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Issues of water in medieval London to *c.* 1300

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ABSTRACT: Water was essential to the commerce, sustenance and cleansing of medieval London and its inhabitants. The paper reviews technologies of supply, access and control, and the uses and risks associated with water during the city's formative period. It surveys the pleasures of water around the city, the paradoxes they involved, and the public supply as an expression of a growing civic culture. It emphasizes the interaction between natural environment, technology and institutions as a fruitful theme for medieval urban history.

Medieval London, a great commercial city, owed its very existence and prosperity to water, especially that of the river Thames.[1] Indeed, the latest view on the origin of the name London is that centuries before the Romans came it denoted the tidal, estuarine stretch of the river itself, extending downstream from the site of the later city to which the name was ultimately transferred.[2] Contemporaries, such as William fitz-Stephen in his famous description of London written in 1174,[3] remarked upon the river – the *fluvius maximus piscosus Thamensis* – with its distinctive tidal flow, its fish and its role as an artery of trade.[4] They also characterized the lesser streams of the city and its environs.[5] Yet collective or communal management of London's water resources was remarkably low-key, reflecting both the abundance of supply and the preoccupations of the city's government. This paper surveys the use, regulation, and social and cultural significance of water in London over

[1] A stimulating recent survey of water in a medieval context is P. Squatriti, *Water and Society in Early Medieval Italy, AD 400–1000* (Cambridge, 1998), which includes (pp. 2–3, 63–5) a brief survey of the little that has so far been written on the subject.

[2] R. Coates, 'A new explanation of the name London', *Transactions of the Philological Society*, 96.2 (1998), 203–29.

[3] The best edition of this *Descriptio Nobilissimae Ciuitatis Londoniae* is printed in C.L. Kingsford (ed.), *John Stow, A Survey of London* (hereafter *Stow, Survey*), 2 vols (Oxford, 1908), ii, 219–29. For a discussion of the description and its bibliography, see C.N.L. Brooke and G. Keir, *London 800–1216: The Shaping of a City* (London, 1975), 112–21.

[4] *Stow, Survey*, ii, 220. For a twelfth-century characterization of the Thames as an artery of trade, see F. Barlow (ed.), *The Life of St. Edward Who Rests at Westminster* (Oxford, 1992), 66–9.

[5] *Stow, Survey*, ii, 220. A useful popular account of the lesser streams is N. Barton, *The Lost Rivers of London* (London, 1962, repr. 1982).

the three centuries up to 1300, when the city achieved its medieval peak with a population of perhaps 80,000 souls.[6]

London's topographical framework had been established under Roman rule. On the north bank of the Thames, the defensive wall enclosed two low hills that rose up steeply from the river. The Walbrook stream and its tributaries running from the north into the Thames divided these two hills. As a barrier to movement Walbrook marked an important distinction between the eastern and western parts of the city, evident in the pattern of its streets (Figure 1) and in its administrative practices.[7] In the northern part of the walled area, and to the north of the walls in an area known as 'The Moor', these streams threaded their way through extensive tracts of marsh and meadow. As the business and population of the city grew, in the Roman period and then again during the Middle Ages, these streams were managed with increasing care and low-lying, boggy areas were infilled so as to create ground for building.[8] Gradually the streams were confined to narrower channels, and were bridged, built over, or entirely suppressed. So far as we can tell, that work was the result of private rather than public initiatives. The principal streets and market areas of both the Roman and the medieval city, in the latter case laid out from the late ninth century onwards, occupied the highest and best-drained ground and some intermediate terraces. Most of them were on an east-west axis, and secondary streets ran up to them from the river. This direct connection between the commerce of the river frontage and the inland markets was a central element in the spatial functioning of the city. In the early medieval plan, there was no street along the river frontage, which at first was occupied by the remains of the Roman riverside wall and quays. Gaps in that wall, giving access to the river, appear to be indicated by place-names incorporating the element 'gate', such as Dowgate, where Walbrook flowed into the Thames (Figure 2), and Billingsgate, just below London Bridge. Both places were important focal points of river-borne trade in the eleventh century, although by then the riverside wall was in decay or had disappeared. From the eleventh century onwards the owners of the quays progressively extended them into the river, by more than 100 metres in the busiest neighbourhood. Access to the river was a valuable

[6] For the development of medieval London and a survey of writing on the topic over the last two decades, see D. Keene, 'London in the early Middle Ages, 600–1300', *The London Journal*, 20.2 (1995), 9–21. See also idem, 'London from the post-Roman period to 1300', in D.M. Palliser (ed.), *The Cambridge Urban History of Britain*, vol. 1, *600–1540* (Cambridge, 2000), 187–216. For the topography of medieval London, see M.D. Lobel (ed.), *The City of London from Prehistoric Times to* c.*1520*, The British Atlas of Historic Towns, vol. iii (Oxford, 1989).

[7] M. Bateson, 'A London municipal collection of the reign of John', *English Historical Review*, 17 (1902), 480–511 and 707–30, esp. 488, 707; H.T. Riley (ed.), *Liber Albus, compiled 1419*, Rolls Series, 2 vols (London, 1859–62), i, 57, 110–11, 231–2; H.M. Cam (ed.), *The Eyre of London 14 Edward II, A.D. 1321*, Selden Society, vol. 85 (London 1968), pp. xiii, cxxxvi, 8.

[8] For relevant archaeological findings, see C. Maloney and D. de Moulins, *The Upper Walbrook in the Roman Period* (London, 1990).

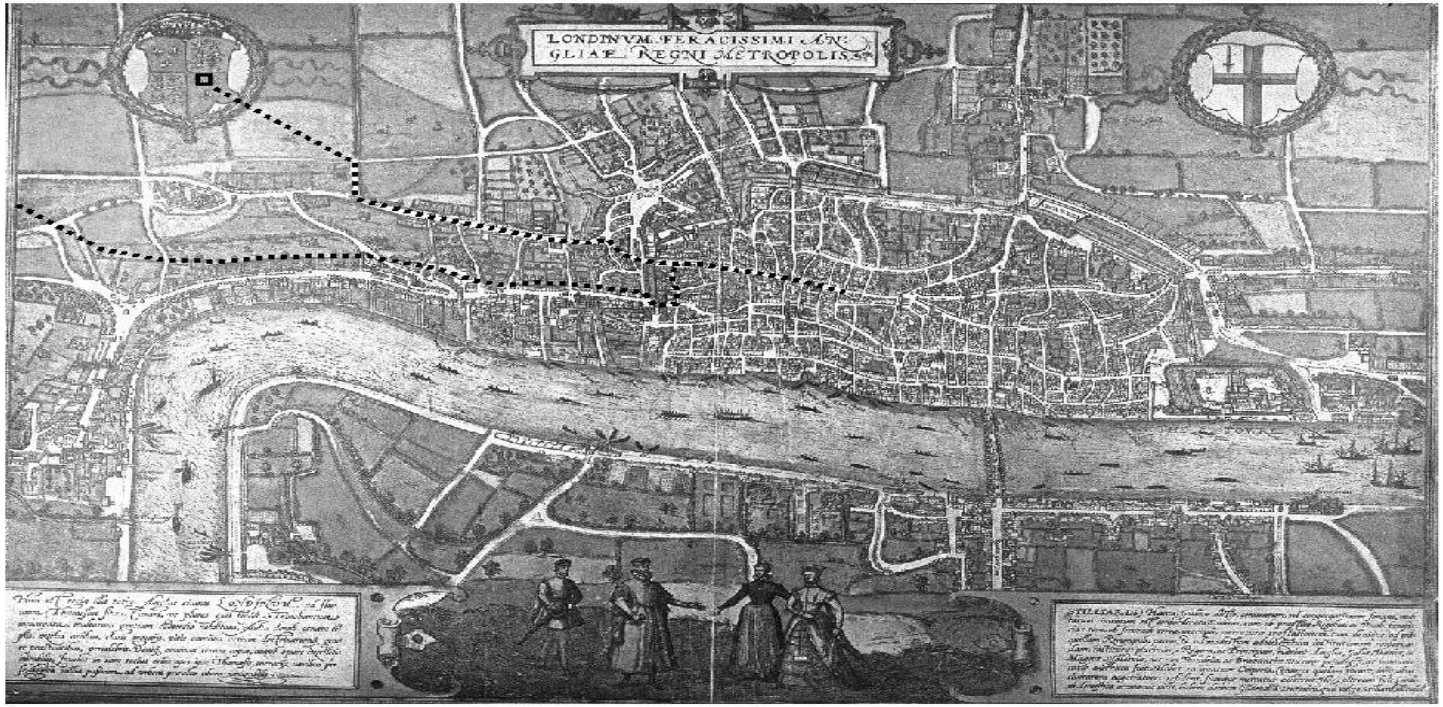

Figure 1: London, Westminster and Southwark in the mid-sixteenth century
From G. Braun and F. Hogenberg's atlas *Civitates Orbis Terrarum*, first published in 1572, and depicting the city as it was *c*. 1550. The extent of the built-up area is very much as it would have been *c*. 1300. The approximate courses of the thirteenth-century water pipes supplying the Great Conduit in Cheapside and the Grey Friars have been added. (*Reproduced by permission of Guildhall Library, Corporation of London*)

asset that the private owners of the quays and the buildings standing on them guarded jealously. Thus, in the thirteenth century and earlier, many of the narrow lanes leading through these properties to the quays were closed off by gates, and a further series of place-names in '-gate' emerged. At only a few places of special commercial significance did the public have long-standing rights of access to the river. Gradually many of the private lanes came to be open to all, a process that was probably well under way by 1200.[9] In 1343 a civic enquiry into obstructions in those lanes, which provides a vivid picture of the physical character of the waterfront district, incorrectly assumed that most of them had originally been open.[10] During the twelfth and thirteenth centuries, a new public street (later known as Thames Street) gradually emerged along the line of the demolished Roman wall, and served the important commercial purpose of linking together the lanes and hence the trade of the different parts of the waterfront.[11]

London had been founded at the lowest point on the Thames at which a well-drained site for settlement adjoined the river and at which a bridge could be built. The precise position of London Bridge was determined by the character of the south bank, where the land was much more low-lying and marshy than to the north, and by the incidence of solid ground along which roads could approach the crossing (see Figure 1). The southern bridgehead settlement at Southwark was important in Roman times and was again substantial by 1100.[12] The road leading north from the bridge followed high ground, and beyond the walls, outside Bishopsgate, was lined by suburban housing on the east side of 'The Moor'. The medieval bridge occupied virtually the same site as its Roman predecessor and was one of the most obvious and powerful symbols of London. This was especially so from the late twelfth century onwards, when it was rebuilt in stone in an operation closely associated with the growth of the citizens' collective identity and of their communal government under the mayor. The rebuilding of the bridge, and the creation of an endowment to maintain it, was perhaps the most impressive enterprise undertaken by the citizens of medieval London.[13]

Immediately to the west of the walled city was another stream, the Fleet, flowing south into the Thames (see Figure 2). During the twelfth

[9] See Bateson, 'Municipal collection', 483–4, for an early thirteenth-century record of a group of river-frontage properties where both lanes and gates occur.

[10] H.T. Riley (ed.), *Liber Custumarum*, Rolls Series, 2 vols (London, 1860), i, 444–53.

[11] For the evolution of the river frontage, see T. Dyson, *The Medieval London Waterfront* (London, 1989); D. Keene, 'New discoveries at the Hanseatic Steelyard in London', *Hansische Geschichtsblätter*, 107 (1989), 15–25.

[12] M. Carlin, *Medieval Southwark* (London, 1996), 1–19, reviews these developments.

[13] For the endowment and a recent account, see V. Harding and L. Wright (eds), *London Bridge: Selected Accounts and Rentals, 1381–1538*, London Record Society, vol. 31 (London, 1995). See also D. Keene, 'London Bridge and the identity of the medieval city', in D. Calabi and C. Conforti, *I Ponti: forma e costruzione dall'antico all'architettura del ferro* (Milan, forthcoming 2001).

century the Fleet appears to have been navigable, at least by small vessels and at high tide, to a point just north of the city.[14] During the thirteenth century, on account of silting, rubbish dumping and encroachment, the limit of navigation retreated towards the Thames.[15] The Fleet had tributaries, at least one of which powered a mill. West of the Fleet the ground rose again to the area now served by Fleet Street, the Strand and Holborn. In the eighth century there had been an extensive trading settlement there and by the twelfth century a populous suburb had re-emerged. There were several minor streams in the more low-lying, westerly part of this suburb. Suburban settlement to the east of the city was much less extensive, in part because the ground was marshy and traversed by streams.

The secondary streams had small catchment areas and flowed relatively slowly, except after heavy rain. Their hydraulic regimes were dominated by the powerful tidal force of the Thames, which was the chief source of energy for driving mills in and close to the city. Most of these were tidal pound mills situated close to the river on streams or inlets to north and south.[16] Water impounded at high tide was released at low tide so as to work the mills. One such mill just east of the city was known as 'Crash Mill', presumably on account of its mode of operation and the noise of the gates that retained the water.[17] A tidal mill at the mouth of the Fleet apparently did not need a pound.[18] The main river had too strong a flow and too great a tidal fluctuation to be easily harnessed as a direct source of power. The discontinuous working of the tide mills meant that the city was short of milling capacity, and so the mills on the River Lea, four and a half miles (7 km.) to the east, came to be an important resource for the city's bakers.[19] London's water resources conditioned other aspects of its industrial geography in the period up to 1300. Thus, dyers and other textile-finishing trades that needed large supplies of clean water established themselves on the river frontage at the heart of the city.[20] In the twelfth century tanners, for

[14] N. Moore, *The History of St Bartholomew's Hospital*, 2 vols (London, 1918), i, 240–1.

[15] E. Williams, *Early Holborn and the Legal Quarter of London* (London, 1927), nos 220–33, 243–4; H.M. Chew and M. Weinbaum (eds), *The London Eyre of 1244*, London Record Society, vol. 6 (London, 1970), no. 353.

[16] For Southwark mills, see Carlin, *Southwark*, 55–7. The Templars' tidal mill at the mouth of the Fleet was notorious as an obstruction to navigation: Williams, *Early Holborn*, nos. 243–4.

[17] The name is first recorded (as *Crassemelne*) in 1233 (London, Guildhall Library, MS 25121/1761) and was probably identical with the mill held in 1066 by one Dodding (*Victoria County History of Middlesex*, i, 120), who in the fourteenth century seems to have been commemorated by the local place-names *Dodynghepond*, presumably the reservoir for the mill, and *Dodyngheslane* (London, Public Record Office, E326/2317). For the mill in the sixteenth century, see Barton, *Lost Rivers*, 84–5.

[18] 'Templars' Mill': Lobel, *City of London*, 95.

[19] B.M.S. Campbell, J.A. Galloway, D. Keene and M. Murphy, *A Medieval Capital and its Grain Supply*, Historical Geography Research Series, 30 (London, 1993), 80.

[20] E. Ekwall (ed.), *Two Early London Subsidy Rolls* (Lund, 1951), 83, 147, 149, 150, 184, 220, 335.

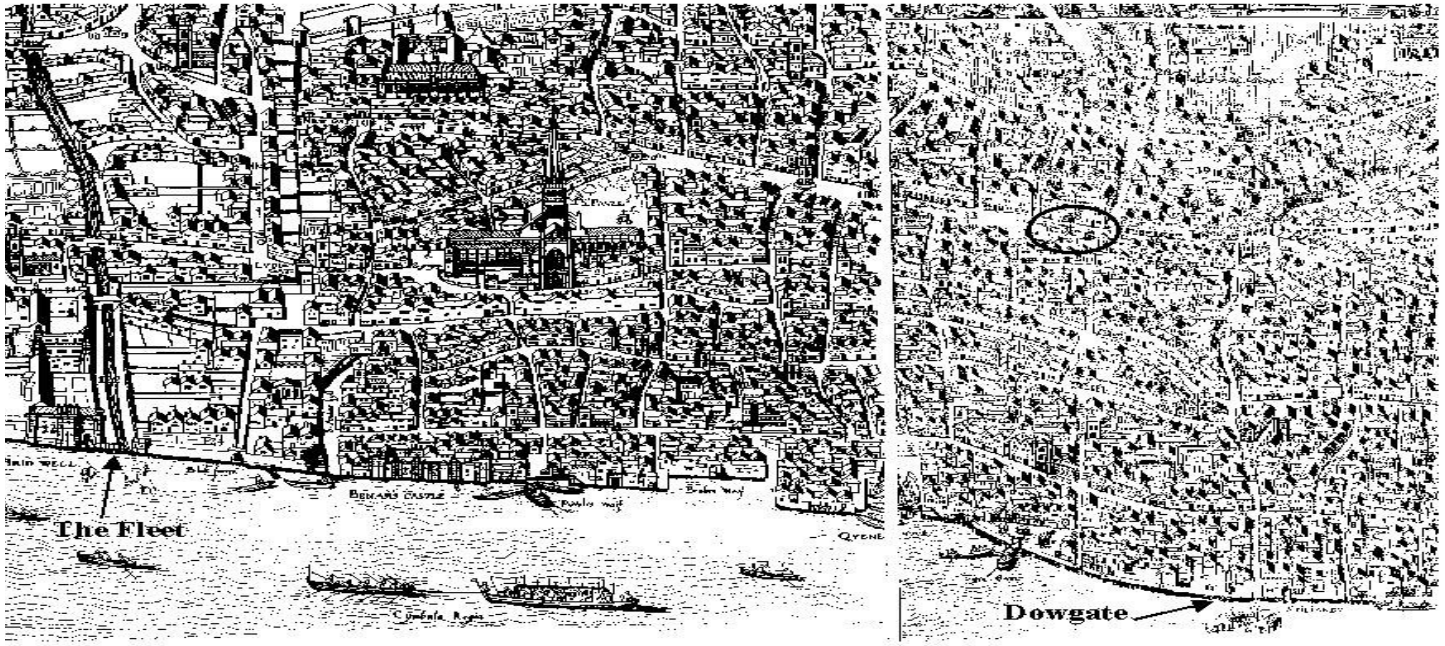

Figure 2: The western part of the walled city in the mid-sixteenth century
From the surviving plates of the 'Copper Plate Map' based on a survey of about 1550. Note the horses in the river by the Fleet and at Dowgate. The Great Conduit is shown at the east end of Cheapside ('Chepe Syde'), close to the number 38. To the west of the Conduit the drawing shows water tankards standing in the street. Much further west is the Great Cross (marked 98). By this date there was also a conduit (the 'Little Conduit') at the west end of Cheapside, where three tankards are shown. The Grey Friars' church is denoted by 102. 'Benams Castle' denotes a successor to the twelfth- and thirteenth-century Baynard's Castle, which occupied a site a little to the west and extending further inland. (*Reproduced by permission of Museum of London*).

whom the cleanliness of the water they used was less critical, worked close to Walbrook in the northern part of the city; later they moved outside the walls to The Moor and the banks of the Fleet, and also set themselves up in Southwark.[21] The navigability of the Fleet was also significant for industry, for it allowed coal and chalk to be landed at cheap suburban quays close to the city. Here a lime-burning industry developed, outside the walls, but conveniently down the hill from St Paul's, which was being rebuilt throughout the twelfth and early thirteenth century (see Figure 1).[22]

In regulating this water system, the primary concern of those who ruled London was with trade, fishing and the maintenance of flow. By the early twelfth century London controlled the Thames far beyond the small extent of its territorial jurisdiction, which was limited to the walled city and its immediate suburbs on the north bank. Upstream London's authority extended some forty miles (65 km.) to Staines, presumably because the royal reeves responsible for the city were also, as sheriffs, responsible for the county of Middlesex, whose western limit was marked by Staines. During the twelfth and early thirteenth centuries control over this stretch of the river was exercised by the lord of Baynard's Castle, at the western end of the walled city (see Figure 2), who served as the king's banner-bearer and guardian of London. Downstream the jurisdiction extended thirty-eight miles (61 km.) to Yantlet Creek and the Medway at the beginning of the Thames estuary. Here control was less exclusive, for both citizens and royal officers had an interest in ensuring that ships and merchants approaching London from overseas did not land their goods at quays other than those in the city. By the early twelfth century 'New Weir', close by Yantlet Creek, marked the limit of the city's jurisdiction for this purpose. Along this stretch of the river it seems that the keeper of the Tower of London, at the eastern end of the city, exercised special control over weirs, although by charters of 1197 and later the king gave up that right to the citizens. These complex interests in the administration of the river continued to cause problems and it seems not to have been until the 1340s that the right of the citizen community to regulate its entire length below Staines was unambiguously expressed.[23] The citizens and other authorities ensured that fishing weirs (often called 'kiddles') did not obstruct navigation and at the same

[21] D. Keene, 'Tanners' widows, 1300–1350', in C.M. Barron and A.F. Sutton (eds), *Medieval London Widows, 1300–1500* (London, 1994), 1–28; Carlin, *Southwark*, 178.

[22] For 'Limeburners' Lane' and 'Seacoal Lane', see Lobel, *City of London*, 80, 93. Materials for rebuilding the cathedral were probably landed near there in the early twelfth century: M. Gibbs (ed.), *Early Charters of the Cathedral Church of St Paul, London*, Camden 3rd series, vol. 58 (London, 1939), no. 34.

[23] W.deG. Birch (ed.), *The Historical Charters and Constitutional Documents of the City of London* (London, 1887), 9, 13, 26, 54, 132; Bateson, 'Municipal collection', 485–6, 495–9, 725; R.R. Sharpe (ed.), *Calendar of Letter-Books Preserved among the Archives of the Corporation of the City of London* [hereafter *Letter-Books A* to *L*] (London, 1899–1912): *Letter-Book F*, 108, 111.

time conserved the stocks of freshwater fish which made an important contribution to the Londoners' diet. Periodically, fishing nets whose gauge was too small were confiscated and burned publicly in Cheapside, the city's principal market street which ran east from St Paul's (see Figure 2).[24]

In controlling the running water within the city the authorities were primarily concerned to maintain the flow, and so prevent flooding and avoid pollution and smell. Those living or working near the Walbrook, the Fleet and the great defensive ditches immediately outside the city walls (which were at least partially full of water) commonly threw their rubbish in them. Ordure, stable sweepings and dead animals posed particular problems, while butchers' waste was both a notorious cause of congestion in drainage channels and visual offence. From time to time concerted action was required. In 1288, for example, the authorities ordered that Walbrook be entirely cleared of dung, rotten matter, and other obstructions and nuisances, and that at every house on the stream between The Moor and the Thames gratings should be installed (or reinstalled), presumably so as to prevent the larger items of rubbish being flushed down house drains into the streams.[25] As ground levels in the city rose, the result of continual digging and rebuilding as well as the deposition of rubbish, so streams such as Walbrook gradually disappeared from view. The strong ebb flow of the Thames, however, was a powerful cleanser. Thus in 1309 householders were ordered not to dump their domestic rubbish in the street outside their houses, but to carry it out of the city or to the Thames,[26] where presumably it would be either washed away or loaded into dung boats which would convey it for spreading as manure on fields at a distance from London.[27] A good deal of rubbish was also dumped at the water's edge in order to make up the ground as new quays were extended into the river. Later the city's butchers were assigned a jetty in the Thames, known as 'butchers' bridge', from which they were to dispose of the entrails from slaughtered beasts.[28] Thus at low tide a good deal of noxious matter was revealed on the foreshore, including entrails and the bodies of drowned persons, especially in the backwaters between projecting quays where the river's

[24] *Liber Custumarum* i, 39–42; T. Stapleton (ed.), *De Antiquis Legibus Liber: Cronica Maiorum et Vicecomitum Londoniarum* (London, 1841), 115–16; H.T. Riley (ed.), *Memorials of London and London Life in the XIIIth, XIVth, and XVth Centuries* (London, 1868), 57, 107, 135; *Liber Albus* i, 498–514. For nets, constructions and other things in the river, see L. Wright, *Sources of London English: Medieval Thames Vocabulary* (Oxford, 1996).

[25] *Letter-Book A*, 212–13. For city cleaning generally, see E.L. Sabine, 'Latrines and cesspools of mediaeval London', *Speculum*, 9 (1934), 303–21; idem, 'City cleaning in mediaeval London', *Speculum*, 12 (1937), 19–43; D. Keene, 'Rubbish in medieval towns', in A. Hall and H. Kenward (eds), *Environmental Archaeology in the Urban Context* (London, 1982), 26–30.

[26] Riley, *Memorials*, 67–8.

[27] The limited evidence for the use of London's wastes to fertilize the surrounding fields in this period is discussed in Campbell *et al*., *Medieval Capital*, 134.

[28] E.L. Sabine, 'Butchering in mediaeval London', *Speculum*, 8 (1933), 335–53.

scouring effect was weak.[29] Moreover, the lord of Baynard's Castle enjoyed the privilege of drowning traitors within his jurisdiction by binding them to a post in the river for the duration of two tides.[30]

Many householders used this grim and filthy foreshore environment as a source of water for domestic and other purposes. In the 1270s the lanes between Thames Street and the river were ordered to be kept open so that men on foot and on horseback could freely get to the water.[31] It was common to ride horses along the foreshore and into the river, presumably for pleasure and to clean and refresh the beasts. Sometimes the riders were thrown off and drowned.[32] The mid-sixteenth-century map of London shows horses being watered on the foreshore and two packhorses near Dowgate which seem to be laden with containers for carrying water back up into the city for sale (see Figure 2). In the twelfth and thirteenth centuries the occupation of 'waterleader', one who carried water for sale to householders, was commonly recorded, and in 1350 the authorities standardized the charges of the waterleaders who carried water by cart from Dowgate or Castle Baynard to Cheapside and other parts of the city.[33] For those on foot the best, but also the most dangerous, time to get clean water from the river was at high tide. Men and women who were drawing water in buckets and earthen pots from the quays when the river was in flood are recorded among the drowned.[34] One of them fell off *Lavenderbrigge*, the jetty where laundresses habitually worked at washing clothes. Londoners also used the river and the city ditch for washing their bodies, and occasionally drowned while doing so.[35] No such cases are recorded for the Fleet or Walbrook, which presumably were too filthy or too narrow for the purpose.

By the mid-thirteenth century bath-houses providing hot baths in return for payment had appeared in the waterfront district and were commonly associated with vice. *Bathestereslane* ('the lane of the female bath-keepers'), close to Dowgate and recorded by 1246–47, commemorated the women who ran these establishments.[36] In a matrimony dispute of 1292–93 the man, Elias of Suffolk, claimed that his marriage to Alice could not be solemnized since he had had carnal relations with Christine, a relative of hers within the prohibited degrees.[37] Those relations had taken place in a common bath-house near the Tower of

[29] For a fifteenth-century example of this problem, see *Letter-Book L*, 180.
[30] *Liber Custumarum* i, 150.
[31] *Letter-Book A*, 218.
[32] Chew and Weinbaum, *Eyre 1244*, nos. 20, 27; R.R. Sharpe (ed.), *Calendar of Coroners Rolls of the City of London A.D. 1300–1378* (London, 1913), 264.
[33] E. Ekwall, *Early London Personal Names* (Lund, 1947), 185; Riley, *Memorials*, 254.
[34] Chew and Weinbaum, *Eyre 1244*, 42; Riley, *Memorials*, 6; Sharpe, *Coroners Rolls*, 100, 253.
[35] Riley, *Memorials*, 7; Sharpe, *Coroners Rolls*, 127, 190.
[36] E. Ekwall, S*treet-Names of the City of London* (Oxford, 1965), 111–12.
[37] N. Adams and C. Donahue (eds), *Select Case from the Ecclesiastical Courts of the Province of Canterbury* c.*1200–1301*, Selden Society, 95 (London, 1981 for 1978–9), 355–61.

London where it had been witnessed by several men, one of them a clerk, and by two female bath-house workers. Elias and Christine were in one tub (according to one witness) and two of the men were taking baths in the same room. One of the female attendants said that she too was in a bath, wearing a linen shift. After their bath Elias and Christine went naked into a little room off to one side, where there was a bed in which they had sex in view of the others. Two further male witnesses to this claimed that they were present resting in a bed together, along with another man and several unknown people lying in beds. Elias, Christine, the principal witnesses and one of the attendants had known each other for some years, meeting and dining together in London and the country and perhaps in other bath-houses. The whole event, involving people from apparently well-established families in London, Essex and Suffolk, suggests a revival of the sociability which had been associated with collective bathing in antiquity and which despite a degree of survival into the early medieval period is thought then to have been suppressed.[38] The late thirteenth-century attempt to drive prostitution outside the city walls probably encouraged the development of bath-houses and brothels on the south bank of the river, where they were later a well-known feature.[39]

Many Londoners probably used the suburban streams for domestic water supplies, but many more, living in the crowded centre of the city, lacked easy access to clean streams or to the river. For many of these citizens wells probably provided a better and more reliable source of water than the waterleaders. It is remarkable that in a city as large and densely populated as London wells made such an important (though unquantifiable) contribution to the water supply. In the Roman city, which was probably less populous than its successor in 1300 but where there was a stronger culture of providing public facilities, the water supply system was remarkably similar. Archaeologists have found no trace of a Roman aqueduct or unified public water supply, but much evidence of wells, many of them concentrated in the same localities as in the medieval city. Wooden water pipes have been found in some central parts of the Roman city, but it is thought that they were fed from springs or wells near by rather than from an aqueduct.[40] Even in Italy, many town-dwellers in ancient times depended upon wells rather than on the public aqueduct for their water.[41] The clue to this plentiful supply of well and spring water in London lies in the geology of the city and its

[38] Cf. Squatriti, *Water and Society*, 52–63.
[39] *Letter-Book A*, 218, 220; Carlin, *Southwark*, 209–29.
[40] J. Wacher, 'The water supply of Londinium', in J. Bird, H. Chapman and J. Clark, *Collectanea Londinensia: Studies on London History and Archaeology Presented to Ralph Merrifield*, London and Middlesex Archaeological Society Special Paper 2 (London, 1978), 104–8; T. Wilmott, 'Excavations at Queen Street, City of London, 1953 and 1960, and Roman timber-lined wells in London', *Transactions of the London and Middlesex Archaeological Society*, 33 (1982), 1–78; D. Perring, *Roman London* (London, 1991), 10–11.
[41] Squatriti, *Water and Society*, 21–3.

environs, where post-glacial gravel terraces overlie impermeable clay and are capped by a bed of permeable brick earth. The gravel thus held a substantial reservoir of water. Moreover, the surface of the clay undulates, and in areas where it is highest the water was close to ground level and fairly readily accessible by digging a well. These deposits had been eroded by streams, and where the interface of the gravel and clay was exposed the water issued forth as springs. These supplies did not gush, but were steady, consistent and available in many localities. In the twelfth century the three well-known springs of London with their 'sweet, healthy, and clear water', lay on the outskirts of the city. In the sixteenth century two of them were still in use, providing clean water within carefully-constructed stone surrounds, but the third, along with many lesser suburban springs, had become filthy or had expired as a result of the increased density of settlement and the rise in ground level.[42] Within the walls place-names such as Monkwell Street and the church of St Olave Upwell (on sloping ground above Walbrook, close to a similar location where many Roman and medieval wells have been found) denote wells or springs which were once visible and perhaps generally accessible to the public, but which seem to have disappeared from view well before the sixteenth century.[43] Throughout London clean, flowing water became less visible and less available as the city grew. The parish church of St Margaret Lothbury, standing beside Walbrook, provides a nice example of this development, for in the early thirteenth century it was sometimes known as *Froscherch*, after the frogs who lived in the clear water nearby. Frogs presumably could not survive in the later dryer and more polluted conditions of the neighbourhood, and the name dropped out of use.[44] In striking contrast, a church in a street sloping south from Cheapside was already by 1179 known as 'the foul church' (*lafullecherche*) after the wet and filthy conditions in the street.[45]

Most wells lay within private properties and would not have been accessible to those who did not dwell there. Some thirteenth-century wells were said to lie in the yards (*curiae*) or gardens of their owners,[46] and when those properties were subdivided the well came to be used by the adjoining households.[47] In an early fourteenth-century case a man assigned to his sister the great hall of his house, along with the right to draw water from a well by the door of the hall; a dispute arose later

[42] Holy Well (now Haliwell), Clerkenwell, and St Clement's Well (in the Strand): *Stow, Survey*, i, 15, 272–3; ii, 220.
[43] Ekwall, *Street-Names*, 89; Lobel, *City of London*, 91.
[44] Guildhall Library, MS 25512, fos 4, 7.
[45] D. Keene and V. Harding, *Historical Gazetteer of London Before the Great Fire, I, Cheapside* (Cambridge, 1987), no. 104/0.
[46] M. Weinbaum (ed.), *The London Eyre of 1276*, London Record Society, vol. 12 (London, 1976), 6; Chew and Weinbaum, *Eyre 1244*, 49; *Letter-Book B*, 277.
[47] For such arrangements in sixteenth- and seventeenth-century houses, see J. Schofield, *Medieval London Houses* (New Haven, 1995), 117–18 and Fig. 75. For shared rights to wells, cf. Squatriti, *Water and Society*, 30–1.

when the brother's successor in the property blocked the entry to the hall.[48] A large house in Bow Lane, which between the twelfth and the sixteenth centuries was inhabited by a succession of leading mercantile families, appears to have been served by a well in the yard at the rear. In the seventeenth century, as the density of housing increased, that part of the property came to be known as Well Yard, around which there were five separate houses, each of which drew water from the well.[49] These cases indicate that wells, which were expensive to construct, were associated with the more substantial houses.[50] From the twelfth and thirteenth centuries onwards the street frontages were occupied by rows of smaller houses of two or more storeys, which provided accommodation for shopkeepers and artisans, as well as for poorer people in upper rooms. These houses generally had little if any yard behind them, and so their occupants can rarely have owned or had access to wells. They presumably carried water into their houses through the street door and depended heavily on the waterleaders. In the fifteenth century such houses were often equipped with lead cisterns in the kitchen for storing water.[51]

Up to the late thirteenth century wells seem generally to have been constructed of timber, sometimes by employing disused barrels stacked one upon another, a form of well lining also used in Roman London. From 1300 onwards stone-lined wells became more common,[52] part of an extended process by which the city's physical structure became increasingly durable. The common Latin term for well (*puteus*) could also denote any pit or hole in the ground, and one well made of barrels was said to have been constructed for use as a latrine (*cloaca*).[53] Latrines or cesspits must often have been close to wells in backyards, and so would sometimes have polluted the water supply. In houses on the street frontage, latrine pits serving the several households on the floors above were often accommodated within the cellar,[54] which would have prevented, or at least inhibited, the situation of a well within the same space. London building regulations of the thirteenth century, however, seem to have been concerned less with the risk that latrine pits would pollute the wells than with their effect in softening the subsoil and undermining the foundations of adjacent buildings. Thus pits were to be set at least two-and-a-half feet from a neighbour's boundary if lined with stone and three-and-a-half if not,[55] and stone construction was employed

[48] H.M. Chew and W. Kellaway (eds), *London Assize of Nuisance, 1301–1431*, London Record Society, vol. 10 (London, 1973), 46.
[49] Keene and Harding, *Historical Gazetteer*, no. 105/23A.
[50] As was also the case in early medieval Italian towns: Squatriti, *Water and Society*, 26.
[51] For an example, see Keene and Harding, *Historical Gazetteer*, no. 95/4D.
[52] Schofield, *London Houses*, 117.
[53] *Letter-Book B*, 277.
[54] For a late thirteenth-century example, see Keene and Harding, *Historical Gazetteer*, no. 105/14.
[55] *London Assize of Nuisance*, xxiv-xxv.

for cesspits earlier than for wells. On the other hand, latrine pits were rarely as much as three metres deep and perhaps did not often penetrate the water-bearing gravel. The wells uncovered by archaeologists were generally deeper than that, while thirteenth-century descriptions record wells as being five or six barrels deep, that is perhaps as much as twenty-nine feet (9 m.).[56]

Wells were a serious risk to life and limb. Children fell into them; adults, stunned by the winding gear or pulled down by the rope, suffered the same fate; men died of suffocation while attempting to clean them out, in one case, it was said, from the fumes given off by the barrels lining the well. As is to be expected, the river was even more dangerous. Of almost 100 deaths by water recorded for thirteenth- and fourteenth-century London, about two-thirds occurred in the Thames. About half of those involved falling out of a boat, while the remainder were occasioned by falling off a jetty, a quay, London Bridge, or a horse being ridden in the river. Deaths in wells, however, accounted for almost a fifth of the total, a clear demonstration of the large number of wells in the city. About the same proportion of deaths by water were caused by scalding in breweries and dyehouses, and about half as many by drowning in the city ditch. The absence of recorded drownings in the Fleet and other secondary streams is striking, and probably reflects the reality of everyday experience. It seems that in the fourteenth century the proportion of deaths in the river, and especially those occasioned by falling from a boat, significantly diminished, perhaps indicating that the fall in population, sharp in London as elsewhere, reduced crowding on and close to the river.[57]

In addition to its fundamental, utilitarian contribution to the commerce, nourishment and health of London, water played an important part in the city's culture of recreation and pleasure, not only in the relatively private indulgences of the bath-house. According to fitz-Stephen in the 1170s, the young men of the city at Easter engaged in the sport of water jousting on the river. Standing in the prows of small boats they aimed to strike with a lance a shield fixed to a pole in midstream without falling into the water. Crowds watched the sport from London Bridge and from the upper rooms of houses on the waterfront. He notes that the springs of the suburbs were frequented by the scholars and young people of the city. As well as providing simple pleasure, these springs were also a focus for religious devotion. One of them, close to the road approaching Bishopsgate and so perhaps useful for watering beasts, was known as 'Holy Well' and in the mid-twelfth century a house of nuns had been founded nearby. Another was 'the well of the clerks',

[56] *Letter-Book B*, 276–7.

[57] Statistics based on reports to the coroners recorded in Chew and Weinbaum, *Eyre 1244*, 10–72; Weinbaum, *Eyre 1276*, 3–81; Sharpe, *Coroners Rolls*; *Letter-Book B*, 256–81.

the memory of which is preserved in the place-name Clerkenwell, where in the mid-twelfth century two religious houses were established.[58] The 'clerks' of the well were perhaps the scholars of the city. Religious considerations apart, such peripheral locations with an open aspect and good supplies of drinking water provided ideal sites for new religious houses. There were several other springs near Clerkenwell, one of them known by the late twelfth century as 'Skinners' Well', where in the late fourteenth and early fifteenth centuries, the parish clerks of the city regularly put on dramatic performances. In 1408 the 'great play' put on there at the feast of Corpus Christi lasted for eight days. Such activities may have expressed a continuing tradition of seasonal religious ritual at the wells originating in the twelfth century or before. In the sixteenth century a pool near Holy Well was known as 'Perilous Pond' on account of the young men who drowned there.[59] Certainly, visits to suburban springs continued to be an important recreation for Londoners into the mid-nineteenth century, although as the city grew these sites could only be found further and further from the city centre.

Spring visiting was one way in which the youth of the city could legitimately escape the everyday, disciplined environment of family, household and shop. It also provided highly-valued sweet air and water, which in the crowded heart of the city were in increasingly short supply. By the 1230s, when London's population may have been 50,000 or more, the state of affairs appears to have become critical and the citizens instituted a supply of water drawn from pure springs well outside the city. It may also have been the case that the civic government had achieved the degree of self-confidence and effectiveness which enabled it to undertake such projects for reasons of status and pride. Whatever the explanation, this was a very early instance for England of the civic provision of piped water, a facility hitherto associated with palaces and monastic houses where by the mid-twelfth century some sophisticated systems had been constructed.[60] In London the royal palace of Westminster had enjoyed a conduit system, drawing water probably from the area now occupied by Hyde Park, from at least as early as 1169–70, and the installation of a new supply at Westminster in 1234[61] may have prompted or facilitated the construction of the citizens' system three years later. The purity of the water was evidently a matter of concern, for the springs they used as a source lay well beyond the suburban limits,

[58] *Stow, Survey* i, 220, 227; Brooke and Keir, *London*, 329–33.

[59] Williams, *Early Holborn*, no. 239; *Stow, Survey* i, 15–16; ii, 272–3; A.H. Thomas and I.D. Thornley (eds), *The Great Chronicle of London* (London, 1938, repr. 1983), 87, 409.

[60] For the sophisticated twelfth-century piped water systems at Canterbury and Winchester, serving cathedral priories and a bishop's palace, see M. Biddle (ed.), *Winchester in the Early Middle Ages: An Edition and Discussion of the Winton Domesday* (Oxford, 1976), 284; W. Urry, *Canterbury Under the Angevin Kings* (London, 1967), 204–6.

[61] R.A. Brown, H.M. Colvin and A.J. Taylor, *The History of the King's Works*, vol. 1, *The Middle Ages* (London, 1963), 549–50.

close to the modern Bond Street Underground station.[62] There, in 1237, the citizens, with the support of the king, acquired a plot of land containing a conduit head, described as a *castallum aut piscina*, which apparently contained a reservoir or settling tank into which the surrounding springs were fed. This site, one advantage of which was that it occupied a relatively high piece of ground, lay almost two and a half miles (some 3.8 km.) from the centre of the city as the crow flies. According to later evidence (which may not represent the thirteenth-century situation since the system was altered and extended on several occasions), the pipes of timber and lead followed a more circuitous line amounting to 4.5 km. That allowed a pipe on or close to the surface to follow a continuous fall over much of the route. Crossing the land now occupied by the National Gallery, the pipe then ran behind the suburban houses on the north side of the Strand and Fleet Street. Initially, it appears not to have served those houses, but from the fifteenth century onwards it was the practice of the householders there to tap the city's pipe with pipes of their own.[63] The main pipe then descended into the Fleet valley, crossed the stream and ascended up into the city. It appears to have passed west and north of St Paul's (as it certainly did by the fifteenth century) and then along the full length of Cheapside to a conduit house, later known as the Great Conduit, at the east end of the street. The finance for the project included £100 given in 1237 by the merchants of Picardy in return for trading privileges in the city.

From the source to the Great Conduit the overall fall in the city's pipe at street level was about 10 m., a slope of no more 0.22 per cent. The water would have flowed very slowly and there must have been particular problems of leakage in the Fleet valley, where the water pressure was greatest. To judge from later records, inspection points and taps were provided at intervals along the pipe to allow for cleansing and the release of air. This system, presumably much renewed, continued to work up to the Great Fire of 1666. In the 1250s the Franciscan Friars, with the support of the king and the citizens, installed a similar system to supply their convent in the north-west corner of the city walls (see Figure 2). That drew its water from a closer group of springs to the west of the city and via pipes which passed beneath the Fleet near Holborn Bridge: in this case the overall fall was more effective, at 0.36 per cent. At several points, where it passed below Newgate for example, this pipe was set well below ground level, presumably so as to provide an even

[62] For this system and the route followed by the pipes, see Keene and Harding, *Historical Gazetteer*, no. 105/36 and A.M. Davies, 'London's first water system: a topographical study', *Transactions of the London & Middlesex Archaeological Society*, n.s. 2 (1913), 8–59. For representations of the Great Conduit in Cheapside, see Fig. 2 and I. Archer, C. Barron and V. Harding, *Hugh Alley's Caveat: The Markets of London in 1598*, London Topgraphical Society, vol. 137 (London, 1988), 65, 90–1 and Plate III.

[63] Cf. *Letter-Book L*, 160; F.H.W. Sheppard (ed.), *Survey of London*, vol. 36, *The Parish of St. Paul Covent Garden* (London, 1970), 31.

slope. This is one of several indications that the system may have represented a technical advance on the city's conduit of two decades earlier. The Dominican Friars seem also to have acquired a conduit during the 1250s: their house was close to Holborn Bridge and so may have drawn on the Franciscans' supply.[64]

Only the city's piped water system, however, was accessible to the public. During the fourteenth and fifteenth centuries additional springs were fed into it and the system of pipes was extended to other parts of the city, where more conduit houses were built. Since the population of London fell in that period, the provision of drinking water for householders presumably improved. It was not until the late sixteenth and early seventeenth centuries, when the city was at least twice the size it had been in 1300, that radically different methods of supplying piped water were adopted. These included mechanical pumping from the Thames, and the city's first substantial aqueduct, 'the New River' which brought in water from many miles away. These systems for the first time allowed substantial numbers of households to be supplied directly by pipe.[65]

The Great Conduit, not so called until the fourteenth century, was probably built in the 1230s or 1240s. The parts of it revealed by Museum of London Archaeologists in a recent excavation in Cheapside are consistent with that date, and the structure is first mentioned in a written record in 1261. The conduit was a substantial building measuring about 12 m. long by 5 m. wide. In the 1280s it seems to have risen to the height of the first floor of houses nears near by. Inside, it contained a reservoir, lined with lead according to a sixteenth-century witness, from which water was probably drawn off by a number of brass taps. The taps were controlled by a group of 'wardens of the conduit', unpaid civic officers elected by the householders of the vicinity.[66] Sixteenth-century drawings (cf. Figure 3) show the Great Conduit, remodelled in the fifteenth century, as an imposing and partially battlemented structure. It was described as 'castellated', a style presumably thought appropriate forsuch a work, and recalling the term used for the thirteenth-century conduit head outside the city, which was perhaps an equally imposing structure. The Great Conduit was a major city landmark and in the later Middle Ages played a prominent part in ceremonial processions as a station where pageants were staged. So far as we can tell, it was the earliest in a series of monumental structures which came to be erected at

[64] P. Norman and E.A. Mann, 'On the White Conduit, Chapel Street, Bloomsbury, and its connexion with the Grey Friars' water', *Archaeologia*, 61, 2 (1909), 347–56; C.L. Kingsford, *The Grey Friars of London* (Aberdeen, 1915), 48–51, 158–61. For the sites of the friaries at that time, see Lobel, *City of London*.

[65] J.W. Gough, *Sir Hugh Myddelton, Entrpreneur and Engineer* (Oxford, 1964), 24–87; B. Rudden, *The New River, a Legal History* (Oxford, 1985), 7–26.

[66] Alternatively, the taps operated vent-holes in the pipes leading from the source. The entire length of the system was controlled by the wardens of the conduit.

Figure 3: The Great Conduit and its neighbourhood in the mid-sixteenth century
From the 'Copper Plate Map' (see Figure 2). The Conduit itself appears as a substantial crenellated structure with a small tower at its west end. Water tankards stand in the street to the west of the Conduit. 'S. Tomas' refer to the church of St Thomas of Acre, which stood on the north side of Cheapside near the Conduit and was a focus of civic ceremonial. By this date the hall of the Mercers' Company occupied the street frontage and a part of the church behind. The map shows the elaborate stone front of Mercers' Hall and Chapel, erected between 1517 and 1524.

intervals along the Cheapside axis, reinforcing the identity of the street as the city's principal public space.[67]

The location of the Great Conduit raises questions concerning its purpose. Cheapside contained a busy street market as well as a great concentration of shops, bazaars, brewhouses and taverns, and so the provision there of a public water supply was highly appropriate. On the other hand, this was an area of the city known to have had a large number of wells, so that the needs of local householders, which the conduit was clearly meant to serve, may not have been especially pressing. Nevertheless, wells may have been in short supply in the immediate vicinity since the Cheapside frontages were built up to an exceptional density and height. But why was the conduit not placed

[67] For the later significance of this axis and the Great Conduit, see L. Manley, *Literature and Culture in Early Modern London* (Cambridge, 1995), 225–9.

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centrally in Cheapside, where it could most readily meet the needs of both street traders and householders? Such a central site was apparently available until 1296, when King Edward I caused to be erected there the magnificent 'Eleanor Cross' in memory of his dead queen. The answer may be that the conduit was intended as a distinctively civic charitable provision, for it stood immediately in front of the house where in 1118 the citizens' patron saint, St Thomas the Martyr of Canterbury, had been born. The citizens had been influential in acquiring that site and in establishing there a house of religious men. By the 1240s it seems that the original plan to build a basilica there in honour of the saint had been dropped, but that a chapel or church on a new plan was being built, a church later to be an important setting for civic ceremonial.[68] This work was in progress as the conduit itself was being constructed. Thus the decision concerning the siting of the Great Conduit may have been associated with a significant stage in the development of the cult of St Thomas within the city, endowing the charitable provision of water by the community of citizens with a profound religious and symbolic significance.

The needs of the poor, who of all groups in this part of the city would have had least access to fresh water, seem to have informed the enterprise. Thus in 1345 it was said that the conduit had been built so that rich and middling persons might have water for preparing food, and the poor for their drink. The rich and middling were presumably expected to drink ale or wine. By the early fourteenth century, however, commercial demands were tending to undermine the supply to poor domestic consumers. In 1310 the warden of the conduit had to swear that he would prevent brewers and fishmongers from using the water, and that he would sell the water neither by night nor by day. Soon after this, charges were levied on those who used the water in pursuit of their trade, the money to be spent on maintaining the system. By the 1330s these assessments took the form of annual rents charged at fixed rates for the use of the tankards in which water was carried away, usually by the servants of households nearby. Attempts to restrict or prevent use by brewers continued: in this part of town they were substantial men whose brewhouses probably included wells. In the fifteenth century, the system was rearranged so that brewers for a fee could draw water from one pipe, while ordinary householders drew it from another. By the mid-fourteenth century all users of the conduit appear to have paid some sort of fee, in contrast perhaps to the thirteenth century when many could have obtained water there without payment. A record of 1350 indicates that about forty-five householders then drew their water from the conduit: the equivalent number before the Black Death would perhaps have been about seventy, less than 1 per cent of all households in the city.

[68] Keene and Harding, *Historical Gazetteer*, no. 105/18.

The substantial investment in the conduit system seems to have resulted in only a small contribution of water to Londoners' needs as a whole, although it added much to the dignity of the city.

Conclusion

This brief survey has demonstrated the way in which water, its clarity and its freedom of flow was, and was perceived to be, essential to the sustenance, health and purity of London. Water also played an important part in determining the distinctive physical, biological and social character of the city's neighbourhoods. The river, in particular, was a vital force, and the ways in which it was controlled reveal much about the articulation of political power in the city and its hinterland. At the same time, water, through the dangerous processes of drawing and using it, was a serious threat to life, and the records of death by water tell us much about the way in which it was used. Water played a key role in recreation, and was the focus for various forms of socialization and religious practice. Yet as a source of pleasure, especially in the privacy of the bath-house, water was also conducive to vice. There was a fine line between cleansing and purity on the one hand and moral pollution on the other. In the city clear streams quickly became clouded and undrinkable, and blocked by the filth which it was also their purpose to carry away. Londoners can hardly have been unaware of this paradox and of water's ambiguous role. The high density of habitation and the forms of waste disposal in the city meant that over time access to pure water became increasingly difficult and a mark of status and power. Thus the provision of sweet water by pipe to a public conduit in the heart of the city in the mid-thirteenth century demonstrated the collective strength of the citizen community, as well as its charitable provision for the poor. Significantly, that provision appears to have been linked to the citizens' cultivation of their patron saint.

Piped water, however, can have supplied only a small minority of the inhabitants of the city, most of whom drew their supplies from the river and from wells. Professional water-carriers, using carts, packhorses or simply tankards on their backs were a familiar sight in the streets. This mixture of forms of supply was characteristic of both medieval and Roman London, and reflects both widespread practice in ancient and medieval Europe and, perhaps even more, the distinctive geological situation of the city. As with other aspects of the basic systems of production which have sustained London, the geological and ecological setting has played a crucial role in shaping the city's institutional and cultural framework.