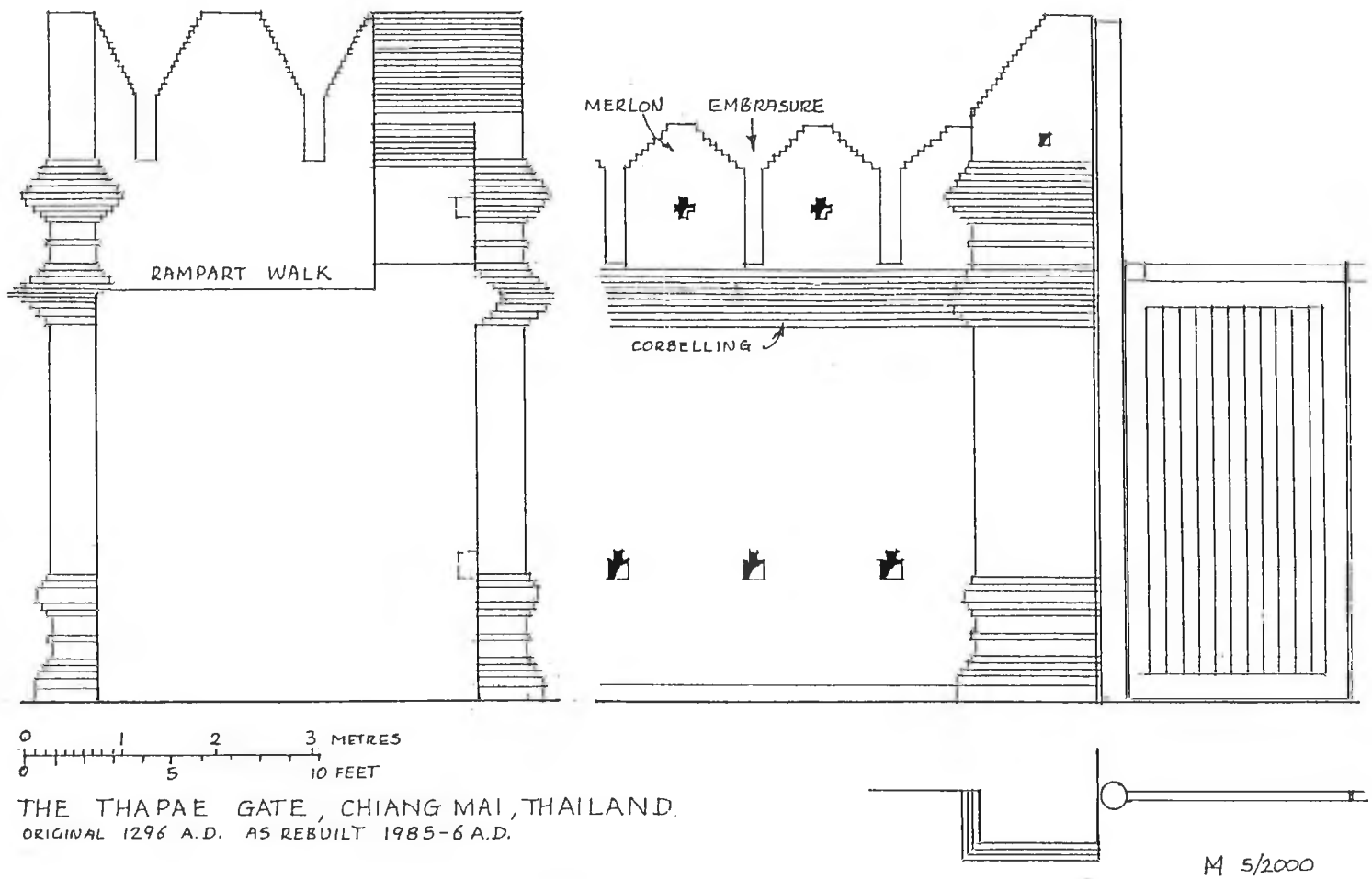


Fig. 3 The Thapae Gate, Chang Mai, Thailand
Built 1296, as rebuilt 1985-86.

Archaeological excavation in 1996 revealed "'the exposture' (*sic*) of the two narrow passages, 1 metre wide, in south and west directs of the chaeng". The city walls were of brick with an earth core, generally about 4 metres thick. The bricks in what appears to be the 1800 repair work are generally 205 x 95 x 35 mm, with 3 courses rising to 140 mm. Some reconstruction and stabilization of the structure was done in 1996 following the excavation; to save confusion for future generations, the new bricks were all stamped with the year of manufacture, 2539 Buddhist Era, on the top face. They were slop-moulded in the same buff fabric and measure 285 x 140 x 40 mm, the average size of the medieval format, about the same size as our own great bricks.

Jaeng Kga Thum ('Katam Corner') There was a fish pond here fed by two conduits which supplied the city with water. Katam = fish trap. Very similar in appearance to Ku Ruang. Restored *c.*1800.

Thapae Gate (fig. 3) Thapae = landing stage. A complete rebuild, after excavation in 1985-86, sponsored by Chiang Mai Provincial Office, Chaing Mai Municipality, the Fine Arts Department of Chiang Mai University, Chiang Mai Teachers' College, and a group of dedicated citizens. Orangey-buff longitudinally extruded wirecut solid bricks, measuring 300 x 140 x 50 mm, in Flemish bond, possibly as a facing to a hollow concrete core. Four courses rise 245 mm. Snap headers appear to have been used. There are small access doors in the rear face of the structure. The archaeological evidence behind the reconstruction included an 1899 photograph. From each side of the gate proper with its corbelled brickwork the reconstructed walls extend for about 60 metres, forming the backdrop to a pedestrian square. The small cross-shaped openings in the brickwork are blind; only half-brick depth, decorative rather than practical.

Jaeng Siphum ('light of the land') North-east corner. Unlike the other bastions which are curved or polygonal, this one is pointed like a redan, and the brickwork is much more decorative, with closely-spaced corbelled courses, zigzags, and rows of cross-shaped holes like those on the Thapae Gate merlons. the foundations on the north side have settled by about 0.7 metres, and the whole has the striking appearance of a cliff face of sedimentary rocks. It as here that construction of the city walls began in April 1296, and to mark the seven-hundredth anniversary an archaeological excavation was carried out against the inner face of the bastion and brickwork repairs done in date-stamped bricks (see above) The smaller bricks of which it is largely built match those of *c.*1800 at Jaeng Ku Ruang.

Chang Peuk Gate (Chang Peuk = White Elephant) Virtually identical in design and materials to the Chiang Mai and Saen Prung gates, so was probably rebuilt from salvaged bricks in 1966-67, and again repaired in 1987; some dated bricks are visible.

BRICKWORKS

Despite the widespread use of brick for fortifications and major public buildings in the city and the surrounding area, I only saw two smallish brickworks during my visit. One was near Lamphun, south of Chiang Mai; the other by the road to Doi Inthanon National Park about 3 km outside Chom Thong. Both were producing wirecut common bricks dried in open-sided sheds and burnt in small Suffolk-type kilns fired with split logs.

I brought home a sample of a typical facing brick and common brick for my collection. this was not a problem as they weighed only 0.6kg each. It would seem that over the centuries, the standard brick size has gradually diminished. Why are modern bricks so small?

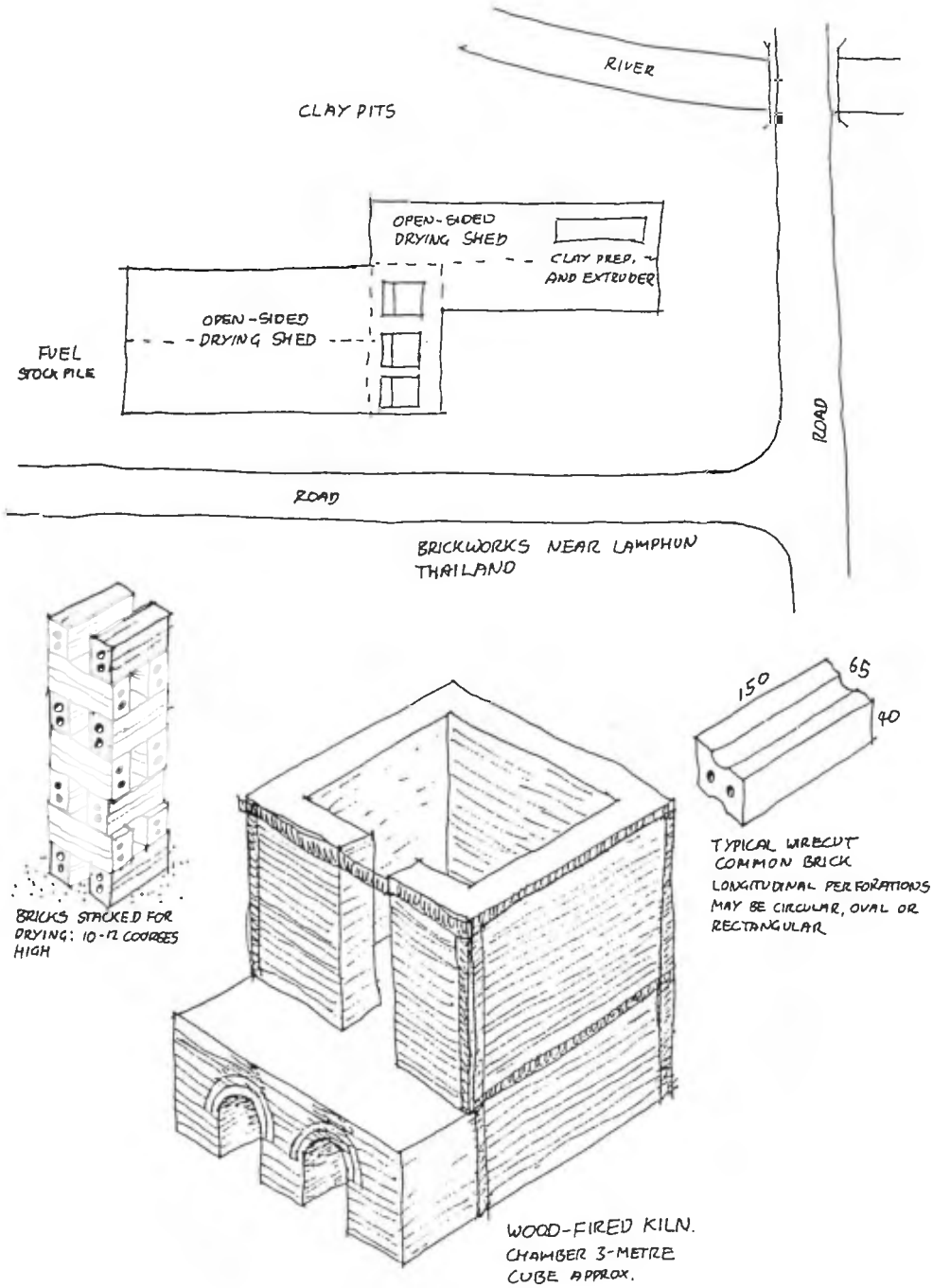


Fig. 4 Brickworks near Lamphun
Top Plan of works
Lower row Bricks stacked for drying; kiln; typical product.

BRICK AND ITS USES

Brick, together with concrete block, is used as a single-skin infill to reinforced concrete framed buildings. The area is littered with half-finished buildings of this type of construction, now disappearing under masses of creeper, victims of the 1997 financial crisis when the banks stopped lending money. The economy is said to be recovering now. The Thai currency, the baht, is gradually strengthening against sterling but is still a long way from pre-1997 levels.

Besides the orange-coloured common bricks, terracotta facing blocks, made of the same fabric, with various impressed designs (fig. 5 centre left) are widely used both internally and externally. They are usually around 175 x 50 x 60 mm deep. Though they can be laid like bricks, they usually have no structural function. Joints are often deeply raked, and indoors the whole may be coated with clear varnish. Buff hand-made slop-moulded bricks, about 160 x 66 x 30 mm are widely used for facing work, generally in small feature panels rather than whole buildings.

TEMPLES

I visited a number of temples, many built between five and seven hundred years ago. The chedis are frequently entirely of brick, though laterite, a stone resembling a porous ironstone, is sometimes used as well. In some cases most of the stucco which originally covered them has fallen away and never repaired, exposing brickwork of a very high standard.

Wat Chedi Luong In Chiang Mai, built by King Saen Muang Ma, A.D. 1401. Enormous chedi of pinkish-buff had-made bricks finely joined, measuring about 310 x 155 x 40-50 mm. Monks were said to have been brought from Sri Lanka to advise on the design, and around the base are the remains of stucco elephant-head buttresses in Sinhalese style. Higher up are semi-circular arches built of bricks laid on end in vertical courses, two rings separated by a ring of bricks laid flat (fig. 5 top right), a Middle Eastern form of construction five thousand years old. The chedi is said to have been 90 metres high originally, but lost the top 30 metres in an earthquake in 1545 and not repaired. Restoration sponsored by the Japanese government was undertaken in 1995, and matching bricks were used. Those in the paving ground around the chedi are hollow wirecuts, longitudinally extruded. Some of these have dark red stripes across the face (fig. 5 top left), probably due to the way they were laid in the kiln.

Wat Suan Dork ('Flower Garden Temple') West of the city centre in Chiang Mai, on Suan Dork Road. Built in A.D.1372 by King Praya and restored in 1931. White-painted stucco with inset red, green, blue, and gold glazed tile decoration over brickwork in English bond. Bricks appear to be about the same size as current British metric standard (215 x 102 x 55 mm), light red-buff. A well in the grounds is lined with similar bricks in header bond.

Hilltribe Promotion Centre is a craft shop adjacent to the Wat Suan Dork. It has a floor of herringbone brickwork on edge impressed with rectangular indentations. Walls and columns are faced the decorative terracotta blocks (see above).

Wat Chang Khong is a redundant temple on the corner of Loi Kroh Road and Kamphaengdin Road, now maintained by the adjacent Imperial Mae Ping Hotel. The temple was built in 1357 for the Ban Chang Khong community, which was famous for making bronze gongs in King Kavila's reign (1782-1815). The wat was renovated in 1848, but the inhabitants moved to the suburbs of Chiang Mai in modern times. No brickwork is visible on the chedi or the viharn (public hall), but a boundary wall adjacent is built of pink-buff slop-moulded bricks, size 235

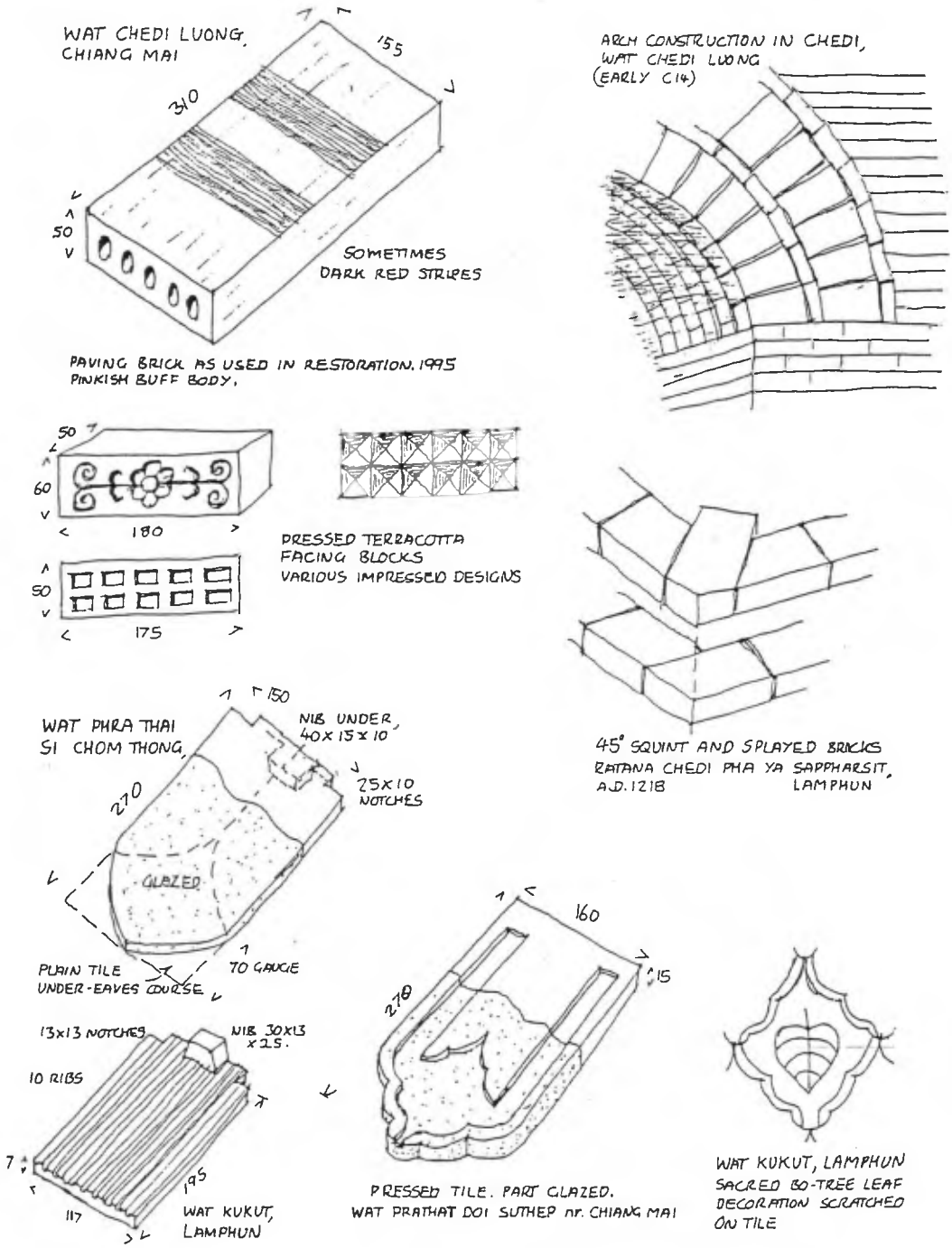


Fig. 5 Bricks and brickwork details.

Top row Wat Chedi Luong, Chiang Mai: brick with dark red stripes as used in 1985-86 restoration; arch construction.

Centre row Pressed terracotta facing blocks from Chiang Mai; corner construction in Lamphun

Lower row Tiles from various sites in Chiang Mai and Lamphun,

x 115 x 65 mm, laid in English bond, one-brick in thickness, under crumbling rendering. In the temple garden is a well 1.3 metres diameter and perhaps 4-5 metres deep. The kerb is 120 mm thick, rendered on both sides, but lower down a lining of radial stretchers is visible, 22 bricks to the circle.

The Roman Catholic Cathedral of the Sacred Heart in Charoenprathet Road , south-east of the old city, situated by the river, is new and was completed in 1996. It is faced with large areas of plain pink brick.

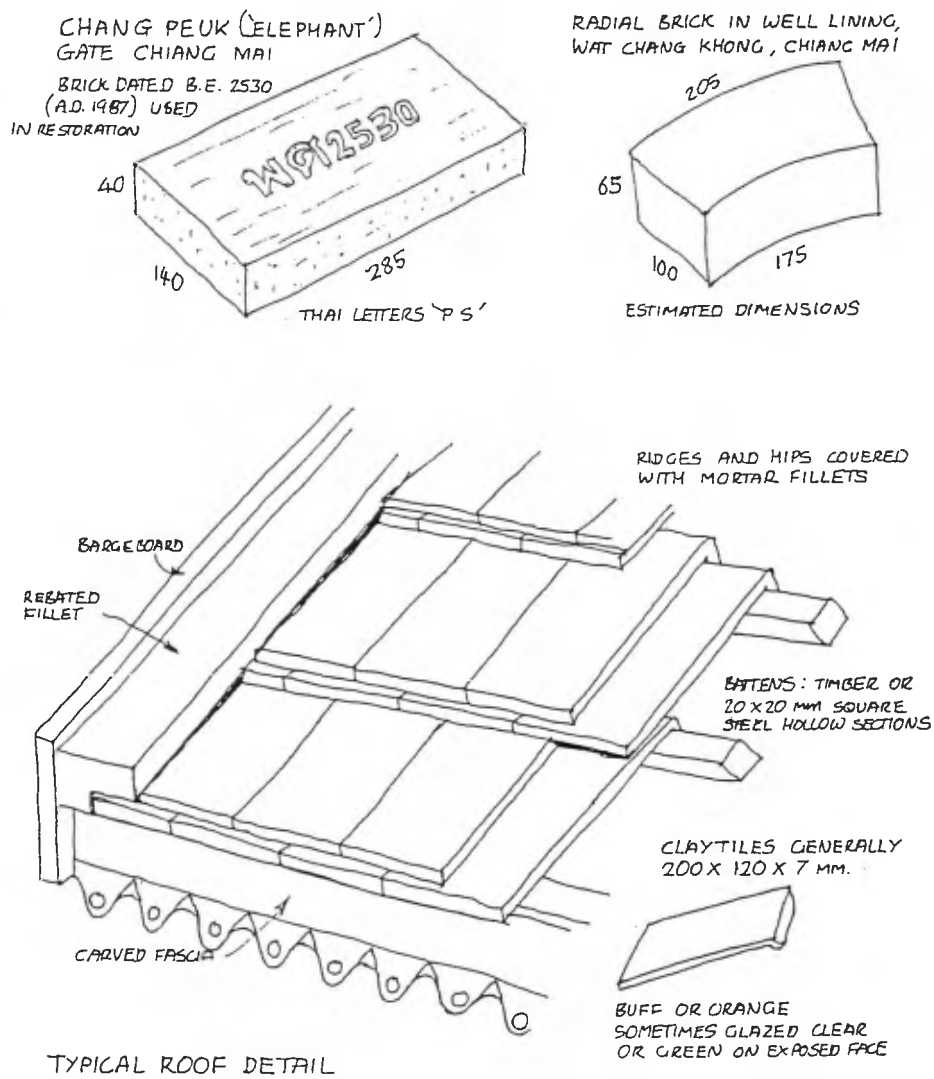


Fig. 6 Individual bricks and roofing details

Top row Dated brick from Chang Peuk Gate, Chiang Mai; brick from well ling at Wat Chang Klong, Chiang Mai.

Lower Typical roofing detail.

LAMPHUN

This city is 16 km south of Chiang Mai. Lamphun has brick fortification similar to but somewhat earlier than the other city. There has been some restoration work using matching hand-made bricks about the same size as those used in Chiang Mai. King Mengrai ruled here from 1281 before setting up his new capital in 1296.

Wat Kakut: Ratana Chedi A twelfth-century building with an octagonal base 4.4 metres across, rising 11.5 metres in diminishing stages. The bricks are of a sandy red fabric varied considerably in size but the joints were always thin, as though each brick had been selected for its position. Sizes measured: 370 x 220 x 70 mm. 300 x 200 x 50 mm, 250 x 150 x 45 mm. Cut squint and splayed bricks were used at the corners (fig. 5 centre right). Our guide told me that rice husk was added to the clay during preparation, though I could see no obvious evidence of that. The clay was spread in a more or less even layer on the ground and cut into brick shapes (as in Lawrence Harley's "pastry method"). This would account for the variations in size, but surface texture suggested slop-moulding.

Swana Chedi Jungkot which is nearby was built in the eighth century of brick (which may not be original) on a laterite base.

Wat Haripunchai is the premier tourist attraction in Lamphun. Of brick interest are the `angle chedi' and the Sankachaiya (Fat Buddha) chedi outside the temple compound by the school. I could find no construction date for these but they are similar in style to the Wat Kukot chedis, The earliest buildings on the site date from the late ninth century. in the angle chedi the bricks are 300 x 160 x 50 mm, in Flemish bond; four courses rise 225 mm. In the Sankachaiya, the bricks measure 220 x 100 x 45 mm; three courses rise 152 mm. Light red to buff colour, with some evidence of black cores to the former. In all the Lamphun chedis nearly all the original stucco covering has fallen away, exposing brickwork of a very high standard.

ROOFING TILES (fig 5. lower sketches; fig. 6 lower)

Temple halls are usually roofed with glazed ornamental plain tiles on battens and rafters, which are exposed inside. One could contribute towards the upkeep of a temple by buying a tile for a few baht and signing one's name on it.

Elsewhere in humbler buildings, I noted a peculiar method of laying plain tiles in double overlapping courses on each batten (fig. 6 main sketch). the tiles are thinner and slightly smaller than the British standard. there are no `fittings'; special tiles for ridges, hips, verges, and eaves are unknown. Ridges and hips are covered with a fillet of mortar. In some modern buildings, the battens consist of 20 x 20 square hollow steel sections.

The Brick Kiln for the Oxford Canal Company at Fenny Compton, Warwickshire

John A. Selby CEng MIMechE MSOE MIPlantE

INTRODUCTION

The brick kiln at Fenny Compton is a single intermittent downdraught kiln (figs. 1, 2, 3). It was spotted in amongst the trees and undergrowth on a walk along the towpath in The Tunnel. The area is still shown on the modern Ordnance Survey Landranger Series map, Sheet 151, as 'The Tunnel', at SP 436524, although the last remaining sections of the tunnel were falled and made into a cutting between 1866 and 1869.

The brickworks is perhaps unique in that it was planned by a civil engineer, Frederick Wood, and therefore the method of use and working did not follow the usual method of exploitation of brickmaking clay, in this case Lower Lias. Frederick Wood was Engineer to the Oxford Canal Company.

The Oxford Canal is interesting, as up to the nationalisation of the canals in 1948, it was a canal company that had never been taken over by any railway company. This was a James Brindley canal and surveyed by him in 1769. This length as a tunnel was completed in November 1776.

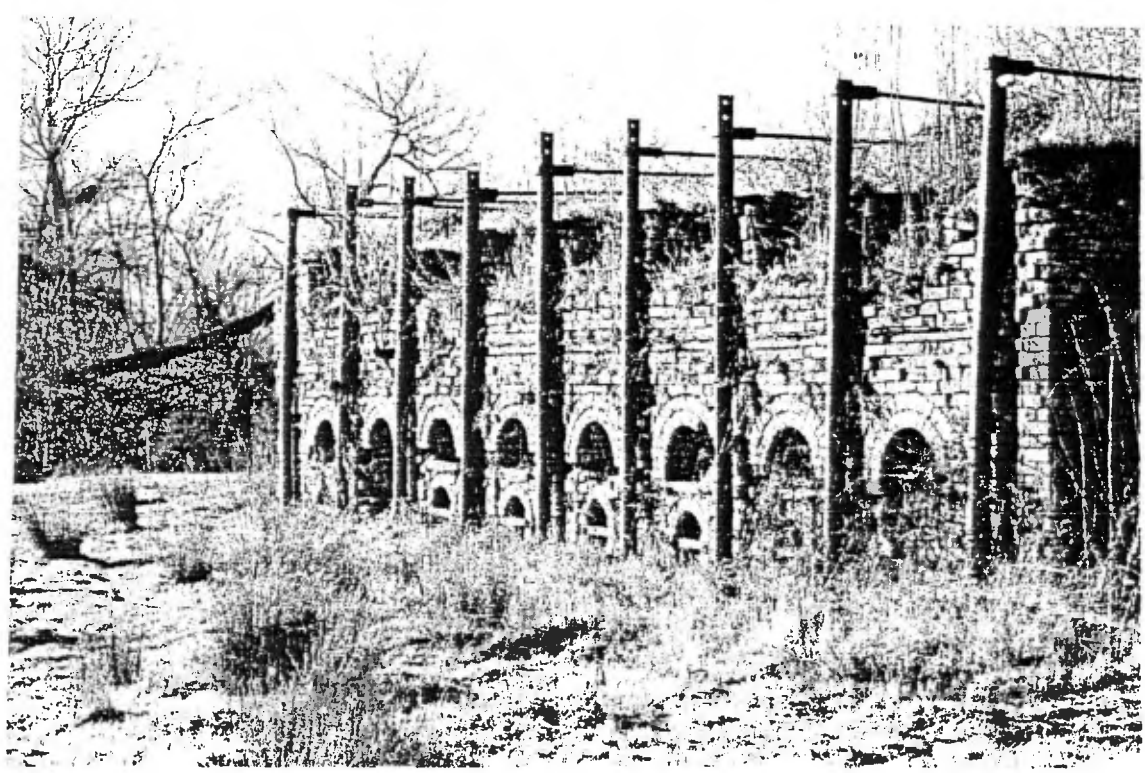
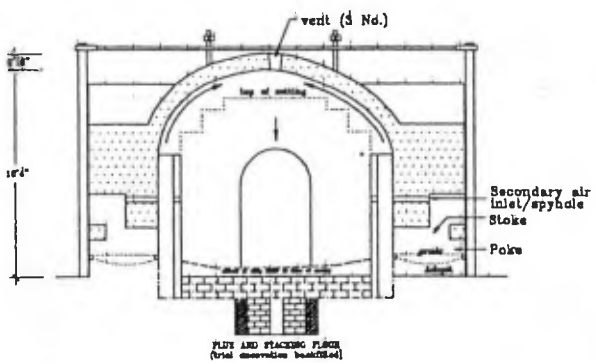


Fig. 1 The east elevation of the brick kiln of the Oxford Canal Company at Fenny Compton, Warwickshire, in 2000
Photo: John A. Selby

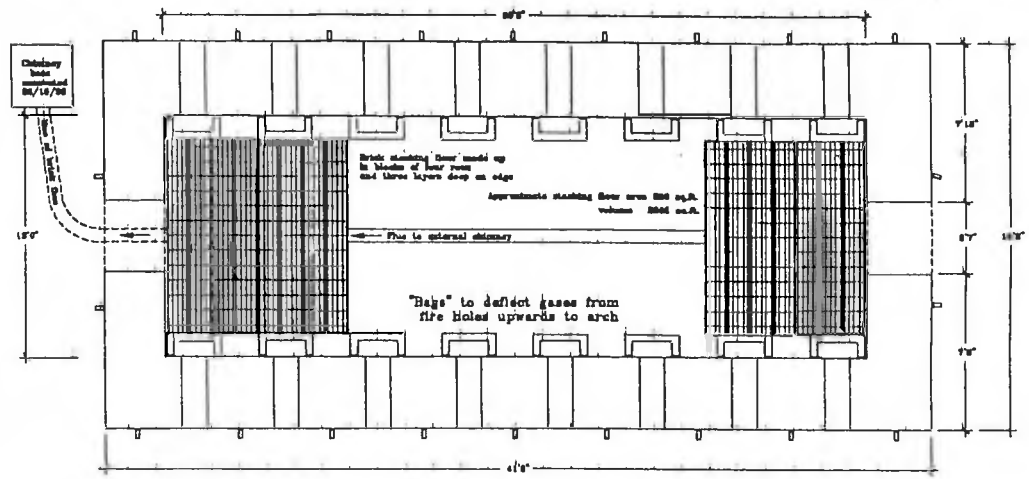
Capacity about 30,000 bricks. Firing on a 3 week cycle.

1 week load
1 week firing
1 week cooling and unloading

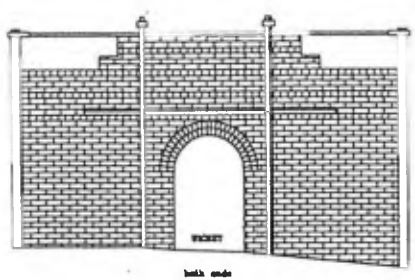
Fuel consumption 12 tons of coal per firing – 8cwt./1000 bricks



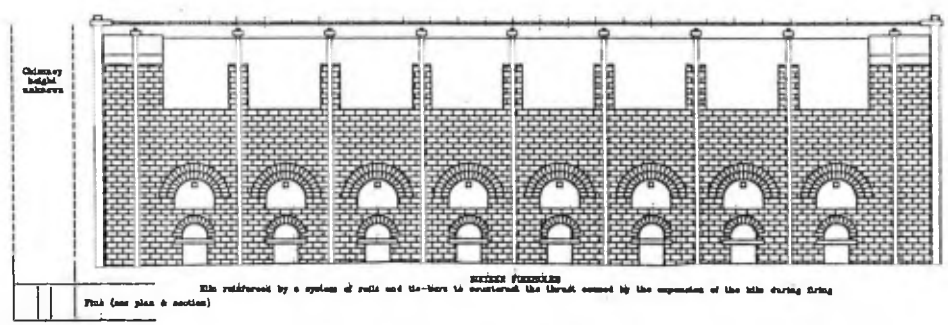
SECTION



PLAN



NORTH ELEVATION



EAST ELEVATION

SURVEY 6/7/1961 & 7/11/1961 APS/ASS
CPLOTED 5/8/1964 APS/ASS
CPLOTED 1/1/2401 APS/ASS

BRICK KILN FENNY COMPTON TUNNEL OXFORD CANAL

C1841 SP436524 TYPE–INTERMITTENT DOWNDRAUGHT

METRES 0 1 2 3
FEET 0 2 4 6 8 10 12

In geological history, the area was on the edge of Lake Harrison (fig. 4) and the overflow from this lake formed the Fenny Compton and Dassett Gaps. It was natural for Brindley carrying out his *`Ochilor survey or a ricconitoring'* on the way south from Napton to Banbury to use the meandering shoreline of the former lake from the start of the summit at Marston Doles thorough the gap be a tunnel and descend from Claydon to the Cherwell Valley. He would also have been aware of the Banbury to Southam turnpike road of 1755 which used this gap, and probably travelled on it when making his survey. From the 377ft summit level at Marston Doles, the canal follows a winding course to Claydon along the 400ft contour line. Thus 4¾ miles as the crow flies became 11 miles for the canal journey.

Fig 3. End and corner of the Fenny Compton kiln.
Photo: John A. Selby

Fig. 2 (opposite)
The brick kiln of the Oxford Canal Company at Fenny Compton, Warwickshire: ground plan, section, east elevation and north elevation

THE CANAL TUNNEL

In his survey book of 1830s onwards, the Engineer to the Oxford Canal, Frederick Wood, in his Survey Book of 1830 onwards writes that they used 1,663,000 bricks in the construction of the 1188 yard tunnel (fig. 5). The survey was made in preparation for the first opening up in 1838-40 (fig. 6) and an updating of the work on the shortening of the northern section in the 1830s.

An interesting account is given by Johann Hogrewe, a Captain of Engineers in the Prussian Army, in his report to George III published in 1790. Part of his description of the Fenny Compton Tunnel (*Tonnel*) reads:

> The extraordinary quantity of bricks which such work demanded are easily to be had in England because in all places an appropriate loam can be found from which without much ado bricks can be burnt in the open without kilns. For that reason there is nothing cheaper in England than bricks. A 1000 pieces are almost everywhere sold for £1 Sterling. (A longer extract is translated in Appendix 1)

The loam Hogrewe refers to in this location is the Lower Lias and suitable for brickmaking. It is only supposition on my part that they could have used the clay from the digging of the tunnel. There is also a small claypit, ¼ mile to the south, or using bricks left over from the construction of locks and bridges to the north, or probably a combination of all three.

Brickmaking had been in the area for over three centuries when the kiln was first constructed. The manor house of the Spencer family at Wormleighton, built *c.*1512 is less than a mile distant and in south Warwickshire, less than ten miles away, Compton Wynyates, the great house of the Compton family was begun in the 1480s with a major building programme in the 1520s. Both used bricks to a considerable extent.

THE CIRCUMSTANCES BEHIND THE BUILDING OF THE KILN

The canal was very profitable in the 1830s, paying a 32% dividend (6*s.* 6*d.* in the £). Because of competition from railways. the canal company had embarked on shortening the Northern Section (Coventry to Braunston) and making improvements at its junction with the Grand Junction Canal.

At the Oxford Canal engineering base at Hillmorton, the London and Birmingham Railway passed with sight by 1838 and no doubt `the buzz' must have been of the all night party held by George and Robert Stephenson with their friends at the `Dun Cow' in Dunchurch, on 23 December 1837 to celebrate the near completion of the Kilsby Tunnel. At the southern end of the Oxford Canal, the Great Western Railway did not reach Oxford until 1844.

The first hint of brickmaking, other than the physical remains of the kiln is a note under `observations' in the 1830 Survey Book (see above):

> 3 cottages belonging to the Company on Tunnel Brick Yard (Clay used from Tunnel opening).

This part of the opening at The Tunnel starts in September 1838 with the first payments:

J. Nicholson drawing posts & rails to F.C. Tunnel	£7. 9. 11
W. Hemmings repairing barrows for F.C. Tunnel	£10. 7. 8
J. Lines smiths work to barrows F.C. Tunnel	£1.16. 0

First account for excavation occurs in October 1838:

J. & W. Morgan on A/C for excavations opening	£240. 0. 0

There is a significant clue to the method of excavation:

Dec 1838 W. Pendred for ropes for horse runs	£5. 3. 8½
do do do	£5. 6. 6
Jan 1839 W. Hemmings carpenter's work putting up horse runs	£1.19. 2

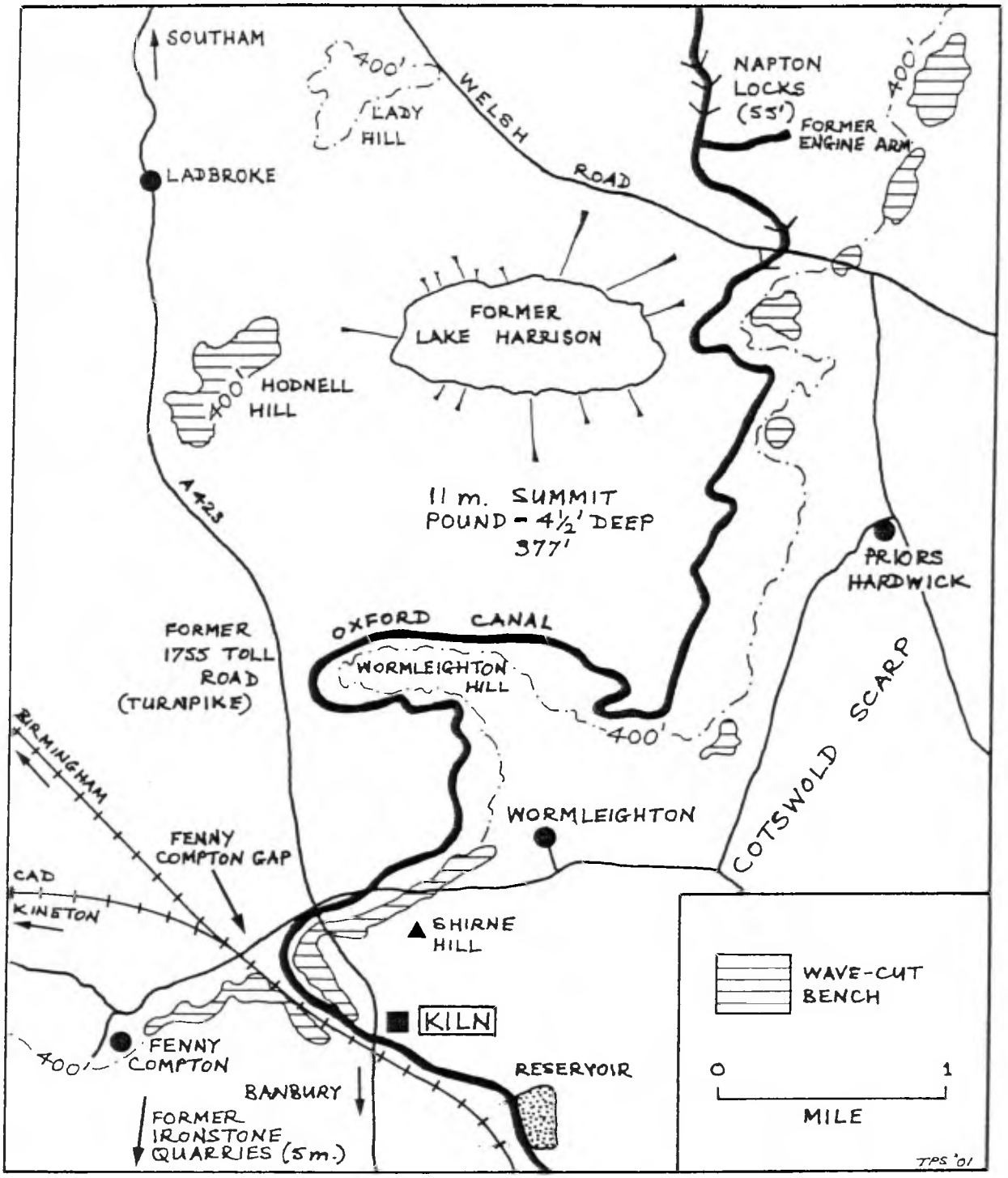


Fig. 4 The Oxford Canal in the vicintity of the brick kiln at Fenny Compton, Warwickshire, showing the former Lake Harrison and the former Turnpike Road from Banbury to Southam (now the A423) and the Welsh Road, which goes through Southam.

(this repeats itself throughout the contract)

It must have been a cold winter as

J. Cook Ice breaking Napton to Claydon £5.11. 10

Mar 1839 S. Maycock building a hut for the Morgans £9. 5. 0

Pickford & Co for carrying of wheels for the horse runs 5. 8

It is to be noted that during this period payments were made for making good the ground at [H]All Oaks (now Brickyard Spinney); for quit rents at Brinklow brickyard where over six and a half million bricks had been made; and to J. Whitmore for making bricks at Souldern (18 miles south from Fenny Compton on the canal). This brickmaker had been employed by the company on the shortening of the Northern Section but was then living in a company cottage at Souldern. John Whitmore reappears in this account (see below).

Payments continued through 1839-40 for opening up the western end (north) 80 yards; eastern end (south) 165 yards; and open basin (referred to as *Bason*) in the middle, 155 yards. It was at the last named that the kiln was to be set up.

Another interesting character during the work was J. Nicholson who appears to be one of the useful and handy men to have around a site for such jobs as:

> Falling brickwork, taking out old brickwork, laying drains, labourers' work, boating bricks for central opening, ditching and under drain round middle opening, labouring assisting at centering for facing, assisting in banking and coping the entrance, cleaning bricks and quicking (planting a hawthorn hedge).

A truly versatile contractors' man; to be followed by work on the brick kiln shortly to be built:

> digging out foundations heading from well to `tunnel bason'.

In April 1849 a payment appears to

J. & W. Morgan for making bricks at F.C. Tunnel £4. 4. 0

And in May,

making bricks and tiles at F.C. Tunnel £2.12. 6

It would appear at this stage that the Engineer Frederick Wood was checking out the brick potential of the spoil from opening out part of the tunnel. From the Brick Tax payment probably about 18,000 bricks were made.

In June 1840 J. & W. Morgan received their last payment for excavation at The Tunnel. Other interesting payments are:

Sept 1839 G. Rowell for gunpowder for blasting rocks in Middle Bason £52. 1. 1¼

and July 1841

Excs of late G. Rowell for matting at F.C. Tunnel £3. 2. 4

Excs of late G. Rowell for gunpowder used F.C. Tunnel £7.16. 6½

The winter of 1840/41 must have been cold as two payments were made to J. Cock for icebreaking. In March 1841, new payments appear:

J. Letts building at kiln at Fenny Compton brickyard £5.11. 0

mason work on a kiln at Fenny Compton brickyard £9.18. 6

J. Nicholson assisting mason at Fenny Compton brickyard £5.11. 6

J. Lines smiths work on kiln at Fenny Compton brickyard £1. 4. 0

W. Hemmings carpenters work to several at Fenny Compton brickyard £4.17. 11

W. Hartwell thatching hovel at Fenny Compton brickyard £1.12. 8

In December 1840, J. Whitmore received his last payment for brickmaking at Souldern and then, in February 1841, the first payment at Fenny Compton for brickmaking, £6. 0*s*. 0*d*.

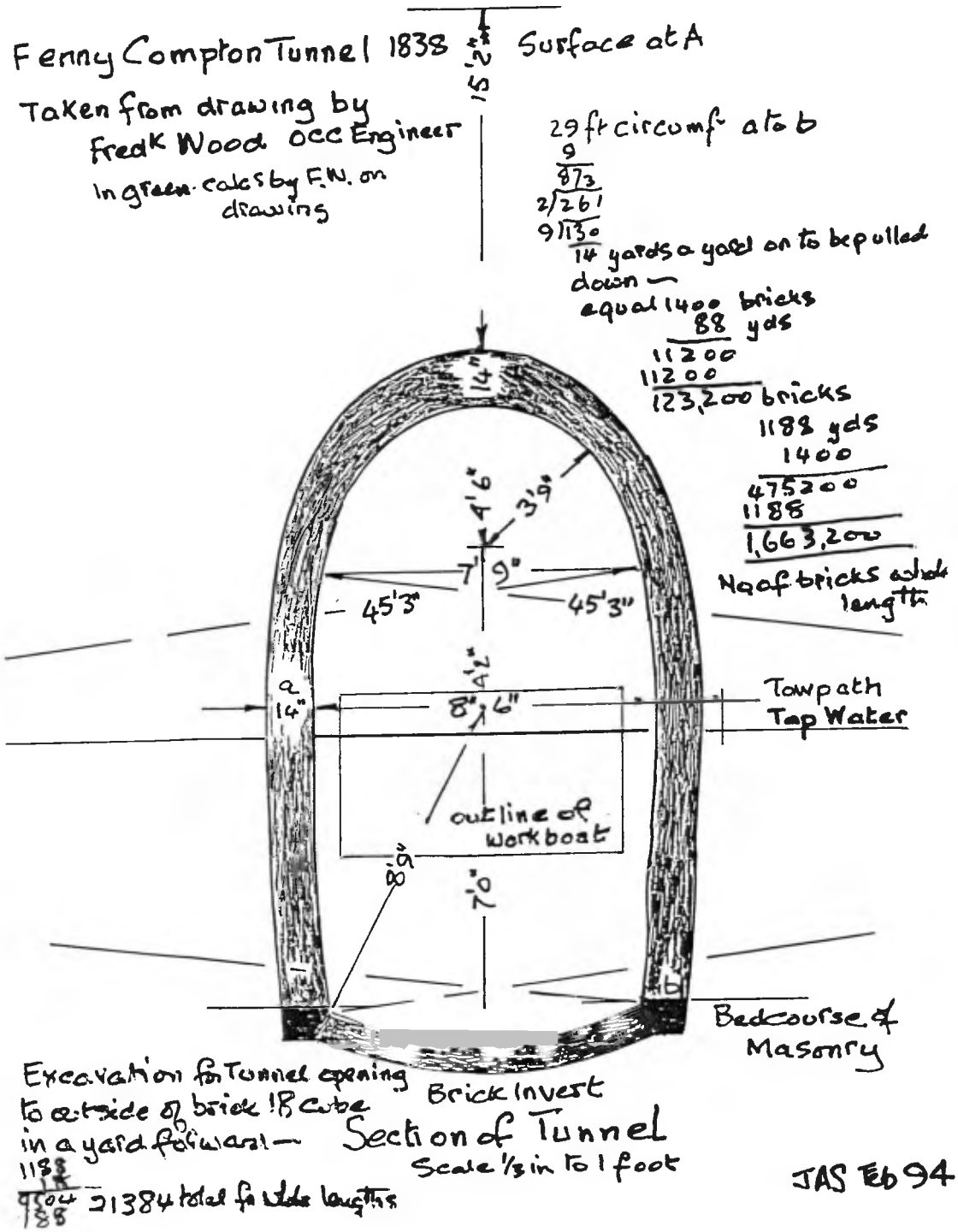
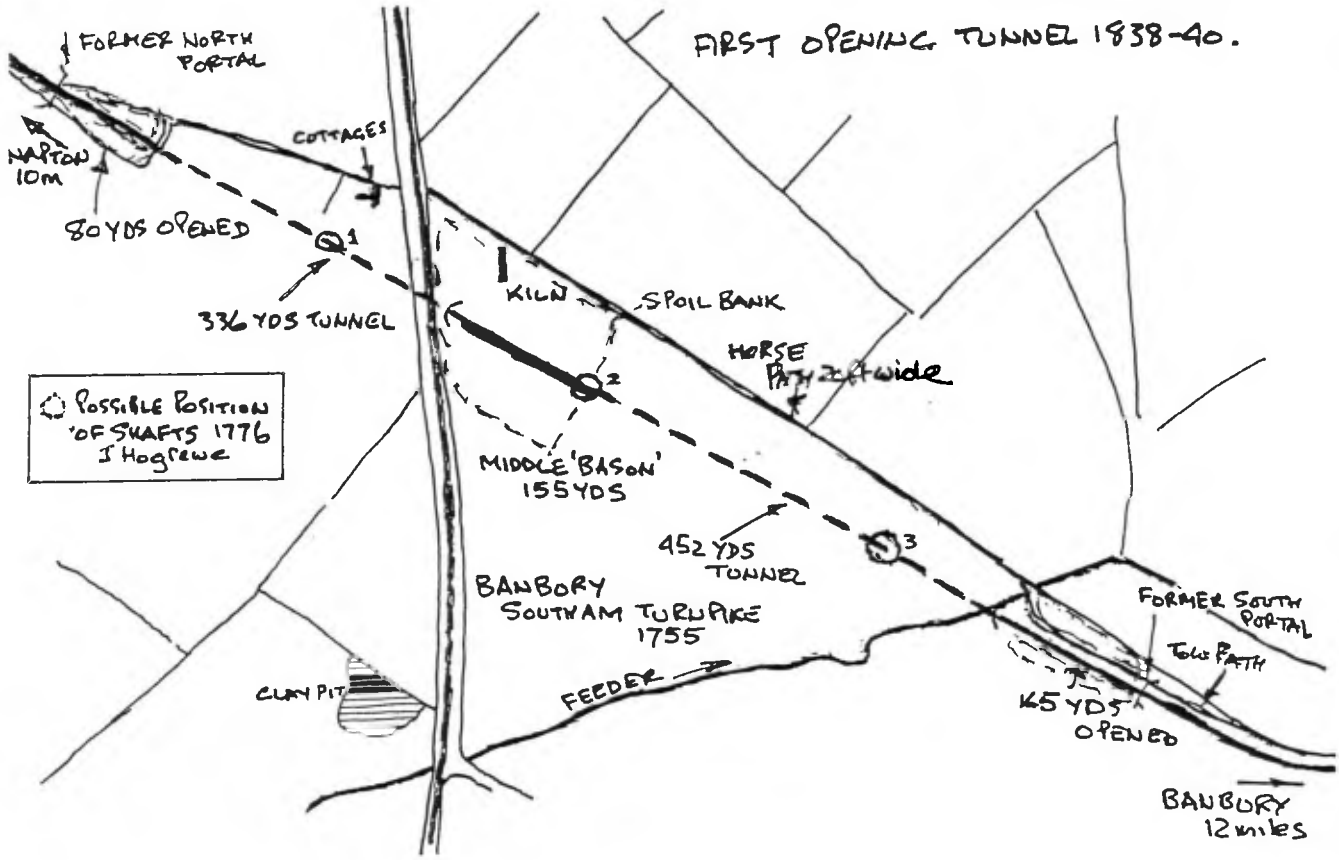


Fig. 5 Cross-section of the tunnel of the Oxford Canal at Fenny Compton, Warwickshire, redrawn from drawing by Frederick Wood, Engineer to the Oxford Canal Company..The drawing includes calculations as to the number of bricks used in building the tunnel.



....

Fig. 6 The first opening of the tunnel of the Oxford Canal at Fenny Compton, Warwickshire, in 1838-40.
Based on 1902 OS map and with kind permission of the Ordnance Survey.

BRICKMAKERS AT FENNY COMPTON

In his first year at Fenny Compton John Whitmore was paid £109 11*s.* 8d. Payments tailed off in November/December and resumed in February 1842. At the same time delivery of regular loads of coal from Wyken Colliery were being made to the brickyard. John Whitmore appears to have brought the new kiln into use quickly after leaving Souldern.

John Whitmore, the first brickmaker at Fenny Compton, at the time of the 1851 census was aged 44 and "living near the tunnel", he describes himself as Brickmaker (Journeyman) born Hillmorton, and married to wife Elizabeth, aged 40, born Long Itchington, Warwks., with an 11 year-old son, Thomas, born at Souldern, Oxon. He can be traced back to 1830 brickmaking at Souldern brickyard with spells at Brinklow, during the shortening of the Northern Section of the Oxford Canal. Brinklow yard was closed and dismantled during 1835 and lime kilns built. The Oxford Canal Company appears to have done quite an amount of work during 1833 to the Whitmores' house at Souldern; it was probably their first home as they were married at Hillmorton on 27 December 1832.

After the building of the kiln, John Whitmore continues as brickmaker at Fenny Compton until the end of 1864. During this period the kiln was rebuilt in 1849 and payments were made for a hovel and thatching it, with payments also for "Straw for thatching brick sheds" in 1850.

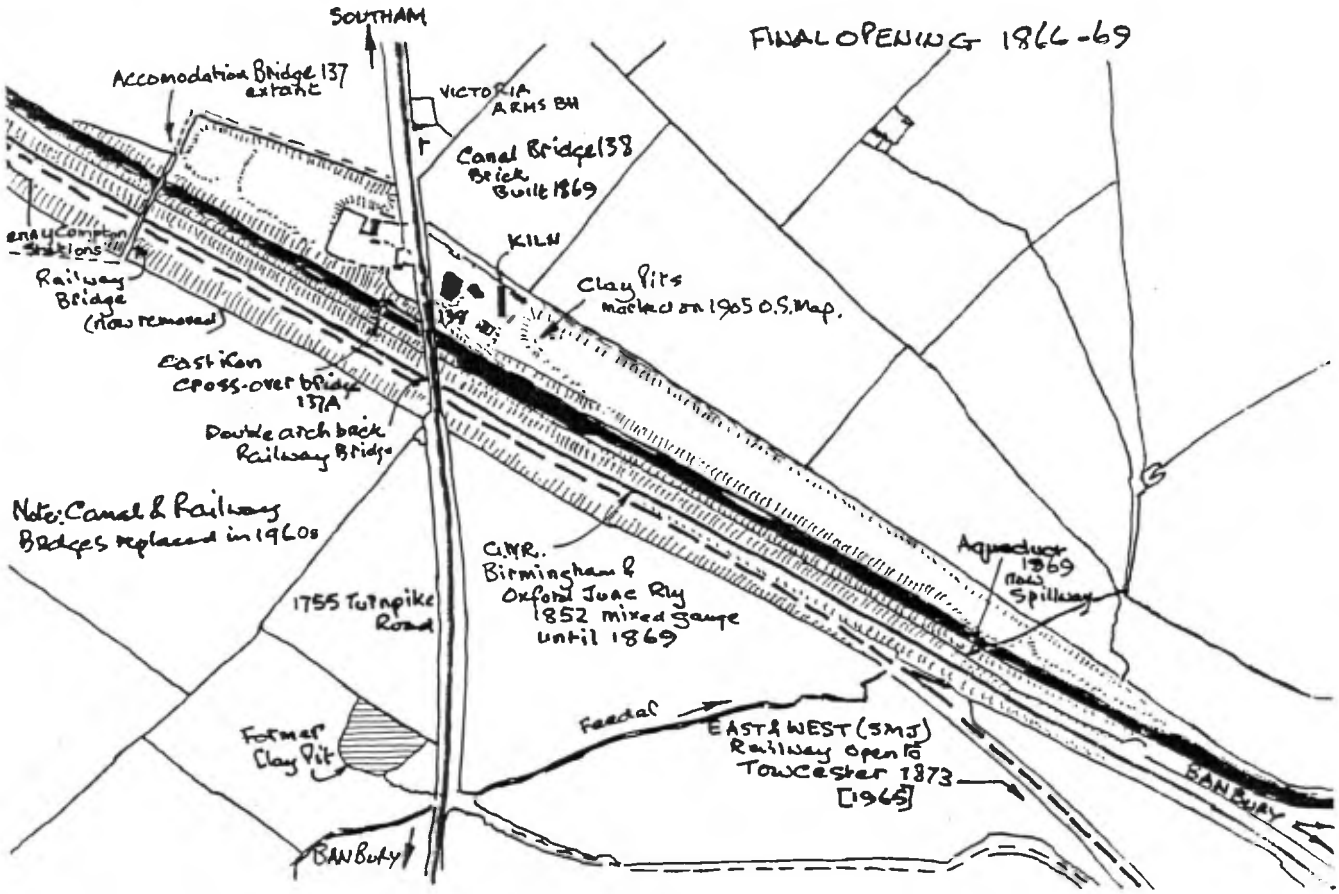


Fig. 7 The final opening of the tunnel of the Oxford Canal at Fenny Compton, Warwickshire, in 1866-69.
Based on the 1902 OS map by kind permission of the Ordnance Survey.

The years John Whitmore was at Fenny Compton were not entirely uneventful as the Birmingham and Oxford Junction Railway, a mixed gauge line of the Great Western Railway, was constructed close by, between 1850 and 1852, in a cutting at a slightly higher level. This was to have an effect on the second opening up of the Tunnel.

An interesting newsworthy aside of the time was when Messrs Peto and Betts, the contractors for the Birmingham and Oxford, assembled on the evening of Sunday 20 July 1851 navies from Evesham, *Fenny Compton,* Charlbury, Harbury and Cheltenham under foremen, converged on Chipping Campden at 9.00 p.m. and on the way by 10.30 p.m. for Mickleton Tunnel (the Battle of Mickleton on the Oxford, Worcester and Wolverhampton Railway, Monday 21 July 1851).

During early 1865 William Langford took over the Fenny Compton brickworks and in .the following year, the second and final opening up of the Tunnel took place (fig. 4)

William Langford later described himself in the 1871 census as aged 35, Brickmaker and Primitive Methodist Local Preacher, and from North Leigh, Oxon., and his wife, Emma, aged 27, from Bletchington, Oxon. (a nearby village to North Leigh). Their second son, Arthur, at the census was aged 1; he had been born 1 August 1869 at Fenny Compton, and was later to take over the brickyard as foreman.

I think William must have been well-respected in Fenny Compton. His name appears regularly in the local Methodist quarterly circuit minutes. In an meeting at Fenny Compton on

February 5th 1903

FENNY COMPTON BRICKYARD
STOCKTAKING

	Material	Stock in Hand Jan 1st 1902	Gone Out 1902	In Hand Jan 1st 1903	Made 1902
	Common Bricks	94,798	154,500	63,763	125,465
N.B	Thin Bricks	10,210	200	10,100	-
	Cut Bricks	603	360	243	-
	1/2 Round Bricks	200	-	200	-
	Culvert Bricks	86	86	-	-
	* (Gate Post?)	186	-	186	-
	Gable Bricks	22	-	22	-
	Pillar Bricks	50	-	50	-
	Large Diam	152	-	152	-
	Ridge Tiles	3,610	112	3,498	-
	Roofing Tiles	47,656	19,781	49,836	21,961
	Round Coping Big 14"	8,009	1,098	6,911	-
	Saddleback	1,894	50	1,844	-
	Wedge	745	-	745	-
	9" Coping	4,330	453	3,877	-
	Lockside Coping 14"	356	728	1,200	1,572
	Lockside Coping 18½"	260	260	-	-
	Quarries 7" x 7"	3,614	210	3,404	-
	Drain Pipes 2"	12,125	10,060	2,065	-
	3"	10,316	1,760	8,556	-
	4"	1,718	1,221	1,715	1,218
	6"	5,298	1,385	4,824	911
	Bullnosed Building Bricks				561

Coal in Stock about 18 tons

N.B Thin Bricks 9,635
Thin Culverts 575
10,210

Thin culverts were taken last year instead of thin bricks

Fred[k] Chamberlain
(Superintendent of the Oxford Canal - Hillmorton)

Table 1 Stocktaking at Fenny Compton Brickyard 1903
Source: Warwickshire County Record Office, Warwick, CR1590/379 (1900-1905) (letter 606)
Note: * Cannot read or interpret (JAS)

21 June 1865 (the year he came to the brickworks) it was

> Resolved that Bro Langford from Oxford come on the Plan providing he obtained his credentials.

In the minutes of the meeting at Harbury, 10 September 1866

> Resolved that Bro W. Langford and his wife have their credentials as requested.

In 1884 he was appointed a Trustee at Fenny Compton and North End Chapels. Finally a letter of sympathy, 5 May 1916, be sent to friends of W. Langford at his decease. He was a contemporary of Joseph Arch of Barford of the Agricultural Workers Union, as they were both Local Preachers on the same Methodist circuit.

In a brickworks context I also would like to think that he had been inspired by the knowledge that on Monday 15 July 1782, John Wesley (then aged 79) wrote in his *Journal*

> About noon I preached to a multitude of people in the brickyard at Bedworth, north Warwickshire. A few of them seem to be much affected.

William Langford must have become a little more prosperous in the 1880s as he moved just over the county border, across the fields from the brickyard, to Claydon Hay, Oxon. In 1891 he described himself at 56 as a farmer. Although correspondence was still addressed to him at the brickyard. His son, Arthur, now 21 in the same census, described himself as a brickmaker and was living at the Victoria Inn close to the brickyard. He finally took over from his father as foreman in 1912, although it is apparent from correspondence he had been in charge many years earlier.

FENNY COMPTON BRICKWORKS, 1866-1917

In 1866 the first contract was placed with William Death for opening up the southern section of the tunnel and depositing the spoil. This was a little more tricky than the earlier opening up in 1839 as the spoil could not be deposited on the south side where the railway had been built. The earlier spoil from the basin in 1839 (fig. 6) on the south side was removed with the building of the railway. A second contract was placed in 1868 for the Northern Section with a large spoil bank to the north-west of the site. During this William Langford continued brickmaking and was a good source of the bricks needed for two new bridges to span the canal. Bridge 137, a farmer's accommodation bridge is extant but no longer used as the abutting railway bridge has been removed; Bridge 138 which carried the Finford Bridge (formerly Southam) to Banbury turnpike road over the tunnel. The bricks were from the brickyard other than the blue engineering brick courses of the four ring arch and string course.

The Great Western railway was busy at this period removing the third rail on the Birmingham and Oxford line and converting this to standard gauge which was completed by 1 April 1869.

At the same period, the construction of the East and West (Stratford and Midland Junction) Railway began. This took some of the bricks for bridge construction in the area. and "70 tons of brick bats" from the tunnel for bridge foundations. There was much acrimonious correspondence between the railway and the resident engineer, Hillas Crampton (son of the well-known Thomas Russel Crampton, railway engineer and founder member of the Institution of Mechanical Engineers). The line from Fenny Compton to Kineton opened 1 June 1871 but did not greatly affect the canal at this stage. However, in the other direction, parallel with both the Great Western Railway and the canal, the line being constructed to Greens North Junction, near Towcester, opened on 1 July 1873. In a letter from Richard Gillet, O.C. Engineer, addressed to Messrs Crampton & Sons on 15 April 1873 reference is made to complaints from boatmen at the "bad road" you keep to the passage of boats and horses at the Canal bridge, and again, on 25 April 1874, after the railway was officially open. Correspondence ceased after this and the

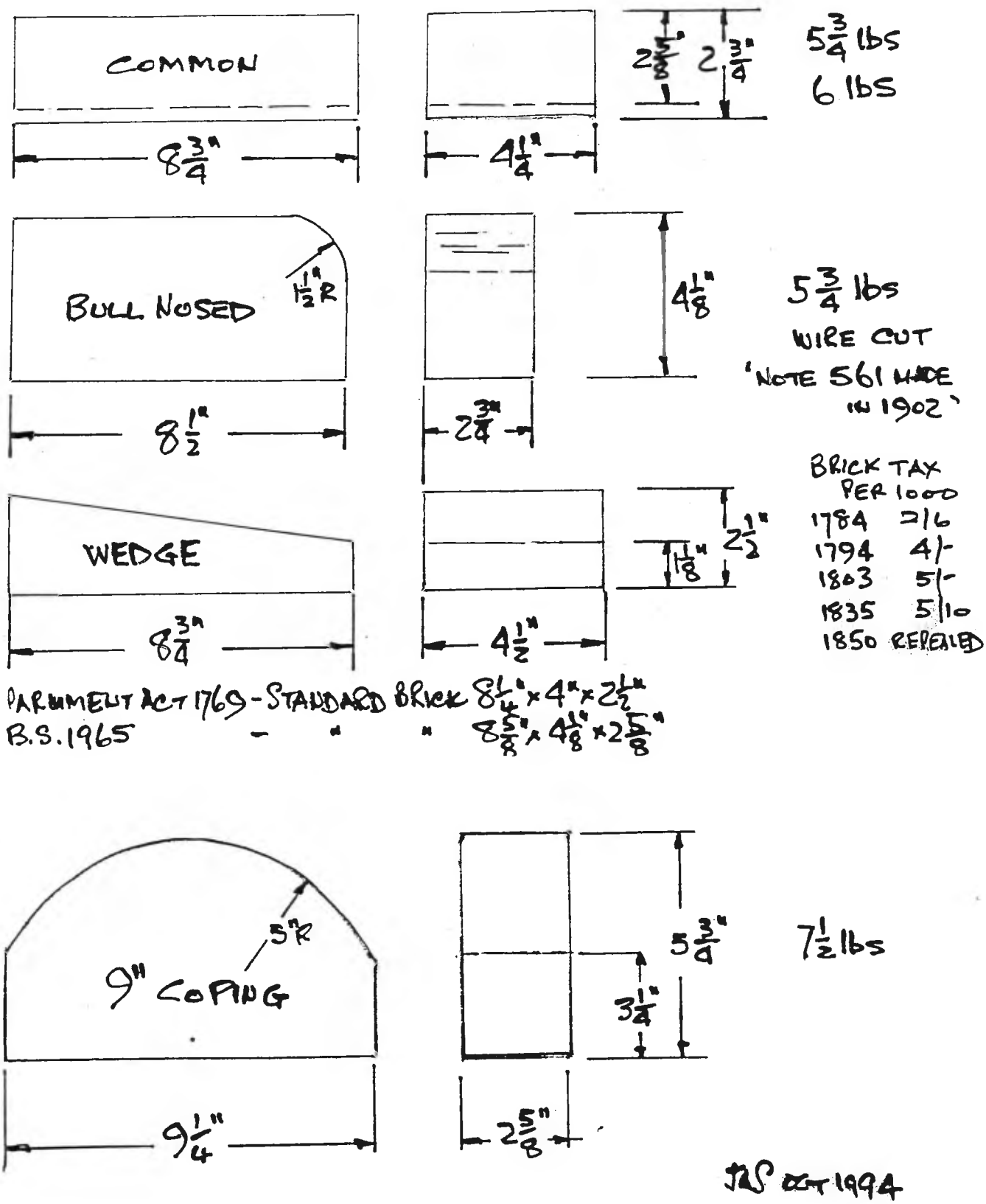


Fig. 8 Sketches of brick types made at the Fenny Compton brick kiln.

brickyard and the village and The Tunnel probably settled down to a more humdrum life.

The brickyard's range of bricks, tiles, special bricks, and land drainage pipes is shown on the stocktaking list of February 1903 (see Table 1).

The common bricks are in two sizes: 8¾ by 4½ by 2⅝ inches and 8¼ by 4¼ by 2¾ inches; and these weigh 6 lb and 5¾ lb respectively (fig. 8). The bullnosed bricks are of the larger of these two sizes and with the bullnose having a radius of 1½ inches; they weigh 5¾ lb. Wedge-shaped bricks measure 8¾ by 4½ and their thickness tapers from 2½ to 1⅛ inches. Coping bricks measure 9¼ by 2⅝ inches and are 5¾ inches high overall; their vertical flanks are 3¼ inches high and their tops have a radius of 5 inches struck from near the bottom of the centre; they weigh 7½ pounds. The kiln also produced saddleback copings with a much shallower curvature, that is a greater radius, than the coping bricks just described. Also identified as products were cant bricks with a plain chamfer across one long arris and drain pipes.

They supplied bricks to builders in the area through wharfs along the southern section. Earl Spencer's estate at Wormleighton purchased quantities of bricks and agricultural drains; his agent and farmer was for a long time John Selby. I doubt if they were ever competitive to the north as nearer that market was the larger Watson Nelson Ltd, Brick & Tile Works, by the canal at Napton and near the London and North Western Railway. That is not to say that bricks and pipes did not travel that way. I like the courtesy in internal letters in those days. The two examples which follow were sent by Frederick Chamberlain, Superintendent of the Oxford Canal at Hillmorton to William Langford at Fenny Compton brickyard.

Hillmorton May 11 1903

Dear Sir,

Creed will call in a few days for 5,000 bricks of the old sort (slop made) and 2,000 of the wire cut, these are for Hillmorton. I want you to keep back 1,000 of good hard wire cuts for lock work for the stoppage.

Yours truly

Fred[k] Chamberlain

W. Langford Brickyard

This gives an indication of how the bricks were made; and again:

Nov. 6, 1903

Dear Sir,

Creed will call at the brickyard on Monday for 100 6" pipes for slip in Willoughby strait. Those split on one side will do.

Yours truly

Fred[k] Chamberlain

W. Langford Fenny Compton Brickyard

I think that they must have had problems with 6" pipes as cracked pipes were offered cheaper.

THE END OF BRICKMAKING

World War I ended brickmaking.

An internal letter to O.A. Anderson, Oxford, from Fred[k] Chamberlain of 8 April 1915 speaks of an inability to get land with clay suitable for bricks and notes "our own is running out". A further latter in the same month notes that the brickyard will close on two or three years time. And in November 1917

The brickyard is now closed down. We sell only a few bricks now and then. Langford still rents the banks.

The last load, of 14,350 bricks, was probably to Lilbourne aerodrome, now Rugby Radio no 1

Station, in April 1917.

So ended a long period for a brickworks on one site, seventy-five years and no big hole, other than a small pond near the kiln, as they used the spoil from the Tunnel and turned it into a useful product, bricks, for their own use and for sale.

Appendix 1
Hogrewe's Account of Fenny Compton Tunnel

Preliminary Note: This work, now in the library of the Institution of Civil Engineers, (Archives reference 1780HOGBES), contains an account of all the English canals constructed from 1759 to 1780 or in progress at the last-named date. The author was Johann Ludwig Hogrewe, a Captain of Engineers, and his original drawings from which the plates were engraved are preserved in the Department of manuscripts of the British Museum (reference Kings MSS46). The work was reprinted but without the plates by J. Bernoulli (the Younger) in his *Sammlung Kuerzer Reisen* of 1781 volume 2, a copy of which is preserved in the British Library (reference 1045.6.2).

A translation made by Friderun Bradley of the portion relating to Fenny Compton reads:

TAB IV Fig 1 shows the plan and *Fig 2* the *section lengthwise* of a part of the underground canal near fenny Compton. Fig 3 shows the section of the same in end elevation. The length of the underground canal which the *English call "Tonnel"* 1200 yards or 3600 feet and some places the canal is more than a 100 ft under the surface and it has the shape of vertically standing ellipses with a height of 12 ft and the maximum width of 9 ft and it is lined throughout with bricks and can be seen in *Fig 3*. Every now and then there are passing places in the canal of 16 ft width and so that when two barges approach one can by in one of the passing places so the other can pass. The water depth, as in the whole of the canal, is 4½ ft. On the barges are mounted burning lights or lanterns and in order to move them there are on both sides of the canal every 12 ft iron rings in the walls which the skipper can grasp with his hands and propel the barge forward.

On *page 66* I have already described how such canals are built in the description of the French underground canal in Picardie and will therefore only add that this canal has 3 shafts and *`A'* of various lengths and that after these had been broken through excavated earth from the canal was taken in little carts under the shafts and taken to the surface in buckets by means of windlass operated by horses. As the canal as well as the shafts did not encounter any rocks but has to be cut though loamy earth mixed with marl and some sand one could do no other than line both throughout with bricks. With the shafts this lining was done in stages as they were dug deeper and deeper. With the canal itself as in mines they gradually dug out a heading in the marked out direction in order to install arches which are 2 ft higher and wider than the section of the tunnel but which have the same shape lined with loose boards so the earth does not fall in. In these, falsework was erected, which was made to the outline of the canal (tunnel) and above this the vaults were then brick-lined. Whereupon the arches and boards which had held back the earth were removed, were then used for the same purpose at the next stage and the empty space was filled with earth. the falsework remained in place until the brickwork was properly set and dried.

The extraordinary quantity of bricks which such work demanded are easily to be had in England because in all places an appropriate loam can be found from which without much ado bricks can be made and burnt in the open without kilns. For that reason there is nothing cheaper in England than bricks. A 1000 pieces are almost everywhere sold for £1 Sterling.

ACKNOWLEDGEMENTS

Staff at various record offices for their help in guiding me for study of their documents and drawings:

Warwickshire County Record Offiuce, Warwick

Institution of Civil Engineers, Library and Archives, London (Report by J.L. Hogrewe is reproduced by their kind permission)

Public Record Office, Kew

Fellow members of the Warwickshire Industrial Archaeology Society (WIAS) and in particular in first drawing my attention to the kiln in August 1990, Peter Chater, and many members of the society with my son, Andrew, for help in July 1991 of a full survey of the kiln.

Later in 1999 Alan Flint and Peter Brown (former brickmakers) who dug out and assisted in the measurement of the flur and chimney base.

Rachel Lawson with her narrow boat, *Jenny Geddes,* was helpful in being able to a slow traverse forwards and backwards to survey and study The Tunnel from the water. On this trip we were able to pick up some bricks dredged from the canal.

Photographs of the kiln were taken by fellow member of WIAS, Mark Abbott.

The maps, figs .6 and 7, were made with the aid of the 1902 OS map with kind permission of the Ordnance Survey NC/01/99.

British Brick Moulds needed in Australia

The extract which follows was culled from an article entitled `Dorling Letters No 2' which appeared in *Suffolk Roots,* volume 3, July 1983. *Suffolk Roots* is the journal of the Suffolk Family History Society. The article contains letters sent by a member of the Dorling family who had emigrated to South Australia. One dated 21 December 1848 throws an interesting light on the need for British brick moulds by the emigrants in Australia. Such moulds could, of course, only be supplied by sea.

The text is in the original spelling.

The Text

.... there is also a blue gum and a red and white gum, the name of these trees are taken from their colour. But there is little difference between the leaves of the red blue and white gum - these are the trees you have read about where the natives climb for wild honey and for oposum this is a small animal little bigger than an English squirell - there is scarcely a gum tree round Adelaide But what has got the foot marks of the native.

here is many brick moulds made with the red gum for I have been working one myself and like it very well but I like beech better on account of it not being as heavy as gum - but should any of you come to this country I should like you to bring as many brick moulds as you can make it convenient. But mind they are made of beech and all the iron screwing on a brick mould here cost 9s and in England it cost 5 - and bring plenty of seed with you such as cabbage seed of various sorts and scarlet runner beans.

.... and on 11th September last my master (Wm Pike) prepared a dinner for all that worked for him which amounted to 10 men and 1 boy. This was his wedding day 22 years since this is something different to the brick trade on the north side of Culforth Parl - as I have a good memory. I though about Sam's birthday on the 10th of September and drink his good health wishing him all the good things he stand in need of which i think are many - and if you wish to obtains 9s per thousand for making bricks apply to the emigration agent in London and with courage and a good check you will find yourselfs at Port Adelaide (do let it BE) ....

Contributed by W.J. WRIGHT

HIORT PATENT BRICKS:
A Provisional Distribution Map

Terence Paul Smith

On 18 November 1825, John William Hiort (1772-1861) took out a patent on special bricks for constructing chimney flues, specifically with the aim of facilitating 'mechanical cleaning' - that is, cleaning by means of the once familiar sweeps' brushes, pushed up or lowered down the flues, rather than by having to send small boys (or, occasionally, girls) up the chimneys.[1] It was a worthy aim, although Hiort's bricks - which, because of their awkward shape, would have been expensive to manufacture, distribute, and lay - seem not to have been widely used. They were manufactured by a company set up by Hiort himself: the London, Surrey & Kent Safety Brick Works at Stangate Old Wharf, Westminster Bridge, Lambeth.

These specialist products were first brought to the attention of members of the British Brick Society by the late Maurice Exwood, who mentioned *in situ* examples in a house near Weston Green, Thames Ditton, Surrey, and also reprinted diagrams from Hiort's patent application.[2] Subsequently, a further example, from the demolished Hope Maltings at Ware, Herts., was brought to members' attention.[3] Following recognition of examples recovered during archaeological excavations by the Museum of London at Coronation Buildings, Lambeth, Hiort bricks were studied in some detail and a list of known buildings was provided: St Katherine's Hospital, Regent's Park, London; the General Post Office, City of London (demolished); Clarence House, St James's, London; and Buckingham Palace, London; in addition to those at Lambeth, Weston Green, and Ware.[4] A further use, at the Custom House, City of London, has since been noted by B. Lawrance Hurst,[5] and a further single example has been recognised amongst building materials from a site excavated by the Museum of London at Queensborough House, 2-18 Albert Embankment, Lambeth.[6] To these must be added a house (no longer extant) at 13 Portman Square, Westminster, designed in the 1820s by Robert (later Sir Robert) Smirke and mentioned by Major-General Sir Charles Pasley[7] and an example which has long been in the literature: Harcourt Buildings, Inner Temple, Fleet Street, also by Smirke, (1832-34); it was destroyed by enemy action in 1941 when the Hiort flues were seen.[8]

The accompanying map (fig. 1) shows all these locations. By their very nature the bricks are not easily recognised *in situ* and there are doubtless other examples as yet undiscovered. (Probably too some have been lost, unrecognised for what they were during demolition.) The map, therefore, cannot be other than provisional. It is nevertheless of some interest. As the circle drawn on the map indicates, nine of the eleven locations lie within 2½ miles (4 km) of their place of manufacture. It seems likely that their distribution was never very wide.

The potamic locations of the two more distant examples are significant. It is virtually certain that the distribution of products beyond central London was by water, and it is likely too that Hiort set up his works at Stangate Old Wharf with that prospect in mind.[9] The intended principal distribution area for the product may, indeed, be reflected in the name of Hiort's 1825 company: London, Surrey and Kent. The Thames and its tributaries would have been invaluable in this connection; rail transport was, of course, a thing of the future in 1825, the year in which the Stockton and Darlington Railway was opened. The bricks at Weston Green would have been taken up the Thames to Thames Ditton; they perhaps completed their journey by road rather than along the little stream known as The Rythe. Those at Ware - which, of course, lies beyond the London/Surrey/Kent region - would have been taken down the Thames to Limehouse, and thence

up the Lea (or Lee) Navigation, which was navigable as far as Ware itself.[10]

It is likely that any examples discovered in the future will be either in central London, and probably in high status buildings, or along the Thames or one of its tributaries.

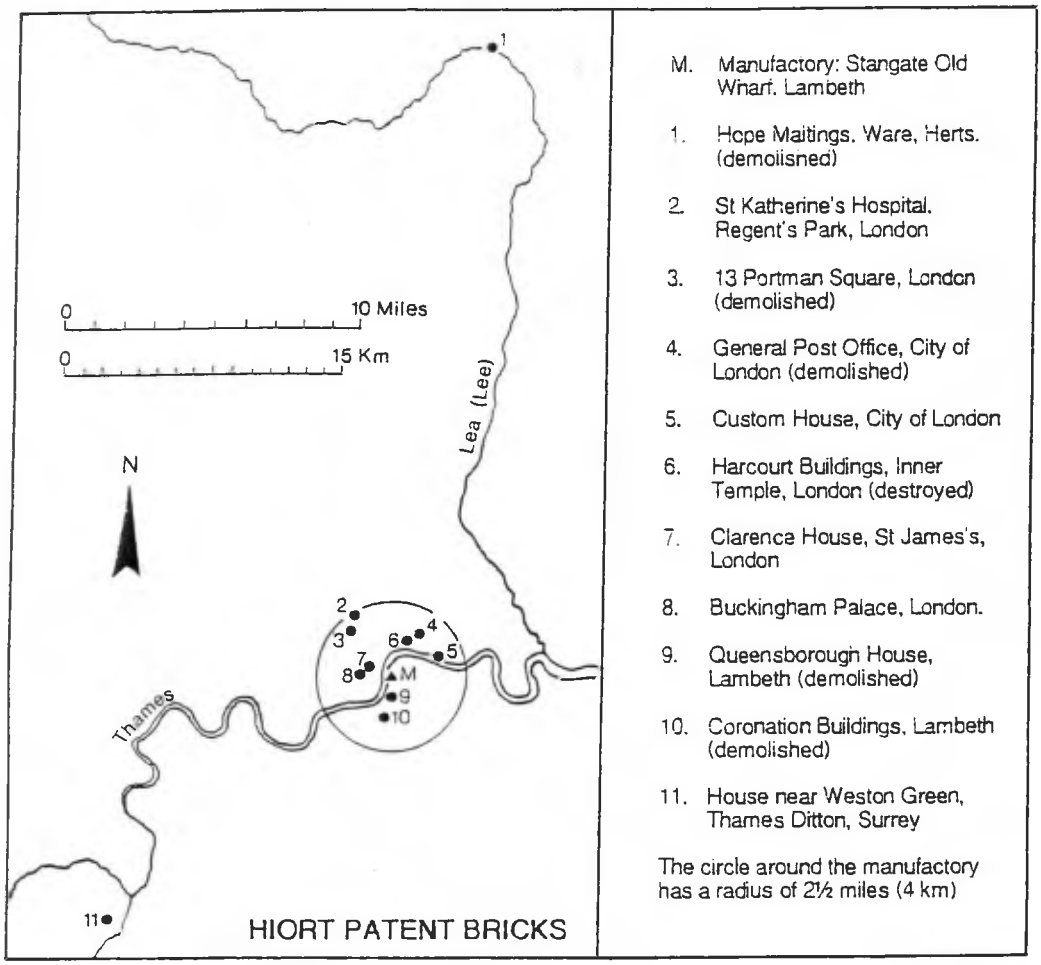


Fig. 1 Hiort Patent Bricks: provisional distribution.

Notes and References

1 T.P. Smith, 'Hiort Patent Chimney Bricks from Lambeth, London', *Trans. London & Middx Archaeol. Soc.*, **47**, 1996, 187-192.

2. M. Exwood, 'Hiort's Patent Brick Chimneys', *BBS Information*, **34**, Nov 1984, 10-13.

3. T.P. Smith, 'Hiort's Patent Brick Chimneys'. *BBS Information*, **38**, Feb.1986, citing R.A. Storey, 'Some Additions to the Industrial Archaeology of Hertfordshire', *Herts Past & Present*. **11**, 1971, 26.

4. Smith, 1996, 187-192.

5. B.L. Hurst, 'Hiort's Patent Chimney Bricks', *BBS Information*, **76**, Feb.1999, 22.

6. I.M. Betts, unpublished building materials report for Queensborough House, 2-18 Albert Embankment, London SE1 (site code: ALA88), Museum of London.

7. C.W. Pasley, *Outline of a Course of Practical Architecture...*, lithographed notes, 1826; first book edition, Chatham, 1862; re-issued, Shaftsbury: Donhead Publishing Ltd., 2001, p.165.

8. J. Summerson, *Georgian London*, Harmondsworth: Penguin Books, 1978 edn., p.234.

9. It appears that the prototypes were manufactured for Hiort at "Mr. Baker's brickfield at Darland," near Chatham, Kent. Pasley, 2001, p.166n.

10. W. B. Johnson, *The Industrial Archaeology of Hertfordshire*, Newton Abbot: David & Charles, 1970, p.116.

Brick For a Day, 2001

The British Brick Society has planned no fewer than six meetings during 2001. The first of these, a Spring Meeting in south-east Warwickshire, visiting the Fenny Compton brick kiln of the Oxford Canal Company (see pp.21-35), Wormleighton Hall and the Chesterton Arch had to be cancelled owing to restrictions on using public footpaths and canal towpaths following the outbreak of foot-and-mouth disease. It is hope that this meeting can take place in March 2002.

The Northern Spring Meeting on 11 May 2001 was a study day on Burton Agnes Hall, East Yorkshire, held at the hall and the Annual General Meeting on 9 June 2001 was followed by a walkabout in King's Lynn, Norfolk. The July Meeting visited Basingstoke, Hampshire, on 14 July 2001. Reports of the second and third of these are printed here.

A report of the meeting at Burton Agnes Hall and on subsequent meetings - the Autumn Meeting in south Hampshire and the Late Autumn Meeting at St Pancras, London, - will appear in a future issue of *BBS Information.*

KING'S LYNN, NORFOLK

Following the Annual General Meeting on 9 June 2001, members and guests were led on a perambulation of part of King's Lynn by Elizabeth James of King's Lynn Museum; Adrian Parker, Planning Officer of the Borough of King's Lynn and West Norfolk; and Edwin Rose of Norfolk Landscape Archaeology. It is fitting that a report of this meeting should appear in an issue of *BBS Information* dedicated to 'Bricks and Water', for Lynn was founded upon water. This is true almost literally, for the land on which the town stands is extremely marshy - the name derives from the Celtic *llyn*, a mere or marsh - and is liable to flooding: I can recall arriving one morning in 1968 at the archaeological excavation site in what was then Baker Lane only to find that heavy rain overnight had filled the trench with water and there were ducks swimming in it! But metaphorically too Lynn is founded upon water: its position close to The Wash - and hence to the North Sea - and its connection with a wide hinterland via the River Great Ouse and its tributaries enabled Lynn to develop as one of the most important and prosperous of medieval ports. Brick was used here from an early date, perhaps partly with an awareness of its light weight - a considerable advantage on soft ground.

Our tour began in the courtyard of Thoresby College, in the hall of which the AGM had been held. Here, in 1964, Helen Parker (now Helen Clarke) excavated a medieval wharf, a reminder of how far the quay has moved westwards since the foundation of the town. The College was founded on this reclaimed land, for thirteen priests of the nearby St Margaret's Church and the Holy Trinity Guild. It was built of brick in 1508-1511. At the Reformation it became a private residence and there was reconstruction of the inner courtyard elevations in the seventeenth century.

From there we moved to Green Quay, built with Dissolution rubble in the late sixteenth century and with an upper storey added in the following century. In St Margaret's Lane, we saw the Hanseatic Warehouse, founded for the merchants of the German Hansa in 1474 (see cover illustration). It is of timber-framing with brick nogging, and there are extensions of later date in brick. The adjoining St Margaret's House dates from 1751. Round the corner, in St Margaret's Place, we viewed St Margaret's Vicarage, a large red brick house on a plinth of white Ely bricks, begun probably in 1811. At the rear is part of a sixteenth-century house.

In Queen Street we saw the seventeenth- and eighteenth-century front of Thoresby College (fig. 1), with its fine Perpendicular doors showing linenfold panelling; the brick-built

Fig. 1 Thoresby College, King's Lynn, Norfolk
The 2001 AGM of the British Brick Society, in King's Lynn, was held in the great hall of Thoresby College, founded in the early sixteenth century as a college of priests. At the Reformation it was converted to a merchant's house. This view shows the north (Queen Street) frontage, which preserves, just left of centre, the original doorway in cut brick rendered to resemble stonework. The wooden doors, with linenfold panels, are also preserved, though not the original inscription, which read *Pro orare anima Magistri Thomas Thoresby fundatoris huius loci* (Pray for the soul of Master Thomas Thoresby, founder of this place). This face of the building was rebuilt in the seventeenth century, when the shaped gables were added, the central one, above a slight projection, distinguished by its segmental pediment. The fenestration was changed in the eighteenth century, when the large sash windows were inserted.

Burkitt Almshouses of 1909; and one of the gems of King's Lynn, Clifton House. The undercrofts here are of thirteenth- and fourteenth-century date, with rib vaults of brick, and the floors above have decorated floor tiles. At the rear of the house is a brick Elizabethan tower from which the owner could watch for his returning ships. Members and guests were able to ascend its five storeys by the narrow spiral staircase, with its original wooden newel post, in order to view the fine prospect from the top. The frontage of Clifton House itself is a grand brick building of 1708, distinguished by the barley-sugar columns flanking the doorway.

We then passed down a narrow lane to see Bank House, built between 1680 and 1725 on

the site of the port tollbooth. Crossing the Purfleet by the new bridge, we passed Henry Bell's Custom House of 1683 - not a brick building but hardly one to be ignored on a visit to the town!

At 1 King Street we were able to see the brick-built house of Sir John Turner, erected *c.*1670. In Bell's print of 1683 it appears to be of stone. If this is not just a drawing convention, then it may be that the house was originally rendered to resemble stone. Scratch marks on the brick surfaces suggest that this was indeed the case, the scratches serving as a key for the render. No. 3 King Street is a fifteenth-century hall house refaced in brick in the mid eighteenth century, whilst 3A is an early-eighteenth-century linking block. No 5 was constructed *c.*1734 with a grey brick façade. The frontage of nos. 7-9 was added in the eighteenth century to what is a fourteenth-century hall with later alterations. It is possible that the yellow bricks of the façade are imports from the Netherlands. Other buildings were looked at before we reached St George's Guildhall, said to be the largest surviving medieval guildhall in England. It was built of red brick in the early fifteenth century, following purchase of the site in 1406. The buttresses are impressively large, and are supposed to have been added *c.*1500. Arches built into those on the north were to accommodate a water channel which ran alongside the hall. There has been some repair. The building is now used as a theatre.

In the Tuesday Market Place some critical remarks were offered about Barclays Bank. A bonus was a visit to the interior of the Corn Exchange built in 1854 to designs by Cruso and Maberley and now beautifully converted to a theatre.

In St Nicholas Street we looked at the Tudor Rose, an ensemble of varying dates, before arriving at St Nicholas Chapel, founded as a chapel-of-ease to St Margaret's Church. The thirteenth-century south-west tower is of stone, as are the south porch and the west end, both part of the rebuilding of 1419. The rest of the new building, however, is of red brick covered with render and with incised lines to resemble fine ashlar stonework, although the Perpendicular windows are of real stone.

We looked briefly at the new West Norfolk Borough Council office block, immediately south of the churchyard. It contains only a little brick but is the most environmentally friendly building in Norfolk - a most commendable example for a local council to set.

Such a brief perambulation, full though it was with items of interest, could only include a fraction of what Lynn has to offer those with an interest in brick, and it is hoped to arrange a longer visit in the not too distant future. Our thanks are due to Elizabeth James, Adrian Parker, and Edwin Rose, for their organisation and guidance in making this a most rewarding visit.

TERENCE PAUL SMITH

BASINGSTOKE, HAMPSHIRE

Leave Ringway North, the instructions said. As an introduction to fortress city, the very names given to the encircling dual carriageway road did not augur well for a British Brick Society visit. Gleaming glass clads the forest of mini-skyscrapers, not quite on the American pattern. True in the town centre there is a brick citadel, otherwise known as the shopping centre, but totally enclosed within high walls of brown brick.

Yet, barely a brickbat's cast from the railway station is the Chapel of the Holy Ghost. The red brick here is structural brick for the outside of the south wall retains much of its original chalk cladding; when built in 1524, the interior would have been covered with plaster of which no trace now remains. Lord Sandys, councillor to Henry VIII, erected the Chapel of the Guild of the Holy Trinity as an addition to the existing chapel. Of the original Chapel of the Holy Ghost only the lower part of the flint tower survives, a thirteenth-century structure with fifteenth-century brick repairs. The original chapel had a half-hexagonal apse to the chancel and Lord

Sandys' chapel, too, has half-hexagonal ends, the west one with a chalk-covered octagonal brick tower sharing the south-west face. The access tower with its robbed-out newel stair and the south and east walls of the chapel survive.

Basingstoke has two railway lines; the main one was built for the London and South Western Railway, but the first trains ran on a Great Western Railway branch line from Reading. Beside this in 1902, a local businessman, Walter Hoare, commissioned E.L. Lutyens to build him a new house, Daneshill, for which the bricks were made from the very good brickearth on his land. The Daneshill Brick began in 1902, at about the same time as the house was built, and continued working until 1946. There is evidence of a private siding from the Great Western Railway, which is at the end of Bilton Road in the middle of an industrial estate, itself partly built into the hollowed out excavations for the brickearth.

The offices of the Daneshill Brick Company now serve as offices for the industrial estate, an incongruous sight amongst the modern glass and steel. The offices have many of the company's specials built into them: half- and quarter-round mouldings, and more complex pieces also in the transoms and mullions to the bay windows, which contain voussoir bricks in the lintels. In the side walls are mock rusticated columns in the orange-red brick with bricks used to make Doric capitals, The chimneys are constructed of bricks that allow the shafts to twist and the vents are highly ornamented.

On the outskirts of Basingstoke is Old Basing House, or rather its site, which is partly cut by the Basingstoke Canal: spoil from this was dumped in the outer bailey ditch of the Norman castle. Members were examining the general view from outside the castle ditch when overhead flew a Lancaster, flanked by a Spitfire and a Hurricane, a display from a nearby airshow.

The first brick house, succeeding one or more medieval stone and/or timber-framed houses, was fitted within the ringwork of the Norman castle. This was the work in the 1530s of William Paulet, whose final title was first Marquis of Southampton. When Henry VIII died, he demolished the first house and built more sumptuously on the site: in the museum attached to the garden are Caen stone figures in roundels which once ornamented the brick great gatehouse of the 1550s house. For regal visits, of which there were to be many in the second half of the sixteenth century, a second brick house to the side of the ringwork was constructed, almost simultaneously with reconstructions of the first house in the 1550s. These houses, together comprising some three hundred and sixty rooms, lasted less than a century. Basing House was besieged for three years in the English Civil War. A direct hit from an incendiary bomb put the house to the fire when the defenders were still well provisioned.

The first house was of unusual plan, being laid out as courts within an existing, basically circular feature so that on entry through a great gatehouse the first court was fan-shaped. The second house outside the castle bailey followed a more conventional quadrangular plan. Little remains above ground of either although the extensive cellars, including kitchen cellars, of the first house were exposed during Victorian excavations.

Across the street of Old Basing there was a third, late-seventeenth-century, house, which was featured in a *Time Team* television programme which also showed its surviving (if blocked) gateways. These and the adjacent brick barn, whose roof timbers were felled in 1534, were closely examined before our conducted tour of the ruins of Old Basing House.

One of joys of a British Brick Society visit is the exchange of information between members. Tony Wright from Fleet brought along details of the Daneshill Brick Company and of buildings where its bricks had been used. He also showed us the gateways of the third house at Basing and the barn with its attendant barn owl. At Basing House, we were fortunate that Alan Turton, of the Hampshire Museum Service who is the curator of the site was available to be an excellent guide. The society's thanks are due to them all.

DAVID H. KENNETT

BOOK REVIEW

John Szarkowski, *The Idea of Louis Sullivan,* with an introduction by Terence Riley.
xviii + 162 pages, 95 unnumbered black and white photographs.
London: Thames and Hudson, 2000, ISBN 0-500-34179-6; hardback, price £39-95.

In 1956, the University of Minnesota Press took the brave step of publishing the work of a young photographer, John Szarkowski, offering a portrait of one of America's finest architects, Louis Henri Sullivan (1856-1924), not by presenting his complete *oeuvre* but by concentrating on a few chosen buildings. The book had a limited print run and has long been unavailable. It is now re-issued in revised format with a new introduction by Terence Riley, Chief Curator of the Department of Architecture and Design at the Museum of Modern Art (MOMA), New York, with a preface by Szarkowski, himself Director Emeritus of the Department of Photography at MOMA.

As both writers stress, Szarkowski's work is not *architectural photography* but *the photography of architecture* - that is, it aims to capture buildings as they are, with traffic, people, advertisements, grime, and not in those sanitised versions which usually illustrate works of architectural history of articles in architectural journals. Which approach one prefers will be a matter of taste. The photographs gathered here do indeed capture the buildings as they are - or *were*, for some have since been demolished - although the surroundings, especially where advertisements are shouting loudly (see, in particular, pp. 109 and 113), are often distracting.

The book includes (pp.19-29) a `Profile of Louis Sullivan', written by Szarkowski. But in a sense the whole book, with its combination of photographs and texts (by Sullivan and others) is a profile of this brilliant, complex, difficult man - sharp-tongued, cocksure, eventually lacking commissions and turning increasingly to strong drink, his own pronouncements on architecture and life mingling the practical, the visionary, and at times the mystical with a descent into free verse reminiscent of a clever sixth-former trying to sound like Walt Whitman.

Sullivan, at first working with an older partner, Dankmar Adler (1844-1900), was a pioneer of skyscraper construction. His dictum "form follows function" was later taken over by others in a sense that Sullivan never intended: as photographs in this book illustrate, Sullivan himself was almost addicted to ornament, often of a flowing, quasi-natural form. This did not detract from the basic nature of the buildings, whose structure and purpose were always expressed in their external design. The office blocks emphasise verticality, but the Schlesinger-Mayer (now Carson Pirie Scott) Department Store in Chicago (1899-1902), because of its very different function and internal arrangements, stresses the horizontal. The Mid-West bank buildings, which were practically the only commissions that Sullivan received in his declining years, use their large semi-circular arches to suggest the construction of the bank vault within, at the same time expressing a sturdiness and sense of security entirely appropriate to bank buildings.

Sullivan (and Adler) worked in various materials, including stone and steel-framing. But there was also a great affection for brick and terracotta, the latter used for the moulded ornament. Several of the photographs show these materials and the use Sullivan made of them. Especially striking is the immaculate brickwork of the Wainwright Building in St Louis (1890); see in particular the detail photograph at p.62. This concern, sadly, seems to have left him in his later creations: the bank buildings are strikingly powerful structures - perhaps the architect's most loveable creations; and yet their brickwork is less carefully wrought: perpends rarely range vertically, so that closer views of the buildings are marred by a raggedness of finish: see in particular the photograph of the Farmers and Merchants Union Bank in Columbus, Wisconsin (1919) at p.6.

And what, finally, does one make of this idiosyncratic book? Certainly, it is well produced and the large-format photographs - once one grows accustomed to their approach - can provide some pleasure, although they represent too few buildings to give anything like a full picture of Sullivan's achievements - or of his failures, especially in certain buildings (some unexecuted) of the early 1890s.[1] The collection of disparate texts has the air of a self-assembly philosophy kit and the writings are not, cumulatively, very enlightening. It is sad that one closes this well-intentioned (and quite expensive) book with an overall feeling of disappointment.

1. A much better understanding of the architect is still to be obtained from another early book, also recently re-issued: Hugh Morrison, *Louis Sullivan: Prophet of Modern Architecture*, New York: W.W. Norton & Co. Inc., 1935; re-issued with an introduction and revised list of buildings by Timothy J. Samuelson, New York and London: W.W. Norton, & Co. Inc., 1998; ISBN 0-393-73023-9; price $30-00 (USA), $40-00 (Canada), no sterling price stated. Morrison's book had previously been re-issued in paperback New York: W.W. Norton & Co. Inc., The Norton Library, 1962.

TERENCE PAUL SMITH

BOOK NOTICE

Ross King, *Brunelleschi's Dome: the Story of the Great Cathedral in Florence*
viii + 184 pages, 7 unnumbered coloured plates, 25 numbered and 1 unnumbered black and white illustrations.
London: Chatto & Windus, 2000, (hardback), 2001 (paperback) ISBN 0-7011-6903-6 (hbk), ISBN 0-7126-6480-7 (pbk)
price £15-99 (hbk) £10-00 (pbk)

There have been a number of books recently which take a single subject and present it in fairly short compass to a general readership. At first blush, Ross King's topic seems *recherché* enough: construction of a dome over an early fifteenth-century Tuscan cathedral. But, of course, it was not just *any* dome, but that of Santa Maria del Fiore (St Mary of the Flowers) in Florence, one of the gems of the Italian *Quattrocento* and the work of Filippo ('Pippo') Brunelleschi (1377-1446). Its image is well-known, its white marble ribs set against the rich red of the terracotta tile cladding, and rising without flying buttresses, which the Florentines regarded as a northern barbarism - appropriate to France, Germany, even Milan, but not to their own city!

Ross King's task is aided by the colourful nature of his protagonist, immensely talented but supremely unattractive in character, often surrounded by men (always *men*) also talented and similarly rebarbative as persons. This circumstance permits fascinating anecdotes and thumbnail sketches to alternate with the more technical descriptions, But even to the latter Ross King brings his experience as a novelist, writing descriptions in limpid prose which never once flags. Only the few diagrams, prepared for the author by others, mar the overall effect: they are often less clear than one might hope, whilst fig. 14 (p.88) is inaccurate - a fact easily checked by rotating a pair of compasses on it, though less easily understood since this is the kind of diagram that is far easier to draw correctly than incorrectly.

Of particular interest to members of the British Brick Society will be chapters 11 and 12, which deal with the manufacture and supply of bricks and with the brickwork itself. The brickmaking industry was far more developed, better organised, and more rigidly controlled in *Quattrocento* Tuscany than in, say, fifteenth-century England. The importance of the industry, incidentally, serves as a warning (though Ross King does not himself make this point) against those who too readily assume a connexion between early brickmaking and a lack of stone. Florence, after all, stands amidst some of the finest building stone in Europe.

Brick was chosen for the dome because of its light weight compared with stone. But the

complex geometry of the octagonal domed construction involved the use of more than standard rectangular bricks; it also required "triangular bricks, dove-tailed bricks, bricks with flanges, [and] bricks shaped specially to fit the angles of the octagon" (p.93) The method of laying the bricks without a wooden centring involved the inclusion of *spinapescie* (`fishbone' or, as we would say, *herringbone*) courses, which served to interlock the bricks and provide a kind of self-supporting system whilst the mortar was still wet (pp.99-101).

There is much more to the story than bricks and brickwork, of course, and the whole book is worth reading - for its human as well as for its technical detail. Such work obviously depends on the scholarly endeavours of others and Ross King is scrupulous in acknowledging such debts. The result is a remarkable story, beautifully and compellingly told. And there is the added enticement of the very attractive colour plates. As well as endnotes, the book includes a bibliography and a full index.

T.P. SMITH

Brick Queries

From time to time, the British Brick Society receives enquiries about bricks, brickmaking, other ceramic building materials, and brick buildings. These are printed when space is available in *British Brick Society Information.* Responses are also included when these are forthcoming.

DHK

WILLIAM BULL

For comparative purposes to my on-going historical research on brickmaking in continental Europe between the seventeenth and early twentieth centuries, I embarked on research on brickmaking in nineteenth- and twentieth-century India, where hand-moulding is still the rule as it used to be in continental Europe before the First World War.

During two visits to the National Archives in New Delhi, I could not fail to come across William Bull CE who lived between approximately 1841 and 1907 or later. William Bull is the inventor of `Bull's Trench Kiln', still everywhere to be found in South Asia.

The British Museum has record of his many British and Indian patents. Most of the patents are in the field of brickmaking. The Institution of Civil Engineers, Great George Street, London, has further information. However, I have been unable to find either an obituary of or a biographical article on this British engineer who has had such an impact on (colonial and contemporary) brickmaking in large parts of the world including China.

Does any member of BBS have any clues as to where to go for further information? I am particularly seeking an obituary or obituaries and, if at all possible, the location of his private papers. I do not know whether these are kept privately or ar in a public institution.

Dr JAN LUCASSEN
Senior Research Fellow,
Internationaal Instituut voor Sociale Geschiedenis
Cruquiusweg 31
1019 AT Amsterdam, the Netherlands

*Note:*William Bull CE does not appear in *Who Was Who*, the *Dictionary of National Biography* or the five-volume *Dictionary of Business Biography.* And as far as I could judge, none of the men with the surname Bull in volumes of *Who Was Who* covering 1897 to 1980 is his son.

DHK

BRITISH BRICK SOCIETY

MEETINGS IN 2002

The British Brick Society has arranged meetings in the forthcoming year as follows:

Saturday 23 February 2002
St Pancras Chambers tour
(a repeat of the November 2001 meeting for those unable to be accommodated first time)
Cost £10-00 for the tour of the Midland Grand Hotel.

Saturday 16 March 2002
South Warwickshire including the brick kiln of the Oxford Canal at Fenny Compton and the seventeenth-century Chesterton Arch.
(This is the re-arranged 2001 Spring Meeting which had to be postponed due to the restrictions imposed at the outbreak of the foot-and-mouth disease epidemic)

Saturday 13 April 2002 *Spring Meeting*
South Suffolk including an owner's tour of Kentwell Hall in the afternoon. The occupied building was described as newly completed in 1563, and has post-fire rebuilding of 1801, together with a twentieth-century maze and a fifteenth-century brick great hall beside the moat. A morning programme will be arranged.
Cost (including tea) £13-00 for the tour of Kentwell Hall.

Saturday 15 June *Annual General Meeting*
Portsmouth
The Palmerston Forts.

a Saturday in September 2002 *Autumn Meeting*
(date to be confirmed)
The Mausoleum at Castle Howard, North Yorkshire, which is only open to group visits. This is brick on the inside.

We hope also to arrange at least one other meeting in the year and possibly two including a visit to a working brickworks.

The officers of the British Brick Society welcome suggestions and ideas for future meetings. Notice of brickworks who would be willing to host a visit would be particularly invited. Please contact Michael Hammett, David H. Kennett or Terence Paul Smith. Thank you.