Navigation on the River Thames between London and Oxford in the Late Middle Ages: A Reconsideration

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SUMMARY

The history of navigation on the medieval Thames has long attracted interest, but important problems have remained unresolved. In particular, when did navigation to Oxford cease and why? This article reconstructs the topography and conditions of medieval navigation, considers navigation costs, examines the purposes and extent of navigation, and explores the history of navigation upstream from Henley after the 1348–9 pestilence. It suggests that navigation to Oxford may have continued longer than previously imagined, and that it stopped for want of demand rather than because the river became unnavigable. It offers a possible explanation for the long delay in restarting navigation to Oxford, and briefly compares the roles of Thames navigation in the Middle Ages and later.

INTRODUCTION

It has long been known that in the late Middle Ages large boats found it difficult to pass along the River Thames between London and Oxford, and that at some time the river became impassable somewhere south of Oxford. Twenty-two years ago, in a famous paper, Professor R.H.C. Davis sought to clarify the chronology of navigation to Oxford in the Middle Ages, and to explain its rise and demise.[1] He also related his findings to the history of Oxford, and affirmed an old view about the role of Henley-on-Thames.

According to Professor Davis, long-distance navigation along the Thames began after the building of water-powered corn mills. Previously, the intermittent occurrence of shallows had made the river unnavigable for large boats. The building of water-mills beside the Thames required the construction of dams (or mill-weirs); they held back water and diverted it into leats. The accumulation of dams along the river changed its physiognomy: they converted a continuous watercourse into a series of deeper ponds. Each dam contained a narrow gap where the water was held back by paddles; i.e., a flashlock. The Reverend Andrew Clark asserted that mills and their dams were usually built above shallows. When a flashlock was opened (by removal of the paddles), water gushed downstream, raising the water-level below the lock, enabling vessels to ride over the shallows. (Dams could also include extra locks, as a primitive means for controlling the water level.) Navigability between London and Oxford, and the consequent navigation, were by-products of the spread of water-powered milling.

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[1] R.H.C. Davis, 'The Ford, The River and The City', *Oxoniensia*, xxxviii (1974), 262–7.

References to water-mills in England become common from the mid 10th century; evidence for navigation on the Thames begins in the mid 11th century (when a cut was made at Abingdon to improve navigability, between 1052 and 1066).

Navigation to Oxford appears to have lasted for a relatively short time. From 1197 onwards, complaints are frequently recorded about obstructions to navigation on the Thames. 'After the early years of the 13th century', Professor Davis reported, 'evidence of an effective navigation on the Thames is hard to find'.[2] This fitted neatly with an observation made over a century ago, by Professor J.E. Thorold Rogers: that by the 14th century Henley-on-Thames was the point to which the Thames 'was ordinarily navigable'.[3] What caused the decline of navigation? According to Professor Davis, so many weirs were built that the river became unnavigable.[4]

Professor Davis also pointed out an apparent link between the navigability of the Thames and the state of Oxford. From the early 11th century onwards, when the Thames was probably navigable, Oxford is recorded as important, prosperous, and populous. But from the mid 13th century, as navigation declined, Oxford's economy began to falter. Population contracted from the mid 14th century onwards, causing dramatic shrinkage of the populated area.[5]

Professor Davis's chronology of the decline of navigation, and his explanation for the closure of the river to Oxford, were later disputed by Dr. Mary Prior. She also wrote about the restoration of navigability and the revival of navigation. Dr. Prior argued that navigation upstream beyond Henley probably continued until the late 14th century, citing an indictment against William Drayton of Rotherfield Peppard (just south of Henley-on-Thames) in the reign of Richard II (1377–99). Jurors charged Drayton with neglecting to maintain a lock and winch, which his ancestors had formerly maintained, implying that the equipment had recently gone out of use.[6] Dr. Prior suggested that the indictment also exposed the reason for the end of navigability. Boats travelling upstream had to be pulled through flashlocks, against the current, by a rope attached to a winch on the river bank (see Fig. 1). In the late Middle Ages, Dr. Prior claimed, winches and ropes had been allowed to decay.[7] By implication, Professor Davis's proposed cause of decline was unlikely.

Dr. Prior argued that revival of navigation along the Thames towards Oxford began in the mid 16th century, when a solution was found to the problem of decayed winches, which made the river navigable again. From at least 1562 until his death in 1573, Thomas West of Wallingford – apparently a young pioneer – traded by barge along the river as far upstream as Culham (south-east of Abingdon). He also employed an agent at Burcot, 3.8 miles (6 km.) east of Culham, who forwarded goods beyond there by land. West was able to take his barge so far upstream because he possessed a portable winch, with which he could pull his boat up through the flashlocks.[8]

Navigability from Culham to Oxford remained a problem: it was not restored until 31 August 1635, when a barge from London arrived in Oxford – the first to make the journey for perhaps around 250 years. The final stage of its voyage had been made possible by the

[2] Ibid. 264.

[3] J.E.T. Rogers, *A History of Agriculture and Prices in England*, v (1889), 758.

[4] Davis, 'Ford, River, and City', 265, 267.

[5] Ibid. 265–7.

[6] M. Prior, *Fisher Row: Fishermen, Bargemen, and Canal Boatmen in Oxford, 1500–1900* (1982), 109. The indictment is published in C.T. Flower (ed.), *Public Works in Mediaeval Law*, ii (Selden Soc. xl), pp. 125, 127.

[7] M. Prior, 'The Accounts of Thomas West of Wallingford, a Sixteenth-century Trader on the Thames', *Oxoniensia*, xlvi (1981), 74.
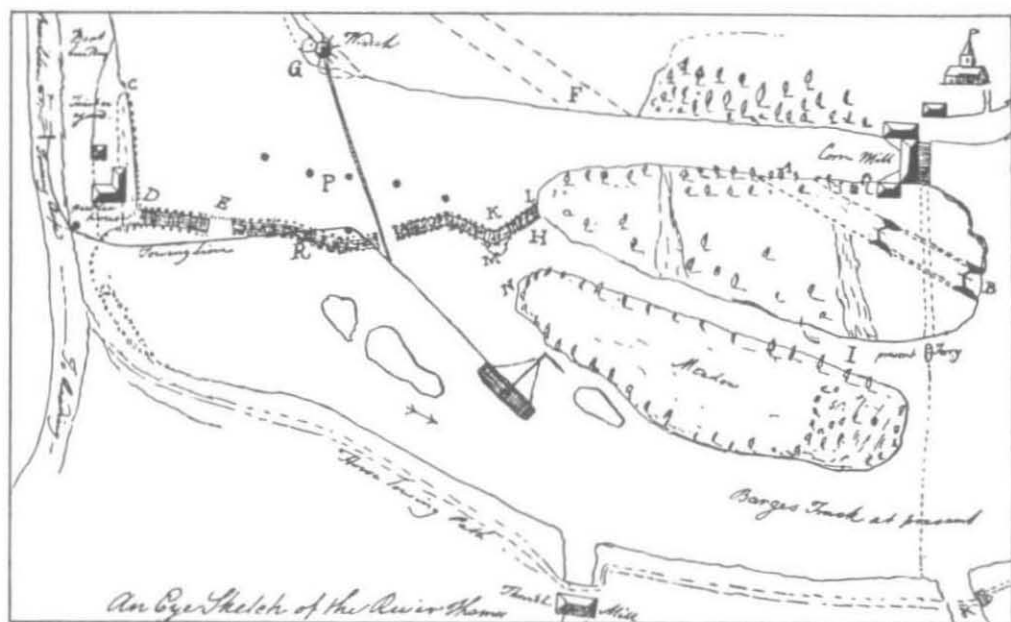
[8] Ibid. 73–4, 77.

Fig. 1. Sketch of mill-dam and flashlock at Whitchurch (from F.S. Thacker, *Thames Highway*, frontispiece).

work of the Oxford–Burcot Commission. Established by Act of Parliament, passed in 1624, the Commission was the first official body in the river's history permitted to improve navigability by means of building works (unlike previous commissions of sewers, which were authorised only to remove illegal obstacles, and the commission established by an Act of 1606, which cleared the river above Oxford).[9] The Oxford–Burcot Commission was instructed to reopen navigation between Oxford and Burcot; by scouring the river bed, repairing weirs and locks, opening up the flow from tributaries, forming tow-paths, and constructing wharves, turnpikes, and locks. The Commission installed the first poundlocks on the river: on the Swift Ditch near Abingdon and at Sandford and Iffley.[10]

Dr. Prior's explanation of the decline and revival of navigation is attractive, because it advances a mixture of plausible economic and technical causes: a decline in river-borne trade, presumably following the pestilences of the mid 14th century, which tempted lock-owners to neglect their winches and ropes; economic revival in the mid 16th century which prompted Thomas West – and presumably others – to equip their barges with portable winches. But Dr. Prior's writings do not explain why the final stage of the river to Oxford remained closed even when portable winches were in use. Moreover, new evidence can be cited which challenges Dr. Prior's chronology and causation. The history of Thames navigation in the late

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[9] For the Act of 1606, for 'Clearing the Passage by Water from London to and beyond the Citye of Oxford', see Prior, *Fisher Row*, 118–20.

[10] Ibid. 120–2.

Middle Ages merits re-examination, which may also shed light on recent debate about the navigability and economic importance of England's rivers in the Middle Ages.[11]

This reconsideration will focus on: (a) the conditions of navigation on the late medieval Thames (by study of topography and costs); (b) the purposes and geographical extent of navigation; and (c) the chronology of navigability and navigation after the 1348–9 pestilence (including discussion of Henley's situation). It will also advance possible explanations for why the reopening of the Thames below Oxford was so long delayed and why the reopening required large-scale restoration work. It will conclude with a brief comparison of the roles of navigation in the Middle Ages with those of later times.

TOPOGRAPHY OF THE MEDIEVAL THAMES AND COSTS OF NAVIGATION

The main places linked by navigation on the medieval Thames were the riverside towns. The towns between London and Oxford can be divided into three groups, according to distance from London. The first comprises Kingston-upon-Thames and Staines, which are some distance upstream from London: Kingston, 20.5 miles (33 km.), Staines, 36 miles (58 km.). Then follow five towns in quick succession: Windsor, which is 7.5 miles (12 km.) upstream from Staines; Maidenhead, 6 miles (9.5 km.) upstream; Marlow, 7 miles (11 km.) further on; Henley-on-Thames, another 8.5 miles (13.5 km.); and Reading (via the Kennet), about 9 miles (14.5 km.) beyond Henley. The third group are towns at some distance beyond Reading: Wallingford, which is 17 miles (27 km.) beyond Caversham Bridge (Reading); Abingdon, which is 16.5 miles (26.5 km.) further upstream; and finally Oxford, a mere 7.5 miles (12 km.) farther.

Navigation along the medieval Thames was made difficult by two kinds of man-made obstruction: fish-weirs and mill-dams. Fish-weirs were constructions for catching fish, particularly eels. They normally belonged to manors, and were encountered by boats along the entire river.[12] Illustrations of later fisheries on the Thames and archaeological remains from other rivers show that fish-weirs were of two types. The first was a wooden bridge or frame, from which baskets or nets were lowered into the river. The second type consisted of two lines of posts and wattle hurdles, set in the river in a 'V' shape. At the point was a basket trap, in which unsuspecting fish were caught.[13] Both types of fish-weir were built out from the bank, and were often placed between the bank and a mid-stream island.[14] Mill-dams were the barriers described above, which vessels confronted near the river-side mills. Fish-weirs were certainly a nuisance: Magna Carta (1215) contains a famous injunction ordering the removal of fish-weirs (*kidelli*) from the Thames and Medway.[15] But of the two kinds of obstruction, mill-dams posed the greater problem for people organising long-distance navigation.

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[11] J.F. Edwards and B.P. Hindle, 'The Transportation System of Medieval England and Wales', *Jnl. of Hist. Geog.*, xvii (1991), 123–34; J. Langdon, 'Inland Water Transport in Medieval England', ibid. xix (1993), 1–11; Edwards and Hindle, 'Comment: Inland Water Transportation in Medieval England', ibid. 12–14.

[12] See numerous references in Fred S. Thacker, *The Thames Highway*, i, *General History* (1914, reprinted 1968), especially chap. 2 *passim*, and ii, *Locks and Weirs* (1920, reprinted 1968).

[13] Both types of fish-weir are illustrated in J. Blair, *Anglo-Saxon Oxfordshire* (1994), xxiii, 124. For information about some Thames fisheries see C.J. Bond, 'Monastic Fisheries' and R.A. Croft and A.R. Pike, 'Buckinghamshire Fishponds and River Fisheries' in M. Aston (ed.), *Medieval Fish, Fisheries and Fishponds in England* (B.A.R. British Series 182), i, 89–92 (Bond), ii, 234–5, 236 (Croft and Pike).

[14] Fishing baskets would also have been positioned at mill-dams. For example, in May 1394, John Rycheman died while loading fishing equipment at a floodgate by Cleeve Mill in Goring parish; P.R.O., JUST 2/138.

[15] G.R.C. Davis, *Magna Carta* (1963), p. 28 (clause 33).

Mill-dams blocked the river's entire width, and built up costs in tolls and time. Flashlocks in dams were opened by mill-operators, who charged for passage. Mill-operators opened locks at their convenience – in the early 14th century, a petition to parliament complained that merchants' boats were sometimes held up at a lock for two or three days.[16] Given these factors, the distribution of mill-dams and flashlocks along the medieval Thames requires investigation, to see if it influenced the efficiency of navigation.

There is unfortunately no survey-type source from which flashlocks on the medieval Thames can be definitively listed and mapped. References have to be collected from a variety of sources, which is made difficult by the ambiguity of words. Both the Latin term *gurges* and the English term 'lokke' were used for both fish-weirs and mill-locks (flashlocks) – they essentially referred to the narrowing of a watercourse, as in the modern term 'gorge'.[17] To demonstrate the use of the terms for fish-weirs, the fishery at Runsford south of Goring can be considered. In 1352 one Thomas Wade quitclaimed his rights in a 'piscaria et gurgite in Tamisia' (fishery and weir in the Thames) at Runsford. The same structure was later referred to (in 1484) as 'j lock'.[18] Use of the terms for mill-dams and locks can be seen in the case of Gatehampton mill. In 1279 the lord of Gatehampton (also south of Goring) held 'j molendinum cum gurgite' (one mill with weir [or lock]). The same weir was referred to in Richard II's reign (1377–99) as 'unum lokke'.[19]

The problem of locating medieval mill-dams and flashlocks has therefore been tackled by assembling sets of references to the water-mills, weirs and locks at particular places – in the Middle Ages and later – and inferring from them the existence of dams and locks in the later Middle Ages (approximately from the late 13th century to the 16th century). The resulting corpus of information is presented in the Appendix. It should be noted that far more evidence is available for the Thames above Maidenhead than below. Moreover, for the river above Maidenhead there are two especially useful (and well-known) sources of information.

The first source is a series of indictments against lock-holders in south Oxfordshire, dating from the reign of Richard II (1377–99) and assigned to 1395–9 by the Reverend A.H. Cooke.[20] The jurors of Langtree Hundred in south-west Oxfordshire alleged (a) that numerous lords possessed locks that were so high they caused floods on adjacent land, and (b) that the locks were narrow, creating strong, dangerous currents such that boatmen could not navigate to Oxford as they used to be accustomed to do. The indictments list 16 locks from Caversham upstream, and add two more in Binfield Hundred in south-east Oxfordshire (at Rotherfield Peppard and Shiplake).[21] (The indictments are then followed by the indictment against William Drayton of Rotherfield Peppard that was cited by Dr. Mary Prior.[22]) Of the 18 locks, 11 have

[16] L.T. Smith (ed.), 'Parliamentary Petitions Relating to Oxford', in M. Burrows (ed.), *Collectanea*, 3rd ser. (Oxf. Hist. Soc. xxxii), 138.

[17] This matter is also discussed by A.H. Cooke in *The Early History of Mapledurham* (O.R.S. vii), 39–40.

[18] T.R. Gambier-Parry (ed.), *A Collection of Charters Relating to Goring, Streatley, and the Neighbourhood, 1181–1546*, pt. 1 (O.R.S. xiii), 99, 227.

[19] *Rotuli Hundredorum temp. Hen. III et Edw. I* (Record Commission), ii (1818), 778; Flower (ed.), *Public Works in Mediaeval Law*, ii, p. 126.

[20] Flower (ed.), *Public Works in Mediaeval Law*, ii, pp. 124–7; Cooke, *Early History of Mapledurham*, 38.

[21] The indictments, in Latin, use the English term 'lokke'.

[22] Above, note 6.

been included in the Appendix list of probable mill-dams and flashlocks. The other seven were either documented fish-weirs or probable fish-weirs.[23]

The second source is a list of locks and weirs between Maidenhead and Oxford compiled by John Bishop in 1585.[24] It catalogues 36 locks and weirs, sometimes mentioning associated mills. Of these, 29 have been included in the Appendix list of probable mill-dams and flashlocks. The other seven were excluded either because they were fish-weirs, or because other evidence could not be found for flashlocks at the places mentioned, or because Thacker's standard history of the Thames (*The Thames Highway*, 2 vols.) suggested locations off the main stream.[25] Of the 11 presumed flashlocks listed in 1395–9, all re-appear in Bishop's list.

Information from these two lists has been supplemented by material drawn from Domesday Book, the 1279 Hundred Rolls, inquisitions *post mortem*, the Victoria County History, and Thacker's *Thames Highway*. (Unfortunately Thacker fails to specify sources for many of his items, though he seems otherwise to have been a careful scholar.) Sources for riverside parishes and mills below Maidenhead are far fewer. The main ones consulted were Thacker's *Thames Highway*, vol. ii, and the Victoria County History.

The list of inferred mill-dams and flashlocks published as the Appendix makes no claim to be definitive. It is hoped that readers (especially local historians) will refine details, adding references or perhaps even slightly altering the tally. Unlisted former mills, dams, and flashlocks may yet be discovered from documents or by fieldwork.

The distribution of probable flashlocks along the Thames in the late Middle Ages, as revealed by the list, created different conditions of navigation for particular sections. From London to Maidenhead there appear to have been no mill-dams and flashlocks in the Middle Ages. For some distance west of London the construction of dams was prevented by the tide: mill-dams and locks would not have withstood the force of currents, reverses of flow, and changes in water height.[26] Even today there is only one lock on the tidal section of river – the half-tidal

[23] Cooke demonstrates that the lock at Mapledurham Chazey was a fish-weir and suggests that the locks at 'Lawardes' (named after the holder, John Laward) and Purley (held by Nicholas Carowe and Richard atte Lee) were also fish-weirs (they would also have been in the stretch of the Thames by Mapledurham parish); *Early History of Mapledurham*, 22, 39–40, 66–7. In 1279 there had been two fisheries at Mapledurham Chazey, one held by Richard de la Legh; *Rotuli Hundredorum*, ii, 779.

'Howleyslokke' held by Joanna Golafre has not been traced in any other source. Its position in the list suggests a location in Goring parish, where there were already three flashlocks. 'Rounsford', also in Goring parish, is well documented as a fishery; see Gambier-Parry (ed.), *Collection of Charters Relating to Goring*, pt. 1, 98–9, 101, 209–10, 213–14, 218–19, 227.

I have been unable to find any other reference to the lock at Crowmarsh Battle held by Sir Hugh Wolf in 1395–9. 'Hudesburn', held by the prior of Wallingford, must have been the fishery in Shillingford called 'Huddesbut' which is referred to in 1531 and had recently been the property of Wallingford priory; Thacker, *Thames Highway*, ii, 183.

[24] Printed in Thacker, *Thames Highway*, i, 54–6.

[25] The excluded items, with their numbers in the list (all but one lying between Maidenhead and Mapledurham) are the following. (a) 'Hedgworthe Weare', presumably something at Hedsor, but no mill-dam is shown on a sketch of the Hedsor–Cookham section of the river in 1605; D.G. Wilson, *The Thames: Record of a Working Waterway* (1987), 56. Thacker thought that this item was 'some dam connected with the mill, below the present lock'; Thacker, *Thames Highway*, ii, 307. (b) 'Bowney Weare' in Wargrave Parish (9), which Thacker thought was in backwaters at Bolney; *Thames Highway*, i, 54. (c) 'Wargroves weare' (10), which was perhaps on Hennerton Backwater in Wargrave; *Thames Highway*, ii, 261. (d) 'An old Ruynous Weare in the p[ar]ish of Suninge [Sonning]' (12). Given that there was already a mill-dam at Sonning (item 12 in Bishop's list), this is likely to have been a fish-weir. (e) 'An old weare called Chawsey' (15). This must have been the fish-weir mentioned above in note 23. (f) 'One other weare above Bensons lock', in Sutton Courtenay Parish (26). Thacker was unable to trace this; *Thames Highway*, i, 56.

[26] One wonders if these factors also deterred the building of bridges below Kingston-upon-Thames in the Middle Ages.

lock at Richmond, opened in 1894.[27] The normal end of the tidal section in the Middle Ages remains to be detected. Today the tide is halted at Teddington, but Thacker suspected that until the early 19th century it pushed much farther, possibly even to Staines, 36 miles (58 km.) upstream from London – over twice the distance to Teddington.[28]

It may be thought surprising, however, that no probable medieval mill-dams and flashlocks have been found between the tidal Thames and Maidenhead. This may simply reflect the sparsity of easily available information. But the apparent situation is corroborated by the history of lock-building after the Oxford–Burcot Commission, in striking differences between the two main phases (the first in the late 18th century, the second in the early 19th century).

Under an Act of Parliament of 1770, the Thames Commissioners (effectively founded in 1751) were given powers 'to erect and maintain pounds or turnpikes where locks or weirs are now made use of', and during their first period of lock-building (1772–91) they indeed concentrated on replacing flashlocks with poundlocks. Their authority covered the entire river between London Bridge and Cricklade (reserving the long-established rights of the City of London to Staines), but their new locks were all built above Maidenhead.[29] A little later the Commissioners built one new poundlock below Maidenhead. It was constructed near a Thames-side mill, but appears not to have replaced an existing mill-dam across the river. The lock was at Romney Island, north-east of Windsor: the site is seen in a painting of Windsor Castle of c. 1708, which shows a water-mill over a natural narrow channel between the east bank and the Island, with the main channel unblocked – indeed, full of boats.[30] (The new poundlock was opened in 1797, and a weir built afterwards.[31])

In the second phase of lock-building, from 1811 to 1838, locks were built below Maidenhead – nine poundlocks, down to Teddington. None replaced an existing flashlock.[32] The present locks above Maidenhead have a long history; those below, only a recent past.

Three more points may also be submitted. If mill-dams and flashlocks were absent from the Thames between London and Maidenhead in the 16th century, that would explain the commencement of Bishop's 1585 list at Maidenhead and its concern with the river upstream from there. Secondly, in 1746 (i.e., a quarter century before the Thames Commissioners began replacing flashlocks with poundlocks), the author and water-bailiff Roger Griffiths stated: 'It appears that there is no Lock on this River from London Bridge till you come to Bolter's Lock [at Maidenhead], which is 51 Miles and an half.'[33] Thirdly, an absence of mill-dams and flashlocks on the medieval Thames below Maidenhead would represent an absence of mills, which would therefore require explanation. It may be that in this part of the Thames

[27] For this see Thacker, *Thames Highway*, ii, 487–8.

[28] Ibid. 394, 465.

[29] Thacker, *Thames Highway*, i, 113–14, 123, 130. The opening dates of replacement poundlocks are noted in the Appendix below. For a useful summary table, see H.I.H. Prince Naruhito, *The Thames as Highway: A Study of Navigation and Traffic on the Upper Thames in the Eighteenth Century* (1989), 23.

[30] The painting is reproduced in Wilson, *The Thames*, 30.

[31] Thacker, *Thames Highway*, ii, 363–4.

[32] The locks were (going downstream from Maidenhead), with date of opening and references to Thacker's *Thames Highway*, ii: Boveney Lock (1838), 346–8; Old Windsor Lock, on new cut (1822), 376–80; Bell Weir Lock (1818), 381–3; Penton Hook Lock (1815), 399; Chertsey Lock (1813), 407–10; Shepperton Lock at Stoner's Gut (1813), 416–26; Sunbury Lock (1812), 435–41; Molesey Lock (1815), 443–7; Teddington Lock (1811), 465–72. Bray Lock was added in 1845, 336–9, and Richmond half-tidal lock in 1894, 487–9.

Thacker suspected a previous 'navigation flashlock' at Boveney, but most of his evidence relates to fishing; *Thames Highway*, ii, 346–7. In the Middle Ages there was a lock (*gurges*) at Shepperton where tolls were levied, but this is not associated with a mill nor with the later poundlock at Stoner's Gut; ibid. 416.

[33] Cited by Thacker, *Thames Highway*, ii, 319; from *Essay to Prove that the Jurisdiction and Conservancy of the River Thames etc. is Committed to the Lord Mayor and City of London* (1746). For Griffiths, see Thacker, *Thames Highway*, i, 110–13.
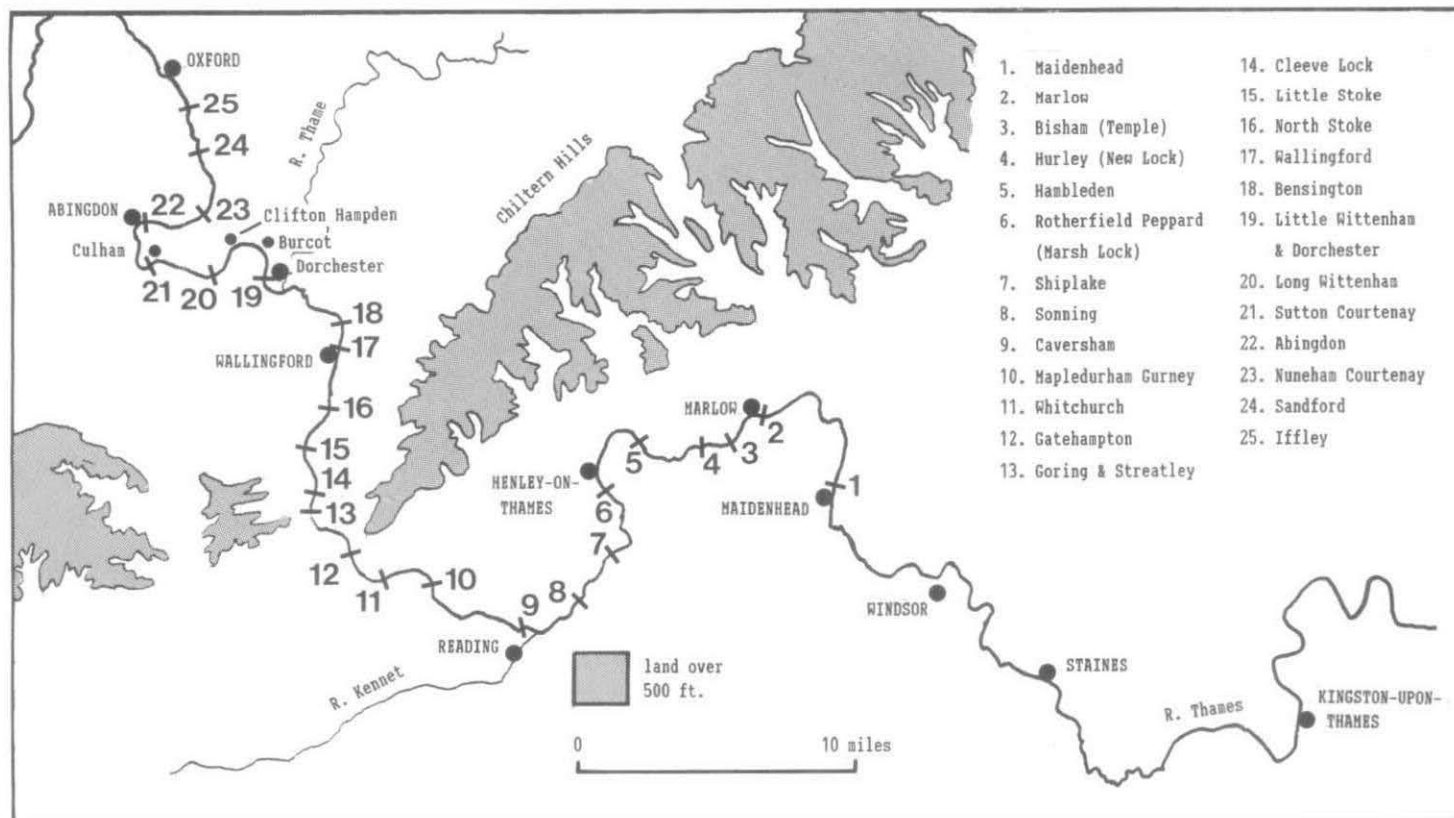
Fig. 2. Mid-Thames valley showing inferred locations of mill-dams.

1. Maidenhead	14. Cleeve Lock
2. Marlow	15. Little Stoke
3. Bisham (Temple)	16. North Stoke
4. Hurley (New Lock)	17. Wallingford
5. Hambleden	18. Bensington
6. Rotherfield Peppard	19. Little Wittenham
(Marsh Lock)	& Dorchester
7. Shiplake	20. Long Wittenham
8. Sonning	21. Sutton Courtenay
9. Caversham	22. Abingdon
10. Mapledurham Gurney	23. Nuneham Courtenay
11. Whitchurch	24. Sandford
12. Gatehampton	25. Iffley
13. Goring & Streatley	

Valley lords preferred to build water-mills on tributaries, rather than the main course. As the Thames approaches London, it becomes increasingly broad and sluggish; hard and expensive to dam, perhaps insufficiently strong to drive water-mills consistently (because the gradient is low). But on the flanks, there are faster flowing streams, hurrying down to the Thames.[34] Another possibility is that a few water-mills were built on the Thames but over natural minor channels, as was noticed at Windsor above and as happened at Chertsey Island.[35]

From Maidenhead Bridge to Caversham Bridge (near Reading) there were only a few locks between each town, between two and four (see Table 1). But from Caversham Bridge (Reading) upstream, the number of locks increased considerably: seven locks up to Wallingford; five to Abingdon; four to Oxford.[36]

So along the river, from London to Oxford, there appears to have been a triple quality of navigability: good to Kingston, Staines, Windsor, and Maidenhead (clear of mill-dams); less satisfactory to Marlow, Henley, and Reading (two to nine locks in total); and worst to Wallingford, Abingdon, and Oxford (with no fewer than 25 locks to Oxford).[37] The downstream view from Oxford was also discouraging: 16 locks just to see Caversham Bridge, then nine down to London (see Fig. 2).

TABLE 1. DISTANCES (MILES/KM.) AND INFERRED NUMBER OF LOCKS BETWEEN MAIN
TOWNS FROM LONDON TO OXFORD

	Distance (mls./km.)	Locks
London Bridge to Kingston Bridge	20.5 (33)	–
Kingston Bridge to Staines Bridge	15.5 (25)	–
Staines Bridge to Windsor Bridge	7.5 (12)	–
Windsor Bridge to Maidenhead Bridge	6 (9.5)	–
Maidenhead Bridge to Marlow Bridge	7 (11)	2
Marlow Bridge to Henley-on-Thames	8.5 (13.5)	3
Henley-on-Thames to Caversham Bridge	9 (14.5)	4
Caversham Bridge to Wallingford	17 (27)	7
Wallingford to Abingdon	16.5 (26.5)	5
Abingdon to Folly Bridge, Oxford	7.5 (12)	4

Note: distances based on 'Thames Mileages' in David Perrott (ed.), *Ordnance Survey Guide to the River Thames* (2nd edn. 1989), 176. Boats going upstream to the centre of Reading would have diverted from the Thames before Caversham lock and bridge, entered the River Kennet, and then have passed through the abbot of Reading's lock.

[34] In Kingston-upon-Thames, for example, water-mills long stood by the Hogsmill River; D. Stidder, *The Watermills of Surrey* (1990), 118–19.

[35] The famous plan of Chertsey Island, Surrey, showing water-mills along the minor stream, is reproduced and discussed by Susan Reynolds in R.A. Skelton and P.D.A. Harvey (eds.), *Local Maps and Plans from Medieval England* (1986), 237–43.

[36] Of the 25 inferred medieval locks, 19 have modern successors. Of the other six, installations are documented at three sites until the 18th century — Gatehampton/Hart's, Little Stoke, and Nuneham Courtenay; and at the other three until the 16th century – North Stoke, Wallingford, Long Wittenham. The abandoned six sites would benefit from further research.

[37] For comparison, there are 33 locks today between London Bridge and Folly Bridge, Oxford; David Perrott (ed.), *Ordnance Survey Guide to the River Thames* (2nd edn.1989), 58–133.

The topography of towns and probable flashlocks on the medieval Thames presents a basis for pondering the costs of navigation. It is well attested that, in the Middle Ages, prices paid for river transport were much lower than prices for road (with reported ratios of river to road charges per unit varying from 1:2 to 1:9 and sometimes more).[38] A variety of sellers and buyers would therefore have desired access to river transport, especially to move bulky or heavy commodities. But the provision of services depended on the ability and willingness of individuals to risk investment in equipment and running charges. Navigation services may not necessarily have been provided where they were wanted.

The first requirement was a boat. Recorded prices for cargo vessels used on the medieval Thames range from 23s. 4d. (for an old 'shout', bought for use as timber) to £20 (for constructing a grain-carrying *batellus*).[39] Boats needed maintenance, such as regular caulking; they also needed towing ropes and sails.[40] The main costs incurred on journeys would have been crew wages and towing (by men and/or horses – there was no continuous towing path for horses until the 19th century).[41] An operator running boats between riverside towns had to cover the costs of journeys lasting several days. A voyage in 1432 (by the countess of Warwick and her entourage, from Brentford to Caversham) shows that navigators could cover an average of 10 miles (16 km.) per day. (The longest distance travelled by the countess in one day was 13.25 miles or 21.2 km.[42]). There were also tolls to be paid at flashlocks: in 1405 the abbot of Reading agreed the following charges for vessels passing through his lock en route from the Thames to the High Bridge in Reading (on the Kennet): 1d. for a burgess's shout, 5d. for a burgess's 'bote'; 2d. for a stranger's shout, 5d. for a stranger's boat; 1d. for a foreign shout.[43] There might be pontage to pay (a toll levied for a period at bridges on road

[38] Masschaele, using purveyance records from 1296 to the 1350s, reports a ratio of only 1:2; J. Masschaele, 'Transport Costs in Medieval England', *Econ. Hist. Rev.* 2nd ser. xlvi (1993), 272. Professor Dyer's two instances of figures for river and road transport in the West Midlands in 1308/9 and 1452/3 produce ratios of 1:6 and 1:5 respectively; C.C. Dyer, 'The Consumer and the Market in the Later Middle Ages', *Econ. Hist. Rev.* 2nd ser. xlii (1989), 309. Campbell and others state that the ratio for transport of a quarter of wheat per mile from Henley to London by river compared with transport of the same by cart was 1:9; B.M.S. Campbell, J.A. Galloway, D. Keene, and M. Murphy, *A Medieval Capital and its Grain Supply: Agrarian Production and Distribution in the London Region c. 1300* (Historical Geography Research Paper Series xxx 1993), 196.

[39] Westminster Abbey purchased an old shout for use in a dam in 1476/7; N. Woodward-Smith and J. Schofield, 'A Late 15th Century Account for a Wharf at Vauxhall, London', *Trans. London and Middlesex Arch. Soc.*, xxviii (1977), 283, 286. For the *batellus*, see Masschaele, 'Transport Costs in Medieval England', 272, citing P.R.O., E101/5/7. In 1382 the wardens of London Bridge paid at least £6 1s. 6d. for the construction of a large boat, and in 1501–2 they purchased a new boat for their carpenters for £12; V. Harding and L. Wright, *London Bridge: Selected Accounts and Rentals, 1381–1538* (London Record Society xxxi), pp. 17–19, p. 156. Sums disbursed on the 1382 boat are mixed in the accounts with other expenditure. All labour costs have probably been noticed, but possibly not all other costs.

[40] In 1432, 3s. 4d. was given for a towing line; J. Harvey, *Gothic England: A Survey of National Culture 1300–1550* (1947), 176. In the early 1570s, Thomas West of Wallingford paid £1 6s. 3d. for a towing cable; Prior, 'The Accounts of Thomas West', 85.

[41] Work began after the Act of Parliament of 1770 authorised the Thames Commissioners to make towpaths. It was still incomplete in 1811. Thacker, *Thames Highway*, i, 124, 164.

[42] Harvey, *Gothic England*, 176–7.

[43] C.F. Slade, 'Documents Concerning Relations between Town and Abbey, c. 1500 AD', *Berks. Arch. Jnl.*, lxi (1963–4), 49–50. It is unclear as to what is meant by a boat, and why the rate for boats should be so high. A foreign shout was presumably the shout of a non-burgess of Reading. The lock appears to have been on the River Kennet.

and river traffic, to raise money for repairs).[44] Flooded towpaths and obstinate mill-operators might also cause delays and inflate costs.

If a vessel on the medieval Thames was crewed by four men each receiving 4d. per day,[45] and if passage through each flashlock cost 2d., then a journey from London to Caversham Bridge (or Reading) and back (taking 12 days) would have cost 19s. for crew and tolls. A journey from London to Oxford and back, taking 20 days, would have cost £1 15s.[46] (In terms of cost per mile, the return journey to Caversham Bridge would have cost 1.4d. per mile, and a return journey to Oxford, 1.6d., 15 per cent more.)

If information about unknown costs could be located (especially towing), it might eventually be possible to reconstruct the total bill for provision of river transport, and to calculate loads and prices required for break-even and surplus. For the moment, however, costs have been discussed simply to indicate the minimum funds required to operate boats on the medieval Thames. Both entry and running costs appear to have been considerable. They would have influenced the range of people who could afford to run vessels, the services available to customers, and the overall extent and roles of navigation. Regular journeys carrying large loads would have required considerable demand. So where did these conditions exist along the medieval Thames? For what purposes was navigation provided and used? How extensive were navigation services?

PURPOSES AND EXTENT OF NAVIGATION

The most straightforward way to consider the purposes and extent of navigation on the medieval Thames is to assess the use made of it by the economies and populations of the best documented and most important towns: London, Wallingford, and Oxford. These places will be considered around 1300, when London's population was at its medieval peak and when Wallingford and Oxford were still leading towns.

The magnitude of London's population c. 1300 has of late been much discussed, in the wake of Dr. Derek Keene's stimulating study of settlement density and rent levels in Cheapside.[47] Dr. Pamela Nightingale, reviewing the issues and evidence, has marshalled a battery of arguments for a figure of 55,000–60,000.[48] She suggests that the City's population declined from the

[44] There were eight bridges between London and Oxford in 1300: going upriver, at Kingston-upon-Thames, Staines, Windsor, Maidenhead, Marlow, Henley, Caversham, and Wallingford. Chertsey Bridge was added c. 1360 and Abingdon Bridge in 1416. For bridges from London and Caversham, see S.E. Rigold, 'Structural Aspects of Medieval Timber Bridges', Med. Arch. xix (1975), 50–1. For Wallingford Bridge, built by 1151, see V.C.H. Berks. iii, 212 n. For Chertsey Bridge, see Rigold, ibid. 50. For Abingdon Bridge, see V.C.H. Berks. iii, 435. Rigold claims, ibid. 50, that the bridge at Sonning in 1659 was 'probably medieval', but this seems unlikely: there are no references to Sonning Bridge (e.g., in a grant of pontage) in the medieval Calendars of Patent Rolls (1216–1509), Close Rolls (1227–1509), and Charter Rolls (1226–1516).

[45] Five men who took elms from Kingston to London Bridge in 1421 received 6s. 8d. for two days and two nights. The entry in the accounts suggests that the crew worked double shifts and may therefore have received 4d. per shift; Harding and Wright, London Bridge, p. 104. In 1432, when the countess of Warwick went by boat from Brentford to Caversham, the men employed were paid 4d. per day; Harvey, Gothic England, 176.

[46] For convenience, equal journey times in both directions have been assumed. Downriver times were probably faster. H.I.H. Prince Naruhito cites much faster journey times (in both directions) in 1809 than those evinced in the Middle Ages, but this was after most of the flashlocks between Maidenhead and Oxford had been replaced by poundlocks and after towpaths had been created along more of the river; Naruhito, The Thames as Highway, 37.

[47] Summarized in D. Keene, Cheapside Before the Great Fire (1985).

[48] P. Nightingale, 'The Growth of London in the Medieval English Economy', in R.H. Britnell and J. Hatcher (eds.), Progress and Problems in Medieval England (1996), 95–8.

1320s until the catastrophe of the 1348–9 pestilence. Then, however, it recovered, growing strongly through the 1350s and 1360s and on until *c.* 1420. (The population in 1377 may have been about 45,000.) The trajectory from *c.* 1420 is unclear (probably downwards), but growth resumed towards the end of the 15th century. In 1500, London may again have contained 60,000 people.[49]

Medieval London was well fitted out with wharfs and hythes, implying considerable use of the river.[50] River navigation would have been especially suitable for the import of such goods as (a) basic foodstuffs in large quantities, (b) heavy building materials, (c) raw materials for some industries (such as wood for baking). The supply of grain to London *c.* 1300 has lately been studied with intensity, resulting in a thorough and impressive anatomisation of a major city's nutritional needs, grain sources, and supply networks in the high Middle Ages.[51]

London then (as later) was England's largest consumption centre and market for grain. The increase of the City's population – especially in the second half of the 13th century – to its peak around 1300 created one of the most commercially minded agricultural areas in England, which was bound to the City by the realm's most sophisticated marketing network. London's influence has been detected in local crop specialisation, in the character of agricultural production (extensive or intensive), and in land values. Much of the grain sent from rural estates passed through feeder markets at six or seven main towns, with specialist London-based cornmongers organising both transport to London and the timing of supply.[52]

The area from which London sucked in grain comprised basically the Thames Valley and estuary. Of all the grain-flows to the City, the one from the west along the Thames was probably the largest. Dr. B.M.S. Campbell and others suggest that two-thirds of London's grain may have been sold at Queenhithe and Billingsgate, the City's river-supplied markets.[53] And of the two markets, Queenhithe, which received boats from upriver, appears to have been the more important (as measured by the number of identifiable cornmongers resident in the area in 1319).[54]

At the heart of the Thames Valley grain-supply corridor lay navigation along the river, but care has to be taken to distinguish the westward extent of navigation and that of the grain-supply area. Dr. Campbell and others studied the London supply area by mapping four kinds of information: (a) places in which London cornmongers were active; (b) the pattern of transport costs; (c) the extent of metropolitan prices; (d) the patterns of production and disposal of grain. They concluded that the areas manifested by the four measures corresponded closely.[55] At the westward end, 'the minimum extent of the region which regularly supplied the capital with grain . . . extended up the Thames almost as far as Oxford'. (The authors presume that Abingdon was probably the limit.[56]) The area thus encompassed south-west Oxfordshire and the area of Berkshire across the river (including Wallingford and its hinterland).

However, the furthest point along the river from which grain was normally shipped was not so distant. Around 1300, London grain merchants appear normally to have operated as far upriver as Henley-on-Thames. Between *c.* 1295 and 1350, some 24 London merchants

[49] Ibid. 97, 101–2, 105.
[50] C.N.L. Brooke and G. Keir, *London 800–1216: The Shaping of a City* (1975), 158.
[51] Campbell et al., *A Medieval Capital and its Grain Supply.*
[52] Ibid. *passim* especially chap. 7 'Conclusion'.
[53] Ibid. 180.
[54] Ibid. 49–50.
[55] Ibid. 46–9, 60–9, 76–7, 143–4, 172.
[56] Ibid. 62.

are known to have traded in Henley or to have been otherwise connected with the town.[57] They did not simply visit and operate in the town's market: they had established Henley – unlike any other upriver town – as the major grain entrepot west of London. Merchants found in Henley included London's three eminent early-14th-century cornmongers: Walter Neel, John Husbond, and Roger le Palmer. They and others had bought or built houses, granaries, and storehouses in Henley. Their presence there attracted grain from south Oxfordshire and south-west Buckinghamshire – from an area within a radius of 12–15 miles (19–24 km.).[58] Merchants busy in Henley also included fishmongers, among them the Chigwells. Alan de Chigwell, in particular, was well set up for trading along the river: in his will of 1343 he bequeathed property in London, Kingston, Surbiton, and Henley, and a shout called *La Rose*.[59] Fishmongers were an important group of merchants involved in shipping grain to London, because their primary business – trade in (salted) fish – concerned a commodity that could be exchanged inland for grain.[60]

The principal grains exported from Henley were wheat and mancorn (a mixture of rye and winter barley). The wheat came especially from beyond the Chiltern Hills; from demesnes growing wheat for the market, ranged along an arc from the Vale of the White Horse to the Vale of Aylesbury. Specialization in wheat occurred on the outer edge of the London supply area because soils were suitable and because the crop's value could bear the cost of long-distance transport to the final market.[61] The less valuable mancorn was grown on a cluster of demesnes nearer Henley.[62]

No evidence has yet been found of London merchants operating in number upriver from Henley. Moreover, if evidence from the manor of Cuxham is typical, grain from the clay vale north of the Chilterns was normally carted or carried over the hills to Henley, rather than being taken west to the river and then transported by boat.[63] As far as can be seen, London's normal use of the river stopped at Henley in 1300. The import of grain to London from river-side places upstream from Henley appears to have been exceptional.[64]

It is likely that around 1300 the London-based grain-importing trade stimulated and sustained the main navigation services along the Thames (though varying by season), given the scale of London's requirement for grain and the funds available to grain merchants for the purchase of boats.[65] This probably had two important consequences. The first is that the

[57] For references see R.B. Peberdy, 'The Economy, Society, and Government of a Small Town in Late Medieval England: A Study of Henley-on-Thames from *c.* 1300 to *c.* 1540' (Ph.D. thesis, University of Leicester, 1994), Appendix 6.

[58] Ibid. 49–60 (hinterland), 70–3 (Londoners). Campbell et al. suggest that Henley and the river beyond Henley served demesnes across a larger area than the conjectural social and economic hinterland area of Henley mapped in Peberdy, 'Society, Economy, and Government', 56. In their view it stretched to Harwell and Wantage to the north-west of Henley; to Hampstead Norris (west of Reading) to the south-west; to Holmer (north-east of Wycombe) to the north-east; and to Billingbear (east of Reading) to the south-east; Campbell et al., *A Medieval Capital and its Grain Supply*, 169. However, Campbell et al. provide no evidence of sales to Henley from the outer parts of this area and ignore the demand for grain from Wantage, Wallingford, Abingdon, Reading, Marlow, and Wycombe. For Wallingford's trading area 1226–*c.* 1242 see N.M. Herbert, 'The Borough of Wallingford, 1155–1400' (Ph.D. thesis, University of Reading, 1971), 135.

[59] R.R. Sharpe (ed.), *Calendar of Wills Proved and Enrolled in the Court of Husting, London, 1258–1688*, i (1889), 480–1.

[60] G.A. Williams, *Medieval London: From Commune to Capital* (1963), 163–4.

[61] Campbell et al., *A Medieval Capital and its Grain Supply*, 124–5.

[62] Ibid. 121–2.

[63] See P.D.A. Harvey (ed.), *Manorial Records of Cuxham, Oxfordshire c. 1200–1359* (O.R.S. 1), *passim*.

[64] For instances see Campbell et al., *A Medieval Capital and its Grain Supply*, 71, 95, 101.

[65] Campbell et al. note that no demesne included in their database owned a shout, though some river-side demesnes possessed smaller boats (*batelli*); ibid. 59.

transport and trading of other commodities were probably built around the pattern of grain shipments. For example, Dr. Campbell and others note that Henley was also a major source for the import of faggots and other wood to London.[66] Secondly, the regular use of the river as far west as Henley for the import of grain probably made that town the furthest regular destination upriver. In addition, it probably gave Henley a notable role as a trans-shipment point, especially for goods destined for Oxford. One day in 1335–6, for example, fruit and 12,000 herrings were trans-shipped at Henley,[67] for feeding the Warden and Scholars of Merton.

Yet not long before this important act of trans-shipment, the river seems still to have been navigable beyond Henley and continued to be used.[68] So what were the roles of navigation beyond Henley? Did Oxford depend on river navigation, as was suggested by Professor Davis? Unfortunately ideas about navigation roles here must at present depend more on probability than hard evidence. Around 1300 Wallingford and Oxford were still important towns (though both were to decline in the 14th and 15th centuries). Wallingford had been one of the wealth-iest places in England, and still contained a major castle, a college of priests and new chapel, a Benedictine priory, and 11 parish churches.[69] Oxford was a leading provincial English centre, ranking as eighth-wealthiest town after London in 1334.[70]

Neither town produced goods that required water for the import of raw materials and the distribution of products. Wallingford's most prominent and wealthiest craftsmen were gold-smiths. Their products – gold artefacts – were small, high-value items, best suited to road transport. Other notable manufacturing groups in the town were shoemakers and leather-workers, who could have obtained their raw materials locally.[71] Oxford's main industries in the 13th century were textiles and leather-working. Neither required heavy imports, nor pro-duced heavy items. Wool, dyestuffs, and teasels can easily be carried by road, in carts or on packhorses. So can cloths. Bark for tanning was on hand in nearby woods; and skins could easily be carried away by foot, horse, or cart. One of the great textile centres of the late Middle Ages, Coventry, prospered independently of major river navigation.[72] In other words, although Wallingford and Oxford could use the river, their economies may not have been fundamentally linked to the navigability of the Thames and availability of navigation. Nor could they have been dependent on long-distance river navigation for their main supplies of grain. Plenty of corn was available to both from central Oxfordshire and north-west Berkshire, which were among the wealthiest parts of the country as assessed in the 1334 lay subsidy (probably a reflection of demand from the towns).[73]

For Wallingford and Oxford, river navigation may have been used for the import of heavy staples that were either non-perishable or which could otherwise be imported periodically, such as wine, herrings, coal, and metals. Indeed, there is a hint that this was so in the indict-ments cited earlier from 1395–9, which mention boats and shouts going from London to

[66] Ibid. 49.

[67] P.D.A. Harvey, *A Medieval Oxfordshire Village: Cuxham 1240–1400* (1965), 92, n. 3.

[68] For example, see references cited by J.F. Edwards and B.P. Hindle, 'Comment: Inland Water Transportation in Medieval England', 12–13.

[69] M. Airs, K. Rodwell, and H. Turner, 'Wallingford' in K. Rodwell (ed.), *Historic Towns in Oxfordshire: A Survey of the New County* (1975), 155–62.

[70] R.E. Glasscock, 'England *circa* 1334', in H.C. Darby (ed.), *A New Historical Geography of England before 1600* (paperback edn. 1976), 184.

[71] Herbert, 'Borough of Wallingford', 108–20.

[72] C.V. Phythian-Adams, *Desolation of a City: Coventry and the Urban Crisis of the Late Middle Ages* (1979), 19–22.

[73] R.E. Glasscock (ed.), *The Lay Subsidy of 1334* (1975), p. xxvii.

Oxford with victuals, wines and other merchandise – 'cum victualibus viniis et aliis mercandis-is'.[74] Inhabitants of Oxford and Wallingford could then have exported leather goods, textiles, and corn to generate income to pay for their imports, and also to supply ballast for the downstream passage of boats.[75]

Although the quantity of information about navigation on the late medieval Thames is meagre, it is clear that the most powerful centre of demand along the river – London around 1300 – generated regular navigation upstream whose extent (to Henley) fell within the better stretches of river (to Caversham Bridge/Reading). There is no evidence of regular navigation beyond Henley, probably because Wallingford and Oxford lacked both exports and inward demand sufficient to generate regular navigation on the inferior part of the river between Caversham Bridge and Oxford.[76] The high medieval pattern of navigation to the mid-Thames Valley may be considered probably to have comprised: (a) a London-generated primary navigation of frequent services to Henley, using most of the better parts of the river; (b) a secondary navigation generated by towns upriver from Henley, of infrequent voyages responding to much lower demand, and where inferior navigability discouraged navigation.

NAVIGABILITY AND NAVIGATION AFTER THE 1348-9 PESTILENCE

There can be no doubt that at some point in the late Middle Ages secondary navigation ceased to extend to Oxford, and that large vessels became unable to reach the town: the reopening of the Thames to Oxford in 1635 was only achieved by the large-scale, expensive works undertaken by the Oxford–Burcot Commission.[77] How much of the Thames below Oxford fell out of use? When and why did navigation to Oxford cease? How did Henley-on-Thames fit into developments? Why did re-use of the river to Oxford begin so late? Why did the river have to be reopened?

Dr. Mary Prior's evidence suggested that navigation to Oxford continued until not long before the reign of Richard II (1377–99), but that the decay of winches at flashlocks made the river unnavigable. It also implied that the river was effectively impassable between Henley and Culham (east of Abingdon) for about two centuries: between the late 14th century (when the winch at Rotherfield Peppard, south of Henley, was no longer maintained) and the 1560s (when Thomas West of Wallingford appears to have been a pioneer who reopened the river to Culham by equipping his barge with a portable winch).[78]

[74] Flower (ed.), *Public Works in Mediaeval Law*, ii, p. 127.

[75] Though much rural produce was probably exported through the river-side towns, wood and timber may have been dispatched from river-side wharfs in rural parishes. P.G. Preece cites the transport of firewood and timber from Wargrave in 1210 and 'talle wood' from Whitchurch in 1573, both places being upriver from Henley; 'Mediaeval Woods in the Oxfordshire Chilterns', *Oxoniensia*, lv (1990), 66, 69–70. In 1301–2, officers of the bishop of Winchester transported 900 pieces of tall-wood and 20 quarters of charcoal by boat from Wargrave, paying £1 for the transportation and 1s. 2d. for loading; M. Page (ed.), *The Pipe Roll of the Bishopric of Winchester 1301–2* (Hants Rec. Soc. xiv), 177.

[76] This is corroborated by Campbell et al.'s information from purveyors' accounts of 1295–6 and 1296–7 that it cost almost twice as much to transport a quarter of wheat to London from Reading (and not much more from Abingdon) than from Henley; Campbell et al., *A Medieval Capital and its Grain Supply*, 195. However, their claims that difficulties of navigability increased above Henley and then diminished above Reading do not concur with evidence presented above; ibid.

[77] See above for details and note 10 for references.

[78] See notes 6–8 for references.

The proposition that lock winches decayed and were later replaced by portable winches can be contested. Mr D.G. Wilson suggested that West's portable winch 'was much more likely to have been the standard barrel windlass on the bow of the barge, used mainly for raising and lowering the mast.'[79] Although this suggestion cannot be ruled out, there is a more probable alternative explanation. In February 1383 a tragic accident occurred at Hambleden Lock, just north-east of Henley: as a shout was being pulled upstream through the lock, a cable snapped, causing the deaths of two men. The record of the accident, in the Berkshire coroner's rolls, mentions two winches: one called the 'land winch'; the other, on the boat, called the 'shout winch'. Moreover, the coroner's record relates that both winches were being used to pull the shout through the lock, as if this was standard procedure.[80] An illustration of a barge going upstream through Whitchurch flashlock in 1786 appears to show a similar arrangement (see Fig. 1). The barge's towing rope extends from the prow to a post by the lock, and then across to the left bank where the end has been fastened to another post. On the right bank is a winch, from which a rope stretches across the river, through the lock, and appears to be fastened to the barge's towing rope. As the land winch was turned, it would have pulled the towing rope and the barge towards the lock, but only if there was a winch on the barge to take up the slack. (The account of the 1383 accident records the use of two cables: one from the shout winch, presumably fixed to a pole on the bank; the other presumably fixed to the shout and attached to the land winch.[81]) If boats usually had a winch on board, then West's so-called portable winch may have been merely a standard item of equipment, carried and used at all periods. Navigation to Oxford probably did not cease because winches decayed along the river above Henley.[82]

Three items of evidence show that the river above Henley continued to be navigable and used for some time after Richard II's reign. The agreement of 1405 between the abbot and the merchant guild of Reading, mentioned above, concerns the passage of shouts and boats from the Thames to the centre of Reading (along the Kennet); it implies considerable navigation to Reading.[83] In 1432 the countess of Warwick and her entourage travelled by barge and boats from Brentford to Caversham,[84] traversing without difficulty the passage at Rotherfield Peppard about which complaints had been made almost 40 years earlier. In 1448-9, stone was shipped downriver from Culham, for building Eton College Chapel. The details of

[79] Wilson, *The Thames*, 31.

[80] P.R.O., JUST 2/9, membrane 4 recto: 'contigit apud Rameham die Jouis proximo post festum sancti petri in cathedra anno supradicto [i.e., 26 February 1383] quod predicti Johannes Willus et Robertus Asshele una cum multis aliis sursum ponderauerunt unam shutam apud hameldene loke cum duobus cabellis et duobus instrumentis uno vocato landwynche et alio le Schute Wynche et cum dicta schuta erat in the loke [*sic*] cabella ligata a le schute Wynche fregit infra schutam predictam et tunc alia cabella retraxit le land Wynche Ita quod percussit quemlibet illorum in sinistra parte capitis ita quod capita illorum erant totaliter quassata et sic statim obierunt sine misericordia ecclesiastica'.

[Translation: 'It happened at Remenham (Berks.) on Thursday after the Feast of St Peter in Cathedra in the aforesaid year [26 February 1383] that the aforesaid John Willus and Robert Asshele together with many others hauled up a shout at Hambleden Lock with two cables and two devices, one called the land winch and the other the shout winch; and when the said shout was in the lock the cable fixed to the shout winch broke within the said shout and then the other cable pulled back the land winch in such a way that it struck each of them on the left side of the head such that their heads were totally shattered and thus they died immediately without the blessing of the Church.']

[81] See previous note.

[82] It is pertinent to note that the surviving flashlock capstan at Hurley has so far outlasted its lock by over two centuries.

[83] Slade, 'Documents Concerning Relations between Town and Abbey', 49–50.

[84] Harvey, *Gothic England*, 176.

the operation are interesting and tantalizing.[85] The master mason procured stone from Taynton, near Burford in west Oxfordshire. The 'master of the works', Master Robert Keys (also Warden of All Souls' College), spent eight days inspecting the river between Culham and Eton (by Windsor). He then sent a first load of stone from Taynton to Culham by road, and then from Culham to Eton by boat. But something must have been unsatisfactory about the first stage of the river journey: thereafter, stone was carted to Henley and taken from there by boat.[86] The episode shows nonetheless that the Thames was passable between Culham and Henley in the late 1440s.

Navigation to Oxford may also have lasted longer than has previously been entertained. Evidence comes from the fate of a tenement. It stood to the south of Oxford, on the east side of Grandpont, north of 'Lambardsland' at the Thames hythe. In 1449, it was disposed of by one John Elmes.[87] Elmes was a merchant based at Henley-on-Thames, where he had been active since at least 1417. In the 1440s and 1450s (and probably in the 1430s too) he was Henley's wealthiest and leading inhabitant. He died in 1460.[88] Elmes may have been involved in trading along the river by boat: just before his death he held two granaries in Henley and an inn in Wallingford called 'The Antelope'.[89] In 1441 Elmes and two other men had been creditors for goods supplied to Richard Smert of Abingdon.[90] It must, however, be noted that Elmes was also involved in wool-exporting and could have used his river-side properties as collecting points from which fleeces were moved by road.[91] When Elmes disposed of his Oxford tenement, he granted it not to another distributive merchant but to a tailor, Thomas Withing. Withing granted the tenement in 1459 (not long before his death) to John Lowe, also a tailor.[92] By 1474 the tenement was back in the possession of a redistributive merchant, the grocer William Dagville, but was now described as a garden. (The land passed shortly afterwards to Lincoln College.[93])

If Elmes' disposal of his hythe-side tenement in Oxford indicates the end of navigation to the town, the timing suggests that navigation ceased because of insufficient demand for river-borne goods (insufficient to make up the large boat loads required), rather than because the river became unnavigable. The disposal of the tenement coincided with the depths of the mid-15th-century depression in Oxford.[94] Oseney Abbey reduced rents on many properties from c. 1435, while St. John's Hospital's rental income fell from 1449. In 1440 the leading townsmen successfully obtained a reduction in the fee farm; they pleaded for further reductions in 1442, 1450, and 1455.[95] Pestilences and epidemics were reported in most years between

[85] H.M. Colvin (ed.), *The History of the King's Works*, i (1963), 280, 282.

[86] It is possible that the problem was not one of navigability. Perhaps boat-owners were unwilling to bring vessels unladen to Culham.

[87] H.E. Salter, *Survey of Oxford*, i (Oxf. Hist. Soc. n.s. xiv), 242. See also map of section SE VII.

[88] For an account of Elmes's trading activities, wealth, and role in Henley society see Peberdy, 'Economy, Society, and Government', 175–81, 186–7.

[89] *Calendar of Inquisitions Post Mortem, Hen. VII*, i, pp. 243, 254.

[90] P.R.O., C241/230, no. 68.

[91] Peberdy, 'Economy, Society, and Government', 179–81.

[92] Salter, *Survey of Oxford*, i, 242. Withing's death is noted in ibid. ii, 14. Withing granted property to feoffees in 1454 to found the Oxford tailors' guild; *V.C.H. Oxon.* iv, 322. Lowe is described as tailor in Salter, *Survey of Oxford*, i, 104; ii, 14.

[93] Salter, *Survey of Oxford*, i, 242. For William Dagville, see *V.C.H. Oxon.* iv, 44. For the revival of activity at the hythe in the 17th century, see I.G. Philip, 'River Navigation at Oxford during the Civil War and Commonwealth', *Oxoniensia*, ii (1937), 154.

[94] The depression in Oxford's economy was part of a general slump, for which see J. Hatcher, 'The Great Slump of the Mid-fifteenth Century', in Britnell and Hatcher (eds.), *Progress and Problems*, 237–72.

[95] *V.C.H. Oxon.* iv, 43–4.

1448 and 1463, and in many years thereafter.[96] It must also be remembered that Wallingford's population and economy shrank dramatically in the first half of the 15th century, which would also have reduced demand for river-borne goods.[97]

How should Henley's position in Thames navigation in the Middle Ages be characterised? Writing of Henley *c.* 1300, Dr. Campbell and others called it 'the highest point of effective navigation on the Thames' and 'the effective head of navigation on the Thames'.[98] As was mentioned above, Professor J.E.T. Rogers and Professor R.H.C. Davis envisaged that Henley achieved prominence in the late Middle Ages after the Thames ceased to be navigable to Oxford.[99]

If arguments advanced above are correct, both views of Henley require revision. It was suggested that a primary navigation from London to the mid-Thames Valley extended to Henley. Henley was therefore head of the London-generated primary navigation. Moreover, Henley did not become a major trans-shipment point only towards the end of the Middle Ages, after navigation to Oxford ceased – as was hinted earlier. Trans-shipment at Henley is recorded as early as the mid 13th century, even though secondary navigation to Oxford continued. In 1256 Henry III had 30 tuns of wine sent by river to Henley and then carried by road to Woodstock.[100] In April 1290, the abbot of Westminster had a load of grain carted from his manor at Sutton-under-Brailes in south Warwickshire down to Henley and there transferred to boat.[101]

So why were goods trans-shipped at Henley when secondary navigation was available to take them to Oxford? It may have been partly because of different frequencies on the two navigations – fairly regular navigation to Henley, irregular navigation to Oxford. In such circumstances, people – especially wealthier ones – may have preferred to ship something upstream sooner to Henley rather than wait for a boat-master to have assembled a load for Oxford. Going downstream, the availability of boats in Oxford may have been uncertain compared with their more probable availability in Henley.

Trans-shipment may also have taken place because the physical geography of the mid-Thames Valley increased the competitiveness of road against river transport. If distances by road and river from London to the river-side towns are compared, the river distances are about 1.5 times as far as the road distances as far as Reading. Between Henley and Oxford, however, the direct road route across the Chilterns is less than half the distance of the meandering river route: 23 miles (37 km.) by road compared with 50 miles (80 km.) by river.[102] Henley held an economically advantageous position between London and the three towns of Wallingford, Abingdon, and Oxford.[103]

[96] Ibid. 19.

[97] Herbert, 'The Borough of Wallingford', 150.

[98] Campbell et al., *A Medieval Capital and its Grain Supply*, 47, 194.

[99] See above notes 3 and 4.

[100] *Cal. Liberate Rolls*, iv, p. 300. In 1205, King John had ordered the sheriff of Oxford to find a cart (*'inveni carriagium'*) to take his plate from Henley to Oxford, which looks like an even earlier example of trans-shipment; *Rotuli Litterarum Clausarum* (Record Commission), i (1833), p. 60.

[101] B.F. Harvey (ed.), *Documents Illustrating the Rule of Walter de Wenlok, Abbot of Westminster, 1283–1307* (Camden 4th Ser. ii), p. 178.

[102] The only major obstacle on the land route from Henley to Oxford, the River Thame just south of Dorchester (near its confluence with the Thames), was bridged by 1146. The bridge was maintained throughout the rest of the Middle Ages; *V.C.H. Oxon.* vii, 40.

[103] If river transport typically cost only half the cost of road transport, as Masschaele suggests, then road and river transport charges between Henley and Oxford may have been similar; Masschaele, 'Transport Costs in Medieval England', 272.

A third factor may have been reduced risk. Flashlocks were dangerous places, where boats could easily sink and goods (and men) be lost. There were probably only five flashlocks from London to Henley, but probably 25 from London to Oxford. So the risk of losing goods on the river from Maidenhead to Oxford was over five times greater than on the river to Henley – an enormously increased risk to take in an age that did not know insurance. It must be suspected that all three factors were weighed when people decided whether to trans-ship goods at Henley or not. In the late Middle Ages, aristocratic customers certainly did not hesitate to opt and pay for long-distance road transport, especially if they could use their own carts.[104]

So Henley's role as a trans-shipment point towards the end of the Middle Ages was therefore merely a continuation of an existing situation. The end of secondary navigation to Oxford must have increased the volume of trans-shipped goods passing through Henley, though if navigation to Oxford ceased in the mid 15th century, the gain to Henley – during a period of economic depression and slow recovery – would have been inconsiderable.[105] Moreover, Henley would have benefited for only about a century – until, that is, Thomas West (and perhaps others) revived secondary navigation in the 1560s and began trans-shipping goods for Oxford at Burcot south-east of Abingdon, thereby depriving Henley of traffic.[106]

If the apparent end of navigation above Henley in (possibly) the mid 15th century happened because demand fell (rather than because winches decayed), Thomas West's use of the river to Culham in the 1560s was a revival of navigation along a dormant stretch of river, not a restoration of navigability. (The Thames may always have been passable to Culham in the late Middle Ages.) But why was the revival of navigation so long delayed? And if navigation had ceased for want of demand, why did its revival require the restoration of navigability below Oxford (as was the case)? How had a problem of demand turned into a problem of navigability?

Revival of navigation may have been long deterred by Oxford's continuing poor economic condition. Oxford's decline and contraction in the late Middle Ages were especially severe and long-lasting. The town declined relative to other English towns: in 1377 it had been 14th in population size after London; in 1523–4 it was 29th in taxable wealth.[107] Oxford's merchants of the 15th century were of lowly stature compared with their forebears in the early 14th century.[108] Oxford continued to stagnate until *c.* 1580. Its ranking among English towns was unchanged in 1576–7,[109] while Ralph Agas's map of 1578 shows 'a town of well-spaced dwellings and vacant plots, streets with few houses, and large gardens and orchards within the walls . . . Only along High Street and in other principal streets close to Carfax were houses and shops abundant, and plots built up behind street frontages.'[110] Expansion of population commenced in the 1580s, thanks to expansion of the University from the 1570s.[111] It was followed by expansion of Oxford's service trades.

[104] C.C. Dyer, 'The Consumer and the Market in the Later Middle Ages', *Econ. Hist. Rev.* 2nd ser. xlii (1989), 309–10.

[105] Among goods shipped to Oxford via Henley in this period, in 1488–9, was wainscot for Warden Fitzjames of Merton College; J.M. Fletcher and C.A. Upton (eds.), *The Domestic Accounts of Merton College, Oxford, 1 August 1482–1 August 1494* (Oxf. Hist. Soc. n.s. xxxiv), 345–6.

[106] Trans-shipment at Henley is recorded again in the mid 17th century, in spite of the reopening of the river to Oxford, though it was during the unusual circumstances of the Civil War; Philip, 'River Navigation at Oxford', 157.

[107] *V.C.H. Oxon.* iv, 15 and references cited there.

[108] Ibid. 43–4.

[109] Ibid. 106.

[110] Ibid. 87. Agas's map is reproduced on 88.

[111] L. Stone (ed.), *The University in Society*, i, *Oxford and Cambridge from the 14th to the Early 19th Century* (1974), 91.

The problem of navigability below Oxford must have been to do with the condition of the river between Culham and Oxford, given that Thomas West was navigating to Culham but not beyond by 1562, and that the Oxford–Burcot Commission later dealt with the section of river referred to in its title. The river upstream from Burcot was difficult to navigate – in Thacker's empathic words, 'It was indeed of old time always an arduous stretch of Thames.'[112] There is a hard rock bed and half-sunken ledges near the present bridge at Clifton Hampden (just upstream from Burcot); and by Long Wittenham (just upstream from Clifton) the river was tortuous and dangerous until a cut and poundlock were made in 1820–2.[113] Along the 13 miles (21 km.) between Oxford and Clifton, 'the channel did not naturally retain a good head of water' – today the fall of water is over twice the fall on the next 13 miles.[114] But why should much of the Burcot–Oxford passage have become unnavigable between (possibly) the mid 15th century and the 1560s?

The answer may lie in the history of boat-building considered in relation to the chronology of reviving demand for river-borne imports in the Oxford area. People became interested in restarting regular river navigation around Oxford in the 1560s (with traffic on the river *above* Oxford being recorded from the 1580s). And from around 1603, leading citizens of Oxford became keen to reopen the river downstream, this presumably reflecting the town's continuing growth.[115] By the 1560s, however, there had been changes in boat construction, which may have made the latest vessels from the London area unable to navigate between Culham and Oxford.

The commonest term used for cargo boats on the Thames in the late Middle Ages was 'shout'. The word was of Dutch origin – the shout itself may have been derived from the Low Countries. To date, the best evidence for the dimensions and characteristics of shouts comes from the remains of a boat unearthed in 1970. Found with fragments of other vessels at Blackfriars, London, it is referred to in archaeological literature as *Blackfriars 3*.[116] Comparison of *Blackfriars 3* with information about shouts in the accounts of London Bridge concluded that this boat was almost certainly a shout.

Blackfriars 3 was long, broad, shallow, and flat-bottomed, 16 yards (14.64 m.) in length, 4.7 yards (4.3 m.) wide, and 1 yard (0.88 m.) high amidships. It had probably been built in or near London between 1380 and 1415; it sank between 1480 and 1500. (Its working life is estimated at an impressive 75 years.) It was clinker built (i.e., with each plank or strake slightly overlapping the one below it) and pointed at both ends, and had carried a mast (probably sporting a square sail). It could bear about 7.5 tonnes.[117] Shouts were designed to convey heavy loads in shallow waters (see Fig. 3). They were used to transport such materials and commodities as tiles, timber, wine, corn, hay, and dung.[118]

By the time Thomas West was navigating up the Thames to Culham in the 1560s, the principal vessel used on the Thames may have changed. References to shouts are numerous in the 14th and 15th centuries, but dwindle in the early 16th century.[119] The last reference so far found is London Bridge's employment of a 'shout[man]' in 1538 (the year of the last

[112] Thacker, *Thames Highway*, i, 62.

[113] *V.C.H. Oxon.* vii, 17.

[114] Wilson, *The Thames*, 31–2.

[115] M. Prior, *Fisher Row: Fishermen, Bargemen, and Canal Boatmen in Oxford, 1500–1900* (1982), 114, 117–18.

[116] A thorough description and analysis of the remains have now been published by P. Marsden in his *Ships of the Port of London, Twelfth to Seventeenth Centuries* (1996), 55–104.

[117] Ibid. 55.

[118] Ibid. 25, 92, 99.

[119] Ibid. 91, 93.

Fig. 3. Reconstruction (by Peter Warner) of a 14th-century dock west of Baynards Castle, London, showing a shout being loaded. (Reproduced by permission of the Museum of London Archaeology Service; © MOLAS 1976.)

published medieval account).[120] From 1548, however, the term 'Western barge' is frequently used, referring to boats operating westwards of London Bridge.[121] Did the change of term represent a change of vessel?

Common use of the word 'barge' for river boats may itself indicate the introduction of larger boats to the inland Thames: in the Middle Ages, 'barge' tended to refer to a sea-going vessel or to a boat used on state occasions.[122] (In the 1560s and early 1570s, Thomas West's boat was a 'barge'.[123]) Some differences have certainly been observed in the materials and methods used for constructing Thames river boats (probably in London), indicating that building methods were changing: elm was employed alongside oak, and oak planks were now cut

[120] V. Harding and L. Wright, *London Bridge: Selected Accounts and Rentals, 1381–1538* (London Record Society xxxi), p. 241 (final reference).

[121] Wilson, *The Thames*, 39, citing F.G.G. Carr, *Sailing Barges* (1951).

[122] *Middle English Dictionary*, i (1956), 648.

[123] M. Prior, 'The Accounts of Thomas West of Wallingford, a Sixteenth-century Trader on the Thames', *Oxoniensia*, xlvi (1981), 85.

tangentially by saw rather than being more carefully split radially by axe (a more expensive method which gave each plank a tapered profile).[124] At the very least, the shout and Western barge had different prow and stern configurations: those of *Blackfriars 3* were pointed whereas those of the Western barge were square-ended (the so-called 'swim-head' form).[125] It is even possible that changes in the construction of sea-going ships may have influenced the construction of river boats. In the Middle Ages, boats and ships were generally of so-called 'shell' construction: a keel was laid down; planks were then attached outwards to form a shell (the planks being overlapped in clinker fashion); the shell was then strengthened by the insertion of beams or frames. Probably in the early 16th century, a new technique arrived in England, so-called 'skeleton' construction: an internal frame was built; planks were then attached to form a base and sides (planks being joined edge to edge in 'carvel' fashion). The new technique permitted the construction of larger, stronger vessels.[126] It is not yet known if skeleton construction was used for inland vessels, but it remains a possibility pending the manifestation of new evidence.

What is certainly known is that by *c.* 1585, in the words of John Strype, 'the Barges [on the Thames] were become of greater burthen [load or tonnage]; almost double what they used to be'.[127] It seems likely that much of the Burcot–Oxford stretch of the Thames was unusable in the late 16th century because barges from London were now too large and deep for the conditions there. It is notable that the Act establishing the Oxford–Burcot Commission states that an aim was to make the river navigable for exporting Headington stone to London and importing coal; i.e., to facilitate transport of the heaviest commodities.[128] Moreover, the Commission acted mainly to raise water-levels, which would have created navigability for large boats carrying heavy loads.

CONCLUSIONS

Dr. J.F. Edwards and B.P. Hindle recently sought to demonstrate that rivers were extremely important in the economy of medieval England by mapping the extent of navigability.[129] A critic, Dr. John Langdon, rightly retorted that evidence for some degree of navigability does not necessarily imply either high-quality navigability or the extent of navigation (or therefore the proposition that extensive navigability implies a well-developed functioning transport system). Instead, Dr. Langdon deployed evidence from purveyance records from the 1290s to 1348 to present contemporaries' views about which rivers were worth using (because of quality of navigation and availability of boats), and to demonstrate the relative use made of particular stretches of river (dividing them into 'A' and 'B' quality according to frequency of use).[130] His evidence for the Thames revealed that purveyors shipped commodities downriver from both Henley and places upstream (including Oxford), but shipments went more often from Henley (on five out of eight occasions). This he ascribed partly to seasonal conditions (passage above Henley being more difficult in summer when water levels were low), partly to the difficulty

[124] Marsden, *Ships of the Port of London*, 31.

[125] For pictures of Western barges, see Wilson, *The Thames*, illustrations 16, 29, 30, 40, 43.

[126] The changes are summarised in Marsden, *Ships of the Port of London*, 31.

[127] Thacker, *Thames Highway*, i, 53.

[128] Ibid. 66.

[129] J.F. Edwards and B.P. Hindle, 'The Transportation System of Medieval England and Wales', *Jnl. of Hist. Geog.*, xvii (1991), 123–34, especially fig. 2 on 130.

[130] J. Langdon, 'Inland Water Transport in Medieval England', ibid. xix (1993), 1–11.

of commissioning empty boats to go upstream from Henley to collect goods.[131] Dr. Langdon's scenario confirms the general picture of the Thames as comprising better navigability to Henley (or Caversham), and inferior navigability further upstream. But the evidence of occasional commissioned journeys is less than a basis for assessing the roles and importance of river navigation.

Any study of medieval river navigation must begin with the extent of navigability, navigability being, of course, a prerequisite for navigation. The quality of navigability is also important: it determines the threshold of demand required to establish navigation (by setting such parameters as reliability of passage, journey times, and associated costs). But the history of the Thames in the late Middle Ages suggests that demand – especially urban demand – is the key factor in determining the roles and extent of navigation, and that changes in demand probably caused changes in the extent of navigation.

In the late Saxon period, the construction of mill-dams and flashlocks created effective navigability between London and Oxford.[132] But at the peak of the medieval economy, in the decades around 1300, the scale of demand for grain and other imports from London stimulated the creation of a supply corridor and navigation that extended up the Thames only as far as Henley. Towns higher up the river could satisfy their foodstuff requirements from local supplies, and did not produce bulky, low-value goods that required cheap transport for export. At best, demand beyond Henley probably generated only an infrequent, secondary navigation. Primary and secondary navigation may have continued to operate (albeit at reduced levels) until the slump of the mid 15th century reduced demand in Oxford (and other places, such as Wallingford and Abingdon) below levels required to make the secondary navigation worthwhile. For a century or so, trans-shipment at Henley would have been an important way of getting goods to Oxford. Secondary navigation beyond Henley was revived in the 1560s, but could not be extended to Oxford because barges now appear to have been larger and could not navigate the final section of river beyond Culham.

The high medieval pattern and content of navigation can be contrasted with the situation in the late 18th century century as portrayed and analysed by H.I.H. Crown Prince Naruhito.[133] The London–Henley supply corridor for primary products had now been extended and transformed, because of the greatly increased scale of London's demands and the advent of new principal bulk commodities. London's major imports were now corn and malt; Henley, Reading, Wallingford, and Abingdon were now important malting centres, not merely entrepots.[134] The main commodity going upriver was coal, used for malting, brewing,

[131] Ibid. 5–6.

[132] Navigation between London and the Oxford area in the late Saxon and early Norman periods would repay further study, especially by archaeologists. Pottery made west of Oxford may have been shipped down the Thames to London in the late Saxon period, but the evidence is ambiguous; see M. Mellor et al., 'A Synthesis of Middle and Late Saxon, Medieval and Early Post-medieval Pottery in the Oxford Region', Oxoniensia, lix (1994), 58–9. Stone from Taynton in west Oxfordshire may also have been transported down the Thames in the late Saxon period, to Sonning and possibly Kingston-upon-Thames and London; E.M. Jope, 'The Saxon Building-stone Industry in Southern and Midland England', Med. Arch., viii (1964), 106. (Where would stone have been trans-shipped from road to river in that period?) It seems unlikely that Oxford's rise in the late 10th or early 11th century would have been stimulated by the creation of effective river navigation, as suggested by Professor R.H.C. Davis. More general causes were probably at work. Dr G.G. Astill has recently argued that town economies throughout southern England expanded powerfully in the late 10th and early 11th centuries; G.G. Astill, 'Towns and Town Hierarchies in Saxon England', Oxford Journal of Archaeology, x (1991), 112–13.

[133] H.I.H. Prince Naruhito, The Thames as Highway: A Study of Navigation and Traffic on the Upper Thames in the Eighteenth Century (1989), chaps. 4 and 5.

[134] Ibid. 78–80.

and heating houses.[135] Economic relationships sustained by river navigation were now to a considerable extent symbiotic. Much of the mid-Thames Valley now formed an economic region linked with London. Secondary demand from Oxford was now also much stronger, with coal being imported for domestic use.[136]

So until when did the medieval pattern and content of navigation last? The 16th century appears to have witnessed their revival and reinvigoration. Henley was revitalized as a grain-exporting town in the early 16th century, and continued as such until at least the 1570s.[137] The content of Thomas West's trade in the 1560s mainly conforms to the medieval pattern, with wood and corn being shipped downstream, fish and consumer goods brought upstream.[138] The best information available suggests that the medieval production and trading patterns of the mid-Thames Valley evolved into their post-medieval guise between 1600 and 1630, as London's population passed the 200,000 mark and continued its inexorable expansion.[139]

[135] Ibid. 57, 68–9.

[136] For Oxford's use of upstream navigation after the reopening of 1635, see I.G. Philip, 'River Navigation at Oxford during the Civil War and Commonwealth', *Oxoniensia*, ii (1937), 152–65, especially 159–60.

[137] Peberdy, 'Economy, Society, and Government', 241–3, 254; J. Thirsk (ed.), *The Agrarian History of England and Wales*, iv, *1500–1640* (1967), 508.

[138] Prior, 'The Accounts of Thomas West of Wallingford', 76, 77. West also exported some malt and imported coal, though the coal appears to have been for use by smiths rather than maltsters.

[139] The rise of large-scale malting in Henley appears to be a development between 1600 and 1630; J.A. Dils 'Henley and the River Trade in the Pre-industrial Period', *Oxfordshire Local History* ii, 6 (1987), 184–5.

APPENDIX: Inferred Locations of Mill-Dams and Flashlocks between London and Oxford in the Late Middle Ages (13th–16th centuries), with references to mills, weirs, and locks (see Fig. 2 above)

Abbreviations:

Bishop	John Bishop's 1585 list of locks and weirs between Maidenhead and Oxford; published in Fred S. Thacker, *The Thames Highway*, i, *General History* (1914, reprinted 1968), 54–7.
D.B. Berks.	J. Morris (ed.), *Domesday Book*, 5, *Berkshire*, 1979.
D.B. Bucks.	J. Morris (ed.), *Domesday Book*, 13, *Buckinghamshire*, 1978.
D.B. Oxon.	J. Morris (ed.), *Domesday Book*, 14, *Oxfordshire*, 1978.
Hundred Rolls, ii	*Rotuli Hundredorum temp. Hen. III et Edw. I* (Record Commission), ii (1818).
Indictments	Indictments against lock-holders, 1395–9, published in C.T. Flower (ed.), *Public Works in Mediaeval Law*, ii (Selden Soc. xl), pp. 124–7.
P.R.O.	Public Record Office, London
Thacker, ii	Fred S. Thacker, *The Thames Highway*, ii, *Locks and Weirs* (1920, reprinted 1968).
V.C.H. Berks.	Victoria History of Berkshire, 4 vols. and index, 1906–27.
V.C.H. Bucks.	Victoria History of Buckinghamshire, 4 vols. and index, 1905–28.
V.C.H. Oxon.	Victoria History of Oxfordshire, 13 vols. to date, 1907f.

Maidenhead

(Previously on boundary of Bray and Cookham parishes; Berkshire)
1346: lease of Ray Mill recorded, which Thacker identifies with Boulter's lock: Thacker, ii, 319.
1585: 'Rea Locke belonging to Harry Merrye . . . and in the kepinge of Robert Weston': Bishop, p. 54.
1772: poundlock opened, to the north of the present 'Boulter's Lock'; Thacker, ii, 320.

Marlow

(or Great Marlow; Buckinghamshire)
1086: one mill at 20s. recorded in Domesday Book; *D.B. Bucks.*, entry 4,18.
1307, 1314: windlass (*Wyndasium*) on the Thames for hauling boats recorded in extents of manor; respectively, P.R.O., C133/128, C134/42, no. 20.
1585: 'Marlowe Locke belonginge to Thomas . . . mergent & kepte by George Westcotte. The lock in the p[ar]ishe of Byssham, the myll & floudgate in Great Marlow': Bishop, p. 54.
1753: plan of river at Marlow shows flashlock and winch; reproduced in H.I.H. Prince Naruhito, *The Thames as Highway: A Study of Navigation and Traffic on the Upper Thames in the Eighteenth Century* (1989), 22, and D.G. Wilson, *The Thames: Record of a Working Waterway* (1987), 21.
1773: poundlock opened; Thacker, ii, 295.

Bisham

(Berkshire)
1328: order made for repair of water-mills at Bisham; *V.C.H. Berks.* iii, 146.
1544: reference to Temple 'Locke', winch, mills, and fishery; Thacker, ii, 285.
1585: 'Temple Lock belonging to John . . . rinkys gent & in the keping of Richard May . . . we': Bishop, p. 54.
1773: poundlock opened; Thacker, ii, 285.

Hurley

(Berkshire)
1086: mill at 20s. recorded in Domesday Book; *D.B. Berks.*, entry 38,5.
1536: mill mentioned in grant of possessions of former Hurley Priory to Westminster Abbey; *V.C.H. Berks.* iii, 156.
1585: 'Newlock [Hurley] belonging to Mr. Bowde & Mr. Lovelace & kept by Henry Tayler'; Bishop, p. 54.
1773: poundlock opened; Thacker, ii, 281.
Note: the last surviving flashlock capstan is at Hurley; see photographs in Thacker, ii, opposite 284; Wilson, *The Thames*, 16.

Hambleden

(Buckinghamshire)
1086: mill at 20s. recorded in Domesday Book; *D.B. Bucks.*, entry 52,2.
1320: two water-mills recorded in extent of manor; P.R.O., C134/63 no. 10.

1338: two water-mills, a haulage of ships (*tractus navium*), and a lock and fishery (*gurges cum piscaria*) recorded in extent of manor; P.R.O., C135/56 no. 13.

1376: Hambleden weir held by Richard le Scrope; Thacker, ii, 273.

1383, 1384: two accidents recorded at Hambleden lock; P.R.O., JUST 2/9.

1585: 'Hambledon Lock belonging to Mr. Scrope & kept by Thomas Bulter'; Bishop, p. 54.

1773: poundlock opened; Thacker, ii, 272.

Rotherfield Peppard   (Oxfordshire)

1086: mill at 20*s*. recorded in Domesday Book; *D.B. Oxon.*, entry 35,7.

1395–9: William Drayton has a 'lokke' in the Thames; Indictments, p. 127. Also detailed complaint about this owner's lock and winch; ibid., pp. 125, 127.

1585: 'At the marshe two mylles havinge one Locke & one weare. One lock & myll belonginge to ffrauncis Stoner gentleman. Thother kepte by one Roberte Wolley yeoman': Bishop, p. 54.

c.1690: Marsh Lock at R.P. appears in Jan Siberechts' painting *A View of Henley from the Wargrave Road*; detail reproduced in H.I.H. Prince Naruhito, *The Thames as Highway*, 19, and Wilson, *The Thames*, 22.

1773: poundlock opened; Thacker, ii, 262.

Shiplake   (Oxfordshire)

1086: mill site at Lashbrook in Shiplake Parish paying 10*s*. recorded in Domesday Book (entry for main manor missing); *D.B. Oxon.*, entry 20,2.

1395–9: the prioress of Goring has a 'lokke' in the Thames at Shiplake: Indictments, p. 127.

1585: 'Shiplack weare kept by Richard Cottrell': Bishop, p. 55.

1773: poundlock opened; Thacker, ii, 255.

Sonning   (Berkshire)

1086: two mills at 12*s*. 6*d*. recorded in Domesday Book; *D.B. Berks.*, entry 3,1.

1585: 'Suning Lock belonging to Mr Richard Blunte kept by Robte ffrewyne and John Wydmore'; Bishop, p. 55.

1773: poundlock opened; Thacker, ii, 245.

1827: older flashlock temporarily reused; Thacker, ii, 247.

Caversham   (formerly Oxfordshire; now Berkshire)

1086: mill at 20*s*. recorded in Domesday Book; *D.B. Oxon.*, entry 20,1.

1295: one mill recorded in extent of manor; P.R.O., C133/77 no. 3.

1307: two water-mills, another mill, and a fishery recorded in extent of manor; P.R.O., C133/128.

1314: two water-mills, a fulling-mill, and fishery recorded in extent of manor; P.R.O., C134/42 no. 10.

1375: mill(s), fishery, and passage with boats (probably a ferry) recorded in extent of manor; P.R.O., C135/252.

1395–9: Earl of Gloucester has 'lokke' in the Thames at Caversham; Indictments, pp. 125–6.

c.1493: old lock, mills, and mill barge, ferry and boat granted to Notley Abbey; Thacker, ii, 233.

1585: 'Cawsam Lock and Cawsam weare, the lock kepte by Richard Barton and the weare by one Salt[e]r. In the p[ar]ishe of Redinge'; Bishop, p. 55.

1778: 'new lock' (presumably poundlock) opened; Thacker, ii, 233–4.

Mapledurham Gurney   (Mapledurham Parish, Oxfordshire)

1086: mill at 20*s*. recorded in Domesday Book; *D.B. Oxon.*, entry 22,1.

1395–9: Amisia Bardolf has a 'lokke' in the Thames; Indictments, p. 126.

1585: 'Mawple Durham Lock belonging to Mr. Michaell Blunt and kept by Robert Blunt'; Bishop, p. 55.

1777: poundlock opened; Thacker, ii, 222.

Whitchurch   (Oxfordshire)

1086: mill at 20*s*. recorded in Domesday Book; *D.B. Oxon.*, entry 35,9.

1395–9: William Drayton, knight, has a 'lokke' in the Thames; Indictments, p. 126.

1585: 'Whitchurche Lock belonging to Harry Knappes and kept by Nicolas Wilford'; Bishop, p. 55.

1787: poundlock installed; Thacker, ii, 216.

Gatehampton

(Goring Parish, Oxfordshire)

1086: mill at 11s. recorded in Domesday Book; *D.B. Oxon.*, entry 35,1.

Before 1251: a weir (*gortum meum*) in Thames mentioned in grant; H.E. Salter (ed.), *The Boarstall Cartulary* (Oxf. Hist. Soc. lxxxviii), p. 64.

Before 1251: prioress of Goring quitclaims the fulling mill in Gatehampton; Salter, loc. cit., 59.

1279: lord of Gatehampton holds a mill with weir (*j molendinum cum gurgite*); Hundred Rolls, ii, 778.

1395–9: John Shelford has a 'lokke' in the Thames 'apud Gatehampton'; Indictments, p. 126.

1401–2 (3 Hen. IV): ref. that John de Shelford and ancestors had two locks; Thacker, ii, 212 (one was the fishery at Runsford, Gatehampton).

1585: 'Harts Locke kept by Hewe Whislter. In the p[arish] of Bassledon'; Bishop, p. 55. Note: Hart's Lock identified with Gatehampton by Thacker, ii, 212.

18th century: toll levied at Hart's Lock; Thacker, *Thames Highway*, i, 262.

Note: this lock decayed and was not replaced with a poundlock; Thacker, ii, 214–15.

Goring & Streatley

(Goring, Oxfordshire; Streatley, Berkshire)

1086: mill at 20s. at Goring recorded in Domesday Book; *D.B. Oxon.*, entry 28,2.

1395–9: the prioress of Goring has a 'lokke' in the Thames at Goring; Indictments, p. 126.

1585: 'Goringe Lock kept by William Whisler & Richard Smyth'; Bishop, p. 55.

1787: poundlock built; Thacker, ii, 209.

1086: mill at 22s., two fisheries at 11s. at Streatley recorded in Domesday Book: *D.B. Berks.*, entry 38,6.

1585: 'The two weares myll and floudgate in the p[ar]ish of Streatley' (kept by William Whisler & Richard Smyth); Bishop, p. 55.

Cleeve Lock

(Goring Parish, Oxfordshire)

1279: the prior of Ogbourne ('Okeburn'), Wilts., holds a water-mill in Goring; Hundred Rolls, ii, 778.

1394: man killed loading a fishing apparatus at 'Clyfemull' (Cleeve Mill); P.R.O., JUST 2/138.

1395–9: the prior of Ogbourne ('Okebourn'), Wilts., has a 'lokke' in the Thames 'apud Clyvemyll'; Indictments, p. 126.

1585: 'Cleve Lock belonging to the Earle of Darbie and kepte by Willm Roberts'; Bishop, p. 55. (Flashlock according to Thacker, ii, 206.)

1787, poundlock built; Thacker, ii, 206.

Little Stoke

(or Stoke Marmion, Checkendon Parish, Oxfordshire)

1086: mill at 20s. recorded in Domesday Book; *D.B. Oxon.*, entry 43,1.

1220–6: Geoffrey Marmion and heirs to hold their lock and mills (*gurgitem suum et molendina*); part of agreement with the abbot of Reading about river-related rights in Cholsey and Stoke Marmion; Salter (ed.), *Boarstall Cartulary*, p. 17.

1279: the entry in Hundred Rolls for South Stoke (Stoke Abbot), describing the location of the lord's fishery in the Thames, mentions the mill of Stoke Marmion; Hundred Rolls, ii, 779.

1279: mill in 'Stoke Parva' recorded in Hundred Rolls; Hundred Rolls, ii, 779.

1379: man drowned in Thames after standing on a bridge on the weir at 'Southmull'; inquisition held at Cholsey; P.R.O., JUST 2/9.

1292: water-mill recorded in extent of manor of Checkendon and Stoke Marmion; P.R.O., C133/62, no. 5.

1395–9: John Rede, Richard Marmion and William atte Dene have a 'lokke'; Indictments, p. 126.

1585: 'Sowthmill Weare. In the parish of Chowlsey'; Bishop, p. 55.

18th century: tolls levied at Moulsford; Thacker, *Thames Highway*, i, 264.
Note: the medieval mill and weir at Little Stoke appear to be continued by the flashlock at Moulsford. Thacker places it just south of Little Stoke, to the north of the railway bridge; Thacker, ii, 201–3. Little Stoke lock appears to have decayed.

North Stoke

(or Stoke Bassett, Oxfordshire)
1086: two mills at 20*s.* recorded in Domesday Book; *D.B. Oxon.*, entry 35,10.
1279: Roger Crok holds water-mill from the prior of Wallingford; Hundred Rolls, ii, 781.
1395–9: prior of Wallingford has 'lokke' at Stoke Basset; Indictments, p. 126.
1585: 'Northstock weare kept by Raphe Pollington of Wallingford'; Bishop, p. 55.
Note: Thacker suggested that there was a weir on a stream at North Stoke; *Thames Highway*, i, 39. But the references of 1395–9 and 1585 are from sources dealing with obstructions on the main course of the Thames.

Wallingford

(formerly Berkshire; now Oxfordshire)
1300: extent of manor refers to royal mill on the Thames under the castle and the weir (*gurgite*) of the bishop of Winchester; P.R.O., C133/95, no. 24.
1395–9: bishop of Winchester has a 'lokke' at Wallingford Bridge; Indictments, p. 126.
1585: 'Wallingford Lock belonging to the same [Ralph Pollington] and kept by George Bancks'; Bishop, p. 56. N.b., Thacker thinks that this was a recent construction; Thacker, ii, 188–9.
1585: 'lock myll and floudgate in the parish of Alhollowes in Wallingford'; Bishop, p. 56.
Note: the 1585 reference to a lock in the parish of All Hallows suggests there was a lock to the north of Wallingford Bridge. All Hallows Church stood in the north-east quadrant of Wallingford. (There were other churches and parishes in the south-east quadrant.) See map in M. Airs, K. Rodwell, and H. Turner, 'Wallingford' in K. Rodwell (ed.), *Historic Towns in Oxfordshire: A Survey of the New County* (1975), 160.

Bensington

(Oxfordshire)
1086: two mills at 50*s.* and fisheries recorded in Domesday Book; *D.B. Oxon.*, entry 1,1.
1279: Hundred Rolls record a mill called 'Quatie' and another mill; Hundred Rolls, ii, 751.
1396: John James and wife Christiana held the water-mill in Bensington; Thacker, ii, 184.
1585: 'Benson Lock and Weare belonginge to Robte George & kepte by Robte Brode-water & Jacob Buisshope'; Bishop, p. 56.
1746: reference to flashlock at Bensington; Thacker, ii, 184.
1788: poundlock built at Bensington; Thacker, ii, 184.

Little Wittenham &
Dorchester

(L.W., formerly Berkshire, now Oxfordshire; D., Oxfordshire)
1086: one mill at 10*s.* recorded at Little Wittenham in Domesday Book; *D.B. Berks.*, entry 7,30.
1163: mill belonging to Dorchester Abbey on Thames (other mills were on the River Thame); *V.C.H. Oxon.* vii, 44.
1585: 'one lock and ij weares', 'kept by Edmund Fettiplace . . . [and] Mr Willm Dunshe'; one weir in Little Wittenham, the other weir and lock in Dorchester; Bishop, p. 56.
1789: poundlock (Day's Lock) opened on the Oxfordshire side of the river, with the flashlock remaining for some time; Thacker, ii, 175–9.

Long Wittenham

(formerly Berkshire; now Oxfordshire)
1295: lord's possessions included one water-mill and fishery (n.b. not specified as being on the Thames); P.R.O., C133/71, no. 16.
1304: two water-mills recorded in extent of manor (not specified as being on the Thames); P.R.O., C133/119, no. 4.
1585: 'One weare at longe Witnam belonginge to wyddowe Sawyer'; Bishop, p.56.
Early 20th century: remains of a mill 'visible in the river-bank' and stones of a dam to be seen under water; *V.C.H. Berks.* iv, 385.

Note: any flashlock at Wittenham presumably decayed; the difficult stretch of the Thames through Long Wittenham was replaced by a new lock and cut in 1822; Thacker, ii, 171–2.

Sutton Courtenay

(formerly Berkshire; now Oxfordshire)

1086: three mills at 50s. recorded in Domesday Book; *D.B. Berks.*, entry 1,37.

1585: four locks mentioned, (i/ii) 'Two Locks & one myll kept by Richard Elstone & Richard Justice'; (iii) 'An old ruynous weare being one Clement Dabnet'; (iv) 'Thomas Trullocks lock, in Sutton parish' ; Bishop, p. 56.

1638: miller installed poundlock shortly before 1638; Thacker, ii, 161.

Abingdon

(formerly Berkshire; now Oxfordshire)

1316: complaint against abbot of Abingdon for heightening his weir and causing floods; Thacker, ii, 152.

1585: 'Abington Lock kepte by Thomas Tysdale' (Abbey flashlock); Bishop, p. 56.

1790: new poundlock built at Abingdon; Thacker, ii, 156.

1585: 'Collombe weare belonging to Edward wilmot gent. In the parish of Collombe', i.e., flashlock along Swift Ditch; Bishop, p. 56.

1624–38: poundlock built on Swift Ditch by Oxford–Burcot Commission; Thacker, ii, 147.

Note: in the middle ages, the main course of the river by Abingdon was the present one, with Swift Ditch serving as a subsidiary course. Swift Ditch was the main stream from 1624/38 to 1790. For the history of the river at Abingdon, see Thacker, ii, 143–58.

Nuneham Courtenay

(Oxfordshire)

1086: a mill at 20s. recorded in Domesday Book; *D.B. Oxon.*, entry 32,1.

1225: 'Sotiswere' mentioned in *Chronicon Monasterii de Abingdon*; M. Gelling, *The Place-Names of Oxfordshire*, Part One, 1971, p. 184.

1279: Hundred Rolls record (a) lord's holding of water in the Thames between 'Bunse-loke' and the mill of 'Stokg[r]ave', (b) tenant of the water between the lock and an embankment below the village, and (c) a mill held by a widow; Hundred Rolls, ii, 722.

1576: 'Thupper Locke' mentioned in Abingdon deed; Thacker, ii, 138.

1585: 'Three Locks at Newnam kept by John Mollyners'; Bishop, p. 56.

Early 17th c.: sketch map of the Thames between Oxford and Culham shows 'lockes' at Nuneham; reproduced in I.G. Philip, 'River Navigation at Oxford during the Civil War and Commonwealth', *Oxoniensia*, ii (1937), plate xiii.

1788: reference to Lord Harcourt's management of flashlock; Thacker, ii, 139.

Sandford

(Oxfordshire)

1279: Templars hold a fishery, a lock (*gurgite*), two water-mills, and a fulling-mill; Hundred Rolls, ii, 722.

temp. Edw. III (1327–77): locks at Sandford broken, mentioned by Anthony Wood, Thacker, ii, 135.

16th c.: mill and weir called 'Lasher's weir'; *V.C.H. Oxon.* iv, 269.

1585: 'Samfords Lock kept by John Ovens'; Bishop, p. 56.

By 1632: poundlock built at Sandford by Oxford–Burcot Commission; Thacker, ii, 134.

Note: for a detailed account of the mills at Sandford, see also *V.C.H. Oxon.* iv, 269–72.

Iffley

(Oxfordshire)

late 12th c.: rents from mill donated; *V.C.H. Oxon.* v, 195.

1279: Hundred Rolls record a mill and apparently a second mill called 'Boymulle'; Hundred Rolls, ii, 712.

1331: water-mill recorded in extent of manor; P.R.O., C135/28, no. 20.

1585: 'Ifle Lock kept by one Mrs. Pitts'; Bishop, p. 56.

By 1632: poundlock built at Iffley by Oxford–Burcot Commission; Thacker, ii, 125–6.