



RESEARCH ARTICLE

Public services and the urban middling sort: the provision of water in Bristol, Chester and Ipswich, 1540–1640

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Abstract

This article examines the relationship between public services and the urban middling sort in provincial England from 1550 to 1640 through comparative case-studies of the finance and management of waterworks, the creation of new skilled roles and the cultural import of water systems in Bristol, Chester and Ipswich. It argues that the middling sort were vital in establishing public services and that water provision centred not only on its value as a material and financial resource, but also as an expanding source of patronage and social capital that shaped and entrenched the emergence of middling groups in society.

This article examines the relationship between public services and the urban middling sort in provincial England between 1540 and 1640 through comparative case-studies of water systems in Bristol, Chester and Ipswich. It investigates the development of water provision from monastic to civic management, how it was financed, how developments in water provision led to the creation of new roles and the part water provision played in civic culture and the commodification of resources. These areas of investigation help to identify both what is distinct about the public services offered in these urban centres, and the role of the urban middling sort in their provision. This article argues not only that the middling sort were key players in implementing new water systems, whether as civic office-holders or skilled tradesmen, but also that such developments in turn shaped and entrenched the emergence of middling groups in society through opportunities for social mobility. The middling sort, acting either as individuals or as members of civic governing bodies, were implicated in every stage of the financing, building and management of water systems. As individuals, they often initiated the implementation of new public services, whether by approaching civic bodies and providing the necessary funds or by building the works themselves. As members of civic bodies, they offered support in the forms of leasing land, providing volunteers to act as overseers or collectors and sourcing additional expertise from elsewhere. The actions of individual members are often hard to distinguish from those of the civic body, and the resulting public

services became cornerstones of civic pride and identity. This article therefore complements historiography on urbanization, incorporation and civic culture, but also posits the important role of individual and collective members of the urban middling sort, and those aiming to rise in social rank, in developing urban space and infrastructure. As will be shown, these were not blanket developments but rather were specific to each urban centre depending on the water systems they inherited and the actions and motivations of governing bodies, skilled individuals and entrepreneurs.

Historians have noted that middling identity was forged in and confined to a specific locality, most notably a parish or town. Therefore, who comprised this middle section varied from locality to locality.¹ Additionally, historians have emphasized the precarity and instability of middling identity. Consisting of those between the upper and bottom ranks of society, the middling sort encompassed a wide range of individuals from a local elite who had access to both political power and economic capital to skilled tradesmen or minor professionals who lived independently above the level of subsistence but did not have the same access to power or capital. Upward and downward social mobility were the norm within this broad group, both across generations and within single lifetimes.² Important in mitigating this precarity were various forms of ‘association’ that proliferated in urban centres, such as trade guilds, charitable organizations and local government. Such associations provided points of contact between the upper and lower middling sort, opportunities for social advancement and increased social security.³ Whilst the middling sort have been identified as important players in state formation, urban growth and the increasing demand for public services and leisure industries, less attention has been paid to how they contributed to those services and industries, or to the materiality and infrastructure of civic space itself.⁴ This article argues that civic infrastructure projects also acted as

¹H. French, ‘Social status, localism and the “middle sort of people” in England 1620–1750’, *Past & Present*, 166 (2000), 66–99; H. French, *The Middle Sort of People in Provincial England 1600–1750* (Oxford, 2007), 30–89; J. Smail, *The Origins of Middle-Class Culture: Halifax, Yorkshire, 1660–1780* (New York, 1994), 14–17; J. Barry, ‘Introduction’, in J. Barry and C. Brooks (eds.), *The Middling Sort of People: Culture, Society and Politics in England, 1550–1800* (Basingstoke, 1994), 20–3; M. Hunt, *The Middling Sort: Commerce, Gender, and the Family in England, 1680–1780* (Berkeley, 1996), 15; A. Mitson, ‘The significance of kinship networks in the seventeenth century: south-west Nottinghamshire’, in C. Phythian-Adams (ed.), *Societies, Cultures and Kinship 1580–1850* (Leicester, 1993), 24–76.

²J. Barry, ‘Bourgeois collectivism? Urban association and the middling sort’, in Barry and Brooks (eds.), *The Middling Sort of People*, 93; C. Muldrew, ‘Class and credit: social identity, wealth and the life course in early modern England’, in H. French and J. Barry (eds.), *Identity and Agency in England, 1500–1800* (Basingstoke, 2004), 149–50; B. Waddell, ‘“Verses of my owne making”: literacy, work, and social identity in early modern England’, *Journal of Social History*, 54 (2020), 164–5; C. Davies, ‘The Woolfes of Wine Street: middling culture and community in Bristol, 1600–1620’, *English Historical Review*, 137 (2022), 412–13; K. Tawny Paul, ‘Accounting for men’s work: multiple employments and occupational identities in early modern England’, *History Workshop Journal*, 85 (2018), 26–46; I.A. Gadd and P. Wallis, ‘Introduction’, in I.A. Gadd and P. Wallis (eds.), *Guilds, Society & Economy in London 1450–1800* (London, 2002), 6. See also <https://middlingculture.com/status-calculator/>, accessed 8 Jun. 2023.

³Barry, ‘Bourgeois collectivism?’, 94; Waddell, ‘“Verses of my owne making”’.

⁴Barry, ‘Introduction’; S. Hindle, *The State and Social Change in Early Modern England c. 1550–1640* (Basingstoke, 2000); R. Tittler, *Architecture and Power: The Town Hall and the English Urban Community c. 1500–1640* (Oxford, 1991), 76; P. Borsay, ‘The English urban renaissance: the development of provincial urban culture c. 1680–c. 1760’, *Social History*, 2 (1977), 591; Davies, ‘The Woolfes of Wine Street’, 386–415; P. Slack, ‘Great and good towns 1540–1700’, in P. Clark (ed.), *The Cambridge Urban History of Britain*, vol. II: 1540–1700 (Cambridge, 2000), 363.

important forms of association in this period. The establishment of waterworks provided a point of interaction between the upper middling sort, those of more considerable wealth who held roles within civic government, and lower or aspirant middling tradesmen, who could exchange their skills for economic and social gains. Therefore, the urban middling sort's involvement in water provision centred not only on its value as a material and financial resource but also as a source of patronage and social capital that expanded the ranks of the middling sort.

The definition of 'public services' in this article follows that outlined by Manon van der Heijden of 'all public facilities provided by (semi-) governments, churches, religious organizations, civic institutions, and individual citizens' – a definition that incorporates the 'myriad agencies, institutions, corporations, and individuals who were part of the city' and vital for the development of public services.⁵ This definition collapses distinctions between public (political and religious institutions) and private (the individuals who participated in and contributed to those institutions). Whilst van der Heijden's definition was formulated in relation to early modern European cities, particularly in the Low Countries, it also speaks to the 'associational' nature of early modern English urban society and to the agency of the urban middling sort, for whom the boundaries between public and private, or 'individual' and 'collective action', were similarly overlapping and unclear.⁶ As such, van der Heijden's definition reflects the participatory nature of state formation in early modern England, which depended on the contribution of skilled individuals and amateurs in a growing network of official and voluntary roles.⁷

Links between public services, urbanization and state formation in early modern England can be found through the concept of projects and projecting, defined by Joan Thirsk as 'a practical scheme for exploiting material things' and by Koji Yamamoto as 'the commercial exploitation of knowledge and technique', particularly the 'exploitation of nature'.⁸ Projects often combined notions of public good and private profit, and relied on grants, patents and legitimation by government for their implementation. Whilst Thirsk and Yamamoto posit the importance of central government for projecting, Paul Slack has linked 'public welfare' projects to civic government and corporations. He argues that a wide range of 'projects and innovations', including waterworks, formed a 'new world of private enterprise which required public sanction and regulation' in the sixteenth and seventeenth centuries. Central to these innovations, Slack argues, was the middling sort, who not only belonged to the 'formal and informal associations' governing urban centres and provided the necessary skills, but also contributed the 'tax base which...determined the quality of public

⁵M. van der Heijden, 'Introduction: new perspectives on public services in early modern Europe', *Journal of Urban History*, 36 (2010), 271; M. van der Heijden, *Civic Duty: Public Services in the Early Modern Low Countries* (Newcastle, 2012), 13, 22–6, 32.

⁶P. Withington, 'Urbanisation', in K. Wrightson (ed.), *A Social History of England, 1500–1700* (Cambridge, 2017), 185–92; Barry, 'Bourgeois collectivism?', 84–112; P. Slack, *From Reformation to Improvement: Public Welfare in Early Modern England* (Oxford, 1998), 27, 157.

⁷Hindle, *State and Social Change*, 23–4; M.J. Braddick, *State Formation in Early Modern England c. 1550–1700* (Cambridge, 2000); E.H. Ash, *The Draining of the Fens: Projectors, Popular Politics, and State Building in Early Modern England* (Baltimore, 2017), 2, 5.

⁸J. Thirsk, *Economic Policy and Projects: The Development of a Consumer Society in Early Modern England* (Oxford, 1978), 1, 7, 8; K. Yamamoto, *Taming Capitalism before Its Triumph: Public Service, Distrust, and 'Projecting' in Early Modern England* (Oxford, 2018), 23–4.

services affordable in a town'.⁹ However, Slack did not further explore the link between waterworks and the middling sort.

Sixteenth- and seventeenth-century England witnessed extensive growth and development, particularly in urban centres. Between 1540 and 1640, there were significant changes to the powers and status of civic government as well as to the agency and identity of urban inhabitants. As Phil Withington and Robert Tittler have shown, this was represented legally in the growing number of towns that obtained charters of incorporation, and architecturally in 'the construction, conversion, or substantial rebuilding' of town halls.¹⁰ This narrative lies in sharp contrast to earlier historiographical conceptions of urbanization, in which medieval England's 'thriving communities', with the exception of London, declined throughout the sixteenth century and only recovered in the post-Restoration period.¹¹ Despite the revival of urbanization in this period, little attention has been paid to public services in early modern England, and what does exist has largely focused on London. Indeed, like older scholarship on urbanization, there is a rich and extensive body of work on medieval England's public services, and the topic is then dealt with again in the late seventeenth and eighteenth centuries when it is tied to a later 'English urban Renaissance', thereby neglecting the period 1540–1640.¹²

This article compares the development of waterworks in Bristol, Chester and Ipswich, three important port towns whose governing bodies had political, economic and legal rights conferred upon them by charters of incorporation. Bristol, the largest of the three, was granted county status in 1373 and had an estimated population of over 10,000 by 1520, which rose to 21,000 by 1700. In contrast, the smaller populations of Chester and Ipswich only exceeded 5,000 inhabitants in 1600, rising to around 9,000 by 1700.¹³ All three urban centres have good record survival, which provide insights into trade, local governance and society. The article first examines the development of waterworks across the three localities between 1540 and 1640, detailing the different ways in which they experienced the transition from monastic to civic management and finance. Secondly, the article focuses on the skills required to build and maintain waterworks, which allowed experienced but lower-status individuals to achieve the economic and political rewards of citizenship and climb the social ranks. Finally, it turns to the cultural impact of waterworks, which acted as markers of civic pride and transformed water into a commodity that was regulated by the urban middling sort. Ultimately, this article argues that public services, such as

⁹Slack, *From Reformation to Improvement*, 26–7; Slack, 'Great and good towns', 363. L. Tomory also linked waterworks to projecting in *The History of the London Water Industry 1580–1820* (Baltimore, 2017), 15.

¹⁰P. Withington, *The Politics of Commonwealth: Citizens and Freemen in Early Modern England* (Cambridge, 2005), 17; Tittler, *Architecture and Power*, 3, 11.

¹¹Withington, 'Urbanisation', 174.

¹²M.S.R. Jenner, 'From conduit community to commercial network? Water in London, 1500–1725', in P. Griffiths and M.S.R. Jenner (eds.), *Londonopolis: Essays in the Cultural and Social History of Early Modern London* (Manchester, 2005), 250–72; Tomory, *History of the London Water Industry*; C. Rawcliffe, *Urban Bodies: Communal Health in Late Medieval English Towns and Cities* (Woodbridge, 2013); D. Jørgensen, "'All good rule of the citee": sanitation and civic government in England, 1400–1600', *Journal of Urban History*, 36 (2010), 300–15; I. Fay, *Health and the City: Disease, Environment and Government in Norwich, 1200–1575* (Woodbridge, 2015); G.T. Salusbury-Jones, *Street Life in Medieval England* (Hassocks, 1975); Borsay, 'The English urban renaissance', 581–603.

¹³D. Harris Sacks and M. Lynch, 'Ports 1540–1700', in Clark (ed.), *The Cambridge Urban History of Britain*, vol. II, 384, 401, 400.

water provision, offer a lens through which to study the interconnectivity of urbanization, the development of specific industries and the emerging middling sort.

The development of water systems: from monastic to civic management

Water systems had existed in Bristol, Chester and Ipswich since the thirteenth century, constructed by monastic houses for their own use. As well as the obvious impacts of geography, topography and access to springs, medieval historians have shown that the presence and actions of monastic orders also played a vital role in water provision.¹⁴ As such, the dissolution of the monasteries from the 1530s had a significant effect on water provision. However, historians disagree over the extent to which it affected supply and development. Whilst John Lee argues that civic authorities had already begun taking over monastic water systems prior to the dissolution, Roberta Magnusson argues that collaboration was rare and that the Reformation caused an ‘abrupt disruption’ in water supplies.¹⁵ Magnusson’s narrative complements what Slack has labelled a ‘new enthusiasm’ for waterworks at the turn of the seventeenth century, when urban centres attempted ‘to fill the vacuum left by the dissolution of religious orders and fraternities.’¹⁶ Focusing on London from the late sixteenth to the early eighteenth centuries, Mark Jenner argues that subsequent developments in civic water systems saw the decline of community-organized common conduits and the rise of ‘private supply’ by ‘capitalist water companies’. Jenner posits that conduits were ‘the symbolic and moral centres’ of medieval towns that were managed and regulated by civic bodies, built and maintained by charitable donations and underpinned a variety of social and economic networks from neighbourhood gossip to water carrying, a task which often acted as ‘a form of charitable support’. According to Jenner, private supply marked a physical and symbolic shift from the ‘bonds of charity and mutual obligation’ represented by conduits, to isolated supplies fed directly into houses by capitalist companies.¹⁷

This section examines the overlapping boundaries between civic and private enterprise in Bristol, Chester and Ipswich in this period of transition from monastic to civic water provision, and complements these discussions with further examples from studies of other civic water systems. Through these provincial case-studies, it is argued that seventeenth-century developments were less striking than Jenner’s London-based account. Mutual bonds of obligation were not severed but transformed as civic bodies took over roles previously conducted by monastic houses.¹⁸ Additionally, as will be shown, the new water companies were not entirely private or capitalist but were joint ventures that required individual entrepreneurship as well as civic regulation and

¹⁴C.J. Bond, ‘Water management in the urban monastery’, in R. Gilchrist and H. Mytum (eds.), *Advances in Monastic Archaeology* (Oxford, 1993); D. Lewis, ‘“For the poor to drink and the rich to dress their meat”: the first London water conduit’, *Transactions of the London and Middlesex Archaeological Society*, 55 (2004), 46; R. Holt, ‘Medieval England’s water-related technologies’, in P. Squatriti (ed.), *Working with Water in Medieval Europe: Technology and Resource-Use* (Leiden, 2000), 88, 93.

¹⁵J.S. Lee, ‘Piped water supplies managed by civic bodies in medieval English towns’, *Urban History*, 41 (2014), 386; R.J. Magnusson, *Water Technology in the Middle Ages: Cities, Monasteries, and Waterworks after the Roman Empire* (Baltimore, MD, 2001), 33, 163, 167.

¹⁶Slack, *From Reformation to Improvement*, 68.

¹⁷Jenner, ‘From conduit community’, 254–9.

¹⁸K. Wrightson, ‘Mutualities and obligations: changing social relationships in early modern England’, *Proceedings of the British Academy*, 139 (2006), 183; Slack, ‘Great and good towns’, 364.

management, personal finances as well as civic levies, and which benefited both individuals and the wider community. This section therefore focuses on the upper middling sort, the urban elite who were ‘tied’ to a ‘town by their juridical and economic privileges’ and who had ‘duties as town inhabitants’, mostly through roles within civic government. Office-holding was a crucial aspect of middling identity and was often unpaid work, offering status rather than remuneration.¹⁹ As Leslie Tomory has argued for the London Bridge Waterworks established in 1581, the sites required for waterworks were civic property, so waterworks were dependent on corporations throughout their ‘entire history’.²⁰ Corporations could raise money via taxes and levies, but they also relied on donations, contributions and loans from wealthy individuals to fund civic projects, thereby creating or reinforcing ties of mutual obligation between the urban community and the middling sort. In this sense, the new companies, and the entrepreneurs and financiers at their helm, correspond with Yamamoto’s description of ‘projectors’ who had ‘symbiotic relationships with the government’ that aided their own private profit as well as the ‘commonweal’ or ‘public good’.²¹

In Bristol, the existence of numerous wells and springs along with collaboration between monastic orders and local government meant a civic water supply was achieved in 1376. Together, the city and the Carmelite friary drew up a contract with plumber Hugh White, who was to be paid £10 a year to maintain the system. Bristol also made agreements with its Augustinian, Dominican and Franciscan friaries over their supply and conduits. Following the dissolution, the full cost and responsibility for maintenance fell on the city, with funds obtained by way of rents, fees for freedom and fines.²² Civic accounts show that whilst Bristol did not implement a new water system, the city spent considerable amounts on maintaining and extending the existing one. For example, in 1577–78 extensive work was undertaken to the Key Pipe, employing labourers, hauliers, masons and a plumber to dig trenches, solder and bury pipes leading to the conduits.²³ The collaboration in Bristol between civic government and monastic orders in water provision was also reflected in Exeter. Bristol and Exeter were both significant medieval towns and by 1525 were among the five largest in southern England. With growing populations came the need to provision them with fresh water and so Bristol and Exeter found early solutions to this problem in the form of common conduits, shared or aided by monastic orders, which served the whole town before the advent of new technology at the end of the sixteenth century.²⁴ Other urban centres that obtained early water supplies likewise did so with the help of monastic orders.²⁵

¹⁹J. Barry, ‘Civility and civic culture in early modern England: the meanings of urban freedom’, in P. Burke, B. Harrison and P. Slack (eds.), *Civil Histories* (Oxford, 2000), 186, 195.

²⁰Tomory, *History of the London Water Industry*, 382.

²¹Yamamoto, *Taming Capitalism*, 15.

²²Bond, ‘Water management’, 57–8; Temple Local History Group, *An Account of St John’s Conduit: Bristol’s Medieval Water System* (Bristol, 1984), 2; Magnusson, *Water Technology*, 33–4; Lee, ‘Piped water’, 374.

²³Bristol Archives (BA), financial records of Bristol City Council and its predecessors (F) AU/1/11, mayor’s audit book 10, 152–61; M.D. Lobel, ‘Bristol’, in M. D. Lobel and E.M. Carus-Wilson, *The Atlas of Historic Towns*, vol. II (1975), 19.

²⁴J. Barry, ‘The organisation of burial places in post-medieval English cities: Bristol and Exeter c. 1540–1850’, *Urban History*, 46 (2019), 598; M. Stoye, *Water in the City: The Aqueducts and Underground Passages of Exeter* (Exeter, 2015), 7, 50, 141–2; Slack, ‘Great and good towns’, 369.

²⁵Holt, ‘Medieval England’s water-related technologies’, 99; J.H. Thomas, *Town Government in the Sixteenth Century* (London, 1933), 59; Magnusson, *Water Technology*, 34; Rawcliffe, *Urban Bodies*, 178.

In contrast, Chester and Ipswich were much smaller towns that only witnessed significant growth over the course of the sixteenth century. In Chester, the Benedictine, Dominican, Franciscan and Carmelite monastic houses retained sole rights to water supply prior to the dissolution, with civic authorities only co-opting, extending and diverting the systems after the dissolution to meet the demands of the inhabitants. In Ipswich, the town and its Augustinian and Dominican monastic orders similarly did not collaborate on water supply. However, inspired by the conduits of their monastic houses, the town did build its own conduit in the fourteenth century, but it 'served only the town centre' and was frequently in disrepair. Following the dissolution, the civic body of Ipswich acquired the Dominican friary's conduit and used it to facilitate a workhouse and alms-house complex.²⁶ In both Chester and Ipswich, it was not until after the dissolution of the monasteries that a water supply for the whole town was embarked upon. The delay allowed for the implementation of new technology, including pumps and water towers, which appeared in England from the late fifteenth century but became increasingly used in the seventeenth century.²⁷ Conduit systems relied on 'gravity-flow' technology: airtight pipes, made of lead, earthenware, wood or a combination of the three, which were used to force water from a conduit head erected at the source, usually a spring or a well, to a cistern that collected the water at the point of access.²⁸ New technology consisted of mechanisms such as pumps and water towers that could convey far greater amounts of water and feed larger piped systems not only to conduits but to individual houses. Whilst Chester and Ipswich sought out this new technology and established piped supplies in the early 1600s, Bristol did not pipe water into people's houses until 1695, during a second wave of waterworks enthusiasm and advances in technology at the end of the century.²⁹

In 1614, the civic assembly of Ipswich raised and approved the idea to supply a new conduit as well as private pipes.³⁰ In July 1614, a survey of the water sources was carried out, and four assembly members were sent 'through the strete' to 'conferre' with householders and enquire 'what fine' and 'yerelie rent' they would be willing to pay for a piped supply.³¹ Whilst this was a civic endeavour, the burden of financing the system fell in the first instance to three private citizens. The civic records note that 'because the towne want monie', Portmans meadow would be 'mortgaged' for £200 by William Bloyes, Richard Martin and Tobias Bloss, which they would 'lend or borrowe & laie out' to the town.³² Bloyse, Martin and Bloss were all 'leading townsmen', serving as portmen, or governors, of the town and holding a variety of other civic offices which, along with their obvious wealth, marks them out as members of the upper middling sort.³³

²⁶D. Allen, 'The public water supply of Ipswich before the Municipal Corporations Act of 1835', *Proceedings of the Suffolk Institute for Archaeology & History*, 40 (2001), 33, 36–8, 49.

²⁷Magnusson, *Water Technology*, 169.

²⁸Lee, 'Piped water', 372. Holt, 'Medieval England's water-related technologies', 92.

²⁹www.bristolwater.co.uk/about-us/our-story/our-history, accessed 14 Oct. 2021; Borsay, 'The English urban renaissance', 588; Slack, 'Great and good towns', 369.

³⁰Allen, 'Public water supply', 40–1.

³¹Suffolk Archives (SA), Ipswich Borough Archives (C) 4/3/1/4, assembly book, fols. 135r, 134v.

³²SA/C/2/2/2/1, court book, 589.

³³N. Bacon, *The Annalls of Ipswicke. The Lawes Customes and Government of the same*, ed. W.H. Richardson (Ipswich, 1884), 419, 430, 439; Allen, 'Public water supply', 41.

The original leases stipulate that each property would be supplied by means of a lead pipe and a tap. The supply was for domestic purposes only and was not to be shared. The loan repayment, maintenance costs and profits were to be raised through leasing pipes to inhabitants. In 1615, pipes were leased at an installation fine of £5 and annual rent of 5s.³⁴ After 1625, the rent increased to 6s 8d, possibly reflecting the growing cost of maintenance, as a 'lesser pipe' was added to the 'mayne pipe' and as the system grew older, or due to profiteering.³⁵ Two other 'private' waterworks were also established in Ipswich: the first by a collective of 11 'private' citizens in 1618, and the second by 12 'prominent burgesses' in 1627, which both required grants from the city for land and permission to lay pipes. Both 'companies' therefore relied on funds or loans from private individuals and grants from civic government for their existence, and further had to abide by restrictions placed on them by the civic government to prevent competition with the town waterworks.³⁶ As such, they likewise represented the mutual obligations between civic body and private citizens in the provisioning of urban public services in this period.

Unlike in Ipswich and Bristol, the wells and springs of Chester could not provide a sufficient supply. The issue over water provision came to a head in 1573 when the incumbent mayor, Richard Dutton, sought the help of specialists to 'make a springe head' at St Giles' well and convey water via pipes to a common conduit. The £70 cost was to be borne by the city, but because the work was never concluded there is no record of how the city planned to raise the money. Subsequent work in 1583, when the city employed a plumber and a stonemason to build a new conduit, was also to be 'upon the citties charge' and a levy of £100 was raised on the inhabitants.³⁷ However, this did not meet the entire cost, and the endeavour was also aided by civic charity, with gifts of £10 apiece from Hugh Offley, a London citizen and son of a Chester sheriff, and Thomas Aldersay, another London citizen whose family were prominent Chester landowners and merchants.³⁸ Despite the expense laid out, the supply remained inadequate and a further attempt in 1584 to add more sources to existing supply lines also failed.³⁹

It was not until 1601 that Chester's supply problem was solved by Chester citizen John Tyrer, who built a water tower and hydraulic engine on the Bridgegate, which would supply a greater quantity but lower quality of water to the city from the River Dee. The success of this project is reflected in the fact that over 30 years later Tyrer was still remembered in Chester for his 'ingenious' endeavour. The financing of Tyrer's system was similar to that of Ipswich, where the water system was funded not through the bequests of the wealthiest in society, but through loans and the active managerial participation of the middling sort. Tyrer requested a fee farm from the city to erect the waterworks, paying 5s per annum, and expended between £500 and

³⁴SA/C/5/5/2/1, corporation water leases, lease of Joseph Parkhurst, 23 Dec. 1615.

³⁵Bacon, *Annals of Ipswiche*, 461, 486; SA/C/5/5/2/10, lease of Thomas Newton, 7 Apr. 1631.

³⁶Allen, 'Public water supply', 47–8.

³⁷Cheshire Archives & Local Studies (CALs), City of Chester Assembly ZA/B/1, assembly book, fols. 135v, 190r, 191r.

³⁸British Library (BL), Harley Manuscripts (HM) 2093, accounts of money expended by the city, 214–16; E. Lane Furdell, 'Offley, Sir Thomas (c. 1505–1582)' (2004), *Oxford Dictionary of National Biography* (ODNB), <https://doi-org.chain.kent.ac.uk/10.1093/ref:odnb/20568>, accessed 4 Nov. 2021; R.C.D. Baldwin, 'Aldersay, Thomas (1521/2–1598)' (2008), ODNB, <https://doi.org/10.1093/ref:odnb/73473>, accessed 9 Dec. 2021.

³⁹BL/HM 2093, articles of agreement, 209; BL/HM 2093, a note of agreement with John Saunderton, 207.

£1,500 of his own money setting it up, which he was to reclaim through a monopoly on leasing pipes.⁴⁰ However, unlike in Ipswich, there is only one extant lease, for the house of butcher Godfrey Wynne, as Tyrer's business papers do not survive.⁴¹ Although the waterworks were privately owned and managed, Tyrer was tied to the city via the fee farm rent, and required its permission both to build the water tower and to access the pipes whenever maintenance was required.⁴² Following Tyrer's death in 1613, ownership passed to his son, also called John, who obtained permission to extend the city's supply by building another waterworks near Boughton in 1621.⁴³ In 1633, the waterworks became the subject of an extensive legal debate when John Tyrer junior sold the works to a conglomerate of citizens against the wishes of Francis Gamull, the owner and proprietor of Dee Mills – a set of grain and fulling mills on the River Dee – who argued that Tyrer had already agreed to sell him the works, which partly lay under Gamull's mills. The legal dispute demonstrates the continued value of the waterworks to the citizens and inhabitants of Chester, who saw the waterworks as the rightful property of the civic community rather than of an individual.⁴⁴

Whilst Chester and Ipswich created private piped supplies, this was not at the expense of a public supply as both waterworks also fed a common conduit. In the civic records, the assembly of Ipswich emphasized that the waterworks were 'for the benefit of the towne' as a whole, providing a ready supply of clean water to all inhabitants at the conduit.⁴⁵ Over 30 years after the waterworks were established in Chester, citizens praised the waterworks for providing them with a ready supply of water in times of 'fire & pestilence', as well as 'for their necessarye uses att all tymes att & for their howses'. Recounting a temporary closure of the waterworks in the 1630s due to the legal dispute over ownership, employee Randle Bradley claimed that 'the Inhabitants...did Murmure & Repyne thereatt for want of water', suggesting the entire city was reliant on the waterworks and that its closure was a topic of common grievance.⁴⁶ The costs and management of these waterworks were therefore shared between civic government and individual inhabitants, and the benefits were wide ranging. The reliance of so-called private capitalist companies on their respective civic bodies and the investments made by both private individuals and corporations demonstrates the continued importance of mutual obligations in early modern urban centres, and emphasizes the associational characteristics of the urban middling sort who financed and managed public services.

Skill and expanding roles

The growth of water 'companies' brought water provision under the purview of civic government and expanded it through the appointment of new officials to implement, maintain and supervise the business. The expansion of water-based civic roles was not entirely new to this period. Focusing on fifteenth- and sixteenth-century

⁴⁰CALS/ZAB/1, assembly book, fols. 200r, 200v, 262v, 263r; State Papers Online (SPO), 16/263 fol. 17, depositions of witnesses taken at Chester, 18 Mar. 1633/34; Magnusson, *Water Technology*, 167.

⁴¹BL/HM 2083, lease of Godfrey Wynne, 594.

⁴²CALS, City of Chester Cartularies ZCHB/3, corporation lease book, 70.

⁴³CALS/ZAB/1, assembly book, fol. 355r.

⁴⁴CALS/ZAB/2, assembly book, fol. 27r; SPO/SP 16/263 fol. 17, depositions of witnesses.

⁴⁵SA/C/2/2/2/1, court book, 589, 599, 603.

⁴⁶SPO/SP 16/263 fol. 17, deposition of Randle Bradley.

Coventry and Norwich, Dolly Jørgensen argues that civic bodies were forced to create new roles to establish and maintain growing sanitation measures, such as the ‘conduit keeper’, responsible for locking, unlocking and maintaining the conduit, as well as collecting rates and taxes.⁴⁷ However, in order to implement and maintain new water systems, urban centres needed individuals with specific knowledge and skill. As hydraulic technology was not confined to a single craft but pulled from various associated disciplines and trades, the skill associated with waterworks was largely experiential.⁴⁸ Eric Ash has argued that experience was the ‘bedrock of any plausible claim to expertise’ in the early modern period, and that expertise concerned with exploiting the natural world was of particular interest to the growing state and its local officers and institutions.⁴⁹ The problem for those wanting to establish civic water projects was how to find and retain skilled individuals and the necessary knowledge within an urban centre.

The individuals in possession of such experiential knowledge and skills were tradesmen and craftsmen who made up the more precarious, lower end of the middling sort. The transition from monastic to civic management of waterworks meant that water projects provided a point of contact between the upper and lower ends of the urban middling sort. Whilst the elite could organize, finance and manage infrastructure projects, they relied on lower middling tradesmen for the practical knowledge and skills to build them. Likewise, the lower middling sort relied on the elite and civic bodies to exchange their manual work and skills not only for economic remuneration but for status and security. In return for their beneficial work for the town, tradesmen could request guild affiliation and citizenship, otherwise known as urban freedom, from those with the power to grant it – a power that monastic houses did not have. Urban freedom was particularly important to precarious craftsmen, giving an individual the right to elect and be elected to civic government, providing social and economic capital through institutional affiliation, creating opportunities for sociability, providing security in later life and offering an easy route to freedom for one’s children via patrimony.⁵⁰

Urban freedom also had important implications for status and the recognition of skill. In his work on eighteenth-century artisans, John Rule emphasized the importance of what he labelled the ‘property of skill’ attained through craft guilds, which was represented physically through clothing, tools and ceremonies, and legally and socially through protection for workers’ rights and pay. The property of skill was also a form of ‘symbolic capital’ and ‘the distinguishing mark separating the artisan from the common labourer’.⁵¹ The separation of skilled from unskilled workers was important for the middling sort’s identity and the credit economy in which they operated. Tawny Paul emphasizes the importance of ‘a reputation for skill and status’

⁴⁷Jørgensen, “‘All good rule of the citee’”, 304–5.

⁴⁸Magnusson, *Water Technology*, 20–1.

⁴⁹E.H. Ash, ‘Introduction: expertise and the early modern state’, *Osiris*, 25 (2010), 6, 11–17, 24; P.O. Long, *Openness, Secrecy, Authorship: Technical Arts and the Culture of Knowledge from Antiquity to the Renaissance* (Baltimore, MD, 2001), 73–4.

⁵⁰Withington, *Politics of Commonwealth*; Barry, ‘Civility and civic culture’, 181–96; J.P. Ward, *Metropolitan Communities: Trade Guilds, Identity, and Change in Early Modern London* (Stanford, 1997), 57–71.

⁵¹J. Rule, ‘The property of skill in the period of manufacture’, in P. Joyce (ed.), *The Historical Meanings of Work* (Cambridge, 1987), 104, 108; D. Woodward, *Men at Work: Labourers and Building Craftsmen in the Towns of Northern England, 1450–1750* (Cambridge, 1995), 15.

in a 'credit economy' and a society in which work was 'an undertaking that established skill, status, independence and self-worth, in addition to being a productive activity to provide maintenance or to generate income'.⁵² Urban freedom singled out an individual as financially 'independent' and possessed of specific skills, which could advance their economic and social standing in a community and help perpetuate this in the next generation.⁵³ The advent of new waterworks helped to create new members of the middling sort, as the specific skills acquired by individuals were transformed into new and bespoke civic roles and exchanged for benefits such as urban freedom.

The trade most obviously associated with waterworks was plumbing, and all three urban centres employed a plumber on a regular basis. Donald Woodward has argued that in the later sixteenth and seventeenth centuries 'plumbers emerged as an early aristocracy of labour, earning rates substantially higher than those of other building craftsmen'. Woodward attributes this, in part, to a 'reduction in the total area of leaded roofs' after the dissolution of the monasteries resulting in fewer plumbers, so that subsequent demand 'led to inflated levels of remuneration'.⁵⁴ However, the rising number of waterworks installations and improvements in the later sixteenth and early seventeenth centuries also correlates directly with this increased rate of pay.

Bristol's plumber was a long-standing civic officer, first appointed in the 1370s, who received a fixed retainer and whose civic importance was illustrated by the fact that the plumber was the only building craftsman that consistently featured on the chamberlains' payroll in the list of officers' fees.⁵⁵ The retainer was a yearly sum paid to an individual that obligated them to work whenever required, for which they were paid the daily going rate. Corresponding with Woodward's argument, the daily rate during this period for plumbers in Bristol was 12*d* per day, much higher than the 8*d* for less-skilled workers such as labourers and hauliers. As well as extra income, the retainer meant guaranteed work which, given the 'casual and intermittent' pattern of work for early modern craftsmen, must have been highly sought after.⁵⁶

From 1559 to the 1660s, the role of city plumber in Bristol was monopolized by the Dakers family, and they received a retainer of £1 6*s* 8*d*. The Dakers' tenure began with Edmond Dakers, who took over from previous plumber John Plomer who appears to have died or left the role in 1558.⁵⁷ Edmond was not a citizen when he entered the role, and only obtained his freedom in 1569, 10 years later, when he was admitted via redemption – payment of a £2 fine alongside the usual 4*s* 6*d* fee.⁵⁸ Edmond's background and training is therefore unclear. However, he established a plumbing lineage that dominated the office of Bristol city plumber for a century. The Dakers' hold over this position in Bristol reflects the situation outlined by Mark Stoye in fifteenth- and sixteenth-century Exeter. Stoye demonstrates a 'clear line of transmission' in the training and apprenticeship of Exeter's 'retained water expert' for over

⁵²Paul, 'Accounting for men's work', 42; Muldrew, 'Class and credit', 149.

⁵³Barry, 'Civility and civic culture', 191–2.

⁵⁴Woodward, *Men at Work*, 51–2, 42–3.

⁵⁵BA/F/AU/1/3–22, mayor's audit books 1–21

⁵⁶Woodward, *Men at Work*, 35–7, 116; Rawcliffe, *Urban Bodies*, 185.

⁵⁷BA/F/AU/1/5, mayor's audit book 5, 200, 333.

⁵⁸BA, records of the city treasurer (04359) 1, burgess book 1557–87, 41b.

100 years, with each plumber being trained by the previous one. Such transmission, Stoye argues, emphasizes the skill and specialization required for this role.⁵⁹ In urban centres with a long history of water supply, it appears that specialist knowledge was retained in a few hands and could not simply be taken up by any plumber. The inheritance of retainers benefited civic bodies, who knew the appointee had been appropriately and well trained for the role, and the family or guild, as retaining knowledge and skill within a tight group provided commercial and economic advantages.⁶⁰

Following Edmond's death in 1586, John took over as city plumber but in the early 1600s was replaced by his brother Thomas, to whom John had left all his goods and property in his 1602 will.⁶¹ John was never admitted to the freedom of the city, but Thomas was admitted in 1612 by patrimony, on account of Edmond being a freeman.⁶² The role changed hands again in the 1630s when it was taken up by Robert Wilkinson, who had been apprenticed to Thomas Dakers and obtained his freedom in 1634, and who continued the Dakers lineage into the 1660s.⁶³ Wilkinson retained this position despite Thomas Dakers' son, Edmund, also entering the plumbing trade. Edmund became a freeman in 1654 by patrimony, but as the role of city plumber was occupied by his father's apprentice, he worked in other areas of the plumbing trade – 'laying the leads' at Bristol's town hall and making 'muskett bullets' – and in related industries, namely holding a share in a 'coleworke' in the Bristol coalfield of Kingswood. Edmund's will reveals a significant estate including over £45 of bequests in money, two houses and a garden.⁶⁴ Edmund's family background in water management likely aided his move into the coal industry, which relied on drainage and pump technology for its success, and provided him with the necessary capital.⁶⁵

Although Chester's waterworks were not civic owned, but a collaboration between private and public enterprise, a plumber called George Salt was retained and employed by both Tyrer and the civic government. In October 1600, two months after Tyrer obtained the fee farm, Salt petitioned and was granted freedom on the basis that 'he is and may [be] a good new such member of this Cittie'.⁶⁶ That Salt's benefit to the city involved the waterworks is evident from a probate account of John Tyrer's debts, which included 7s 6d to 'Salt the Plumber', and from a petition Salt entered against the city in 1611 for payment of £3 6s 8d, which he claimed to be owed having been 'retayned by the Cittie to keepe and repayre the Cunditt within the Cittie'.⁶⁷ Salt therefore managed to exchange his plumbing skills for citizenship and a

⁵⁹Stoye, *Water in the City*, 80–1.

⁶⁰Ward, *Metropolitan Communities*, 51; Long, *Openness, Secrecy, Authorship*, 92.

⁶¹BA/F/AU/1/12, mayor's audit book 11, 159, 311; BA/F/AU/1/16, mayor's audit book 15; The National Archives (TNA) records of the Prerogative Court of Canterbury (PROB) 11/155/384, will of John Dackers, plumber of Bristol, Gloucestershire, 29 Apr. 1629.

⁶²BA/04359/2, burgess book 1607–51, 45.

⁶³BA/F/AU/1/20–22, mayor's audit books 19–21; BA/FC/AB/1(d), Bristol apprenticeship books, 241; BA/04359/2, burgess book 1607–51, 227.

⁶⁴BA/04359/3a, burgess book 1651–62, 1b; BA/F/AU/1/22, mayor's audit book 21, 32, 177; TNA/PROB 11/329/585, will of Edmund Dakers, plumber of Bristol, Gloucestershire, 24 May 1669.

⁶⁵J. Hatcher, *The History of the British Coal Industry*, vol. I: *Before 1700: Towards the Age of Coal* (Oxford, 1993), 212–31, 178–81; Tomory, *History of the London Water Industry*, 14, 23.

⁶⁶CALS/ZAB/1, assembly book, fols. 313r, 263v.

⁶⁷CALS, wills and probate records (WS), will and probate account of John Tyrer, 1619; CALS, assembly files (ZAF) 9/20, petition of George Salt, 1611.

highly sought-after retainer, demonstrating the mutual benefits and obligations that waterworks created as well as the blurred boundaries between civic and private enterprise.

Whether or not Ipswich kept a plumber on retainer is unclear and, unlike Bristol, there are no insights from apprenticeship records. However, plumbers by the name of Palmer consistently feature in the Ipswich treasurer's accounts from the 1570s. This was most likely a family firm as 'old Palmer' and Thomas Palmer are recorded alongside John Palmer, but John Palmer alone appears more frequently after the new water system was installed in 1614, when he was paid 20s 9d for 'worke done about the conduit & pypes'.⁶⁸ Whilst Thomas Palmer's 1608 will indicates limited wealth (goods, household items and work tools), John Palmer's 1651 will provides evidence of considerable wealth as he bequeathed 'howses, buildings, curtilages, and hereditaments' as well as over £55 to various recipients.⁶⁹ Woodward has argued that house ownership was beyond the means of the majority of building craftsmen in this period.⁷⁰ Therefore, the substantial estates of both Edmund Dakers in Bristol and John Palmer in Ipswich provide further evidence of the greater wealth of plumbers compared to other building craftsmen, and suggest the importance of civic water systems to that prosperity.

Whilst Bristol's water management remained largely unchanged across this period, with one plumber maintaining the system, Ipswich's and Chester's water systems experienced a greater flux in workforce as they required skills and expertise from outside their own citizenry. Whilst relatively unskilled and unpaid roles such as assessors, collectors and overseers could be filled by existing citizens appointed to government committees, the practical work required the employment of 'experts' who had gained a reputation for their work in other towns and cities across England. New infrastructure projects were particularly valuable for outsiders who could, like Salt the plumber, exchange their skills for citizenship and its accompanying privileges. Why outsiders sought or gained citizenship in these localities over others is unclear, but they may have migrated from rural areas, been apprenticed in another town and now trying to set up on their own, or had simply established a family and laid down roots.

In Ipswich, unpaid and unskilled surveyors were appointed from within the ranks of the town's portmen and common councillors. For example, in December 1616 the mercer and merchant John Herne, a chamberlain and coroner, and Edmund Deye, a common councillor and later MP, were appointed as the first 'Surveyers' of the 'newe waterworke', tasked with identifying 'defects' and ensuring they were 'Amended & repayred'.⁷¹ In contrast, skilled and paid roles appear to have been taken up by outsiders. For example, Mr Least was paid 6s 8d for the original 'surveying of the water'. Least's remuneration and his absence from future records suggests that he was an outsider who had specific expertise for which the city was willing to pay.⁷² In 1622,

⁶⁸SA/C/3/2/1/2, treasurers' and chamberlains' accounts, fols. 156r, 197r, 225v.

⁶⁹SA, Ipswich Probate Registry records (IC/AA) 1/44/30, original will of Thomas Palmer of Washbrook, 1608; TNA/PROB 11/219/384, will of John Palmer, plumber of Ipswich, Suffolk, 25 Nov. 1651.

⁷⁰Woodward, *Men at Work*, 232–5.

⁷¹SA/C/4/3/1/4, assembly book, fol. 163r; Bacon, *Annalls of Ipswicke*, 394, 428, 443; J.P. Ferris, 'Day (Deye) Edmund (-d.1640) of Ipswich, Suffolk', *History of Parliament*, www.historyofparliamentonline.org/vol/ume/1604-1629/member/day-edmund-1640, accessed 9 Nov. 2021.

⁷²SA/C/3/2/1/2, treasurers' and chamberlains' accounts, fol. 212v.

the assembly agreed ‘that one having skill in waterworke latelie Employed at Colchester’ should be brought to Ipswich to improve the supply.⁷³ The skilled individual was most likely Peter Witham, ‘cheife undertaker’ of the Colchester waterworks established around 1620.⁷⁴ Ipswich’s employment of Witham demonstrates that expertise and the reputations of skilled individuals travelled, and that news of successful work in one place could lead to employment in another. Knowledge of successful works elsewhere could also explain why Ipswich decided to install a new water system. David Allen has suggested that Ipswich’s governing body was motivated by rival examples in nearby Norwich, which had a civic-sponsored piped water system since 1584, and through regular visits to London, which had its first domestic piped system in 1581.⁷⁵ Expenses recorded in civic accounts show that middling civic office-holders, particularly legal officers, made regular visits to London on business and were therefore the perfect go-betweens, transferring knowledge and ideas from the metropole to the provinces.

The influence of London was particularly telling in Chester. Whilst Chester’s sixteenth-century efforts at improving the water supply also required the standard roles of assessors, collectors and overseers, the physical work was undertaken by London tradesmen, demonstrating the role of London companies in ‘contributing to training and to the diffusion of knowledge and skills at a national level’.⁷⁶ Employment of London plumbers and tradesmen is not surprising given the successful waterworks in the capital, and London plumbers were also employed at water systems in Exeter and Oxford.⁷⁷ Efforts to improve the Chester conduit in 1573 were conducted by Dutch/German émigré Peter Morris, a water specialist who left his work in Chester unfinished to begin negotiations from 1574 to build London’s first piped water system that fed directly into people’s homes (the London Bridge Waterworks).⁷⁸ The work in 1583, a new conduit and improved pipes, was conducted by two more London craftsmen, master plumber John Saunderton and stonemason Allen Waymale.⁷⁹ The work resulted in social advancement for one individual: Saunderton’s son William, who remained in the city after his father returned to London to ‘keep & mentten the sayd Engen’.⁸⁰ The engine referred to was most likely a pump mechanism used in St Giles’ well, which Morris was originally contracted to build. In 1591, William Saunderton petitioned for and was granted urban freedom due to ‘having donne divers new Faire Workes in the conveyance of water by pump and other feates within this Citie’.⁸¹ Therefore, Saunderton’s skill transformed him from a disenfranchised outsider to a citizen with access to the political and economic privileges that entailed.

⁷³Allen, ‘Public water supply’, 44; SA/C/4/3/1/5, assembly book, fol. 36v.

⁷⁴Parliamentary Archives, records of the House of Lords HL/PO/JO/10/1/67, petition of Peter Witham, of Colchester, 26 Jul. 1641.

⁷⁵Allen, ‘Public water supply’, 40.

⁷⁶CALS/ZAB/1, assembly book, fol. 190r; D. Keene, ‘Livery companies: what, when and why?’, in Gadd and Wallis (eds.), *Guilds, Society & Economy in London 1450–1800*, 171.

⁷⁷Stoye, *Water in the City*, 58; C. Cole, ‘Carfax conduit’, *Oxoniensia*, 29 (1964–65), 143.

⁷⁸CALS/ZAB/1, assembly book, fol. 135v; Tomory, *History of the London Water Industry*, 13–14, 32–7; Jenner, ‘From conduit community’, 256.

⁷⁹Guildhall Archives, Worshipful Company of Plumbers CLC/L/PH/D/002/MS02210/001, accounts of master and wardens.

⁸⁰BL/HM 2093, a note of agreement with John Saunderton, 207.

⁸¹CALS/ZAB/1, assembly book, fol. 245v.

The advent of Tyrer's new waterworks in 1600 similarly highlights the opportunities public services offered for social mobility. According to the later court case over the waterworks, Tyrer was granted the fee farm due to the influence of his patron, the long-serving alderman Edmund Gamull, who owned Dee Mills. Deponents recalled that Tyrer was 'employed in the busness and affayres' of Gamull, and it is possible his employment involved the hydraulics needed to power the water corn and fulling mills.⁸² Additionally, Tyrer was a brewer, a trade associated with developing water technology across Europe.⁸³ Tyrer's skills did not necessarily derive from direct experience in waterworks, but a combination of powerful patronage and related trades aided his bid to provide the city's supply. The success of the waterworks allowed Tyrer to accumulate social capital within the city and achieve a key marker of middling status through election to public office, first as a common councillor in 1609 and then as collector of the city rents in 1612, which also increased his economic capital.⁸⁴ Tyrer's social advancement is further evident from the fact that his son was later identified as 'gent', an easily assumed and not necessarily accurate label but nonetheless indicative of increased wealth and social standing.

Tyrer and his son also became patrons and employers themselves, namely of experts from outside the city for whom no apprenticeship records can be traced. However, details of their careers can be obtained from petitions they entered to the Chester assembly requesting freedom of the city. For instance, carpenter James Apleton, employed by Tyrer to make and repair 'pipes and other Engines', petitioned the city in 1607 stating that he had 'longe lived' in the city and was 'retained to continewe' working at the waterworks. As well as emphasizing the 'publick good and utilitie' of the waterworks, Apleton expressed a desire to 'trade the reste of his live' in Chester and added that he had 'married a freemans daughter', thus adding more clout to his request. Apleton's petition also hinted at precarity, stating that he had 'noe skill in anie other trade whatsoever' and requesting that the fine be 'matchable with his poore estate'. His freedom was granted 'by reason of his employment aboute the waterworke'.⁸⁵ Similarly, John Tyrer junior employed 'Engineer' Robert Sherwyn who had worked at the waterworks for 12 years when he petitioned the city for his freedom in 1627. Sherwyn's petition emphasized his independence, having 'lived of himselfe by his owne industrie & paynes'; his unique set of skills, 'not beinge hurtfull to any trade in this Cytty'; and his increased age, 'beinge growen into yeares'. Sherwyn was approximately 55 years old when he submitted this petition, suggesting that his principal motivation was the economic and social benefits urban freedom could offer in later life. Like Apleton's, Sherwyn's petition demonstrates the precarity of lower middling tradesmen and the perceived security provided by urban freedom. Unlike Apleton though, Sherwyn was deemed 'not free by a generall consent'.⁸⁶

⁸²SPO/SP 16/263 fol. 17, depositions of witnesses.

⁸³C. Shulman, 'The groundbreaking water supply systems of central and eastern European cities, 1300–1580', *Technology and Culture*, 60 (2019), 733–4.

⁸⁴CALS/ZAB/1, assembly book, fols. 308v, 317r.

⁸⁵CALS/ZAF/10/33, petition of James Appleton; CALS/ZAB/1, assembly book, fol. 301v.

⁸⁶CALS/ZAF/13/9, petition of Robert Sherwyn, 1627; SPO/SP 16/263 fol. 17, depositions of witnesses; CALS/ZAB/2, assembly book, fol. 13v.

Sherwyn met with more success in his second petition in 1630, which was supported by a testimonial from the mayor, aldermen and JPs of Chester that trumpeted Sherwyn's 'skill & experience by the longe imployment for waterworks in this city', and from other employment around the country, particularly 'in the foundaon of a Bridge at Bangor in Wales' said to have been 'very useful & servisable for the whole countrey'.⁸⁷ Sherwyn's petition therefore encompasses both local and national recognition of skill, showing that the reputations of skilled individuals or experts were communicated much further across the country than is suggested by the example of neighbouring Ipswich and Colchester, and that recognition of skill and experience was the means to (eventually) gain civic status. Like Sherwyn, Morris, Saunderton and Witham all appear to have gained skills through practical experience, which led to towns and cities across England seeking out their services. Additionally, it is possible that someone with experience of the Chester waterworks proceeded to offer their services to the city of Exeter in 1635. The 'unknown entrepreneur' offered to build water engines similar to those 'adopted in London and Chester', suggesting that they were using their prior experience of and reputation from these works to seek further employment elsewhere.⁸⁸

Each urban centre sought out the skills and knowledge for the water provision in different ways. In Bristol, the Dakers family seem to have been outsiders who paid their way into the freedom of the city and subsequently produced a lineage of successful Bristol plumbers. In Ipswich, plumbers built the system but outside assistance was sought on a temporary basis to improve it. This was common practice in waterworks, seen in Chester's employment of Morris, as well as water experts employed in other urban centres such as Exeter, Norwich, Sandwich and Rye, demonstrating a national market for plumbers and other skilled individuals.⁸⁹ As well as temporary contractors, Chester retained expertise within its walls by rewarding skilled individuals with freedom of the city. This was not unique to Chester. The waterworks established in Shrewsbury in 1555 provide an even more overt example of exchanging hydraulic skills for a civic position. When John Richmond approached Shrewsbury to build a conduit, he offered to supply iron if the city would supply the remaining materials, a £60 fee and make him a 'free burgesse'.⁹⁰ Through such exchanges, an individual's skills were formally recognized providing creditworthy social capital, social and economic security through urban freedom, and social mobility into or further up the ranks of the middling sort.

Commodification and civic culture

Whilst still provisioning common conduits, Chester's and Ipswich's new waterworks did partially transform water from a public good, free at the point of collection, to a commercialized commodity that acted as a material marker of status for those who could afford a private supply. Jenner argues that, in London, the fees would have been unaffordable for 'middling' households, and especially for 'labouring' households.⁹¹

⁸⁷CALS, Chester Quarter Sessions ZQ/SF/74/82, petition of Robert Sherwyn, 1630.

⁸⁸Stoye, *Water in the City*, 141.

⁸⁹*Ibid.*, 58, 71; Thomas, *Town Government*, 62; Lee, 'Piped water', 381.

⁹⁰R. Cromarty, 'The water supply in Shrewsbury 1550–1835', *Transactions of the Shropshire Archaeological and Historical Society*, 75 (2000), 15.

⁹¹Jenner, 'From conduit community', 258.

However, in Chester and Ipswich, the piped supply seems mostly to have been taken up by middling urban citizens. In Chester, the court case over the waterworks and one surviving lease provides evidence of 13 leaseholders, the majority of whom were middling tradesmen: butchers Godfrey Wynne and Robert Fletcher, bakers Richard Wright and Hugh Crumpe, hatmaker Thomas Lowe, saddler Thomas Percivall, tailor Thomas Alcocke, shoemaker Thomas Ince, draper Robert Ince and brewer Thomas Eaton. The other three leaseholders were yeoman William Alcocke, alderman and proprietor of Dee Mills Edmund Gamull and alderman John Brereton. Whilst only accounting for a small number of leaseholders, it does suggest that the majority were tradesmen. Indeed, during the 1630s legal battle over ownership of the Chester waterworks, it was continually emphasized that the waterworks were of particular benefit to the city's 'tradesmen'.⁹²

In Ipswich, 14 surviving leases from 1615 to 1640 portray a similar picture, featuring grocers Joseph Parkhurst and Bezaliell Sherman, drapers Edward Dodson and William Tyler, merchants Thomas Seelie and John Bliethe, baker John Smithe, mariner Richard Burlingham, clothier John Aldus, chandler Thomas Newton and haberdashers Samuel Lane and Samuel Aldgate, as well as gentleman John Coleman and Dame Elizabeth Felton. The Great Court Books of Ipswich record many more leases that are not extant. For example, in November 1619 alone, 53 named leaseholders are recorded. Unfortunately, the records do not indicate the leaseholders' profession or status, but it is obvious that a few were very wealthy. Whilst 40 leases were solely for the leaseholder's own dwelling house, the remaining 13 individuals held multiple leases possibly demonstrating a wider recognition of the importance of provisioning water or suggesting greater status or financial gain for landlords through provisioning rental properties. For example, John Smith had leases for his 'dwelling house' and his 'new house', Richard Jennings had a personal lease and one for a house 'in Hulings occupation', Robert Barber had a personal lease and one for a house in 'Clevelands occupation' and Mr Bloyse had leases for his 'dwelling house', a house in 'Copes occupation' and another in 'Lukes occupation'. However, these particularly wealthy individuals comprise only a small number of the leaseholders, and throughout the records it is stressed that the waterworks were intended 'for the benefit of the towne' as a whole.⁹³

As Ipswich was a municipal system, there is also evidence of some discounted rates for those involved in civic government. For example, the town recorder, John Lany, paid 3s 4d yearly rent rather than the 5s required of other leaseholders. Lany's reduced rent should be considered in the light of Jenner's argument that private water supplies were 'part of the currency of civic favour' that reveal the 'micropolitics' of a community.⁹⁴ There is less evidence of this in Chester. The only such 'favour' was a free pipe extended to Tyrer's patron Edmund Gamull because he had allowed pipes to be constructed under his grain mill.⁹⁵ As Tyrer had expended a significant amount of his own money on the waterworks, it is unlikely that any other reductions were offered.

⁹²SPO/SP 16/263 fol. 17, depositions of witnesses; J.H.E. Bennett, *The Rolls of the Freemen of the City of Chester*, Part 1, 1392–1700 (Liverpool, 1906), 53, 124, 85, 41, 109, 67, 76, 69.

⁹³SA/C/5/5/2, corporation water leases; SA/C/2/2/2/1, great court book, fols. 316v–317r, 590.

⁹⁴Jenner, 'From conduit community', 251, 254.

⁹⁵SPO/SP 16/263 fol. 17, depositions of witnesses.

In addition to commodification, the material infrastructure of waterworks contributed to urban culture and civic pride in this period. Conduits were located on significant sites, highly adorned and intended to be seen and admired as physical representations of civic prosperity and pride.⁹⁶ This was particularly important for port towns like Bristol, Chester and Ipswich, whose economies rested on overseas and domestic trade, because good public services were crucial for attracting the customers and visitors upon whom economic activity relied.⁹⁷ The conduit at Chester was adorned with the coats of arms of its benefactors and the city and was situated at the central High Cross, where the four main roads met. The cross was a cultural, administrative and religious centre where ceremonial activities and pageantry were performed, and where the main city church and town hall were located.⁹⁸ The Ipswich conduit was also erected in a central location near to the town hall.⁹⁹ The Bristol conduits were likewise adorned with coats of arms and in 1600 the city paid £2 4s to ‘wydowe Phippes for payntinge the Cittyes Armes upon the newe Conduitt at the key and for gold and other Coullors’.¹⁰⁰ The continued cultural importance of, and civic pride associated with, water pipes and conduits is further exemplified in Bristol to the present day in the tradition of walking the pipeline of the St Mary Redcliffe water pipe, a ritual supposedly dating back to 1190, and in Chester in a blue plaque mounted on the site of the Bridgeway which commemorates the water tower built there in 1601.¹⁰¹

Conclusion

Through an examination of water provision in Bristol, Chester and Ipswich in the period 1540–1640, this article has shown how each urban centre gradually took on responsibility for this service after the dissolution of the monasteries. The financing and management of the waterworks demonstrates that there was not a simple transition from public services to private companies. Instead, these were collaborative ventures that relied on both individuals and civic bodies, blurring the boundaries between the two. As such, the new waterworks are representative of the ‘associational’ characteristic of the middling sort in early modern England as well as the participatory nature of state formation. The middling sort were key players in implementing new projects and developments that subsequently reinforced the growth of middling groups in society through an increased recognition of skill or expertise and subsequent opportunities for social advancement; the commodification of resources that served to reinforce social distinctions; and through tying civic officials to the city

⁹⁶Lee, ‘Piped water’, 384; Cole, ‘Carfax conduit’, 153–60; Magnusson, *Water Technology*, 24; Rawcliffe, *Urban Bodies*, 193, 220; Cromarty, ‘Water supply’, 18; A. le Baigue and A. Leach, “‘Where streams of (living) water flow’”: the religious and civic significance of Archbishop Abbot’s conduit in St Andrew’s, Canterbury, 1603–1625’, *Archaeologia Cantiana*, 139 (2018), 120, 129; Stoye, *Water in the City*, 104.

⁹⁷Harris, Sacks and Lynch, ‘Ports 1540–1700’, 382, 397, 400, 403; Slack, ‘Great and good towns’, 369.

⁹⁸CALS/ZAB/1, assembly book, fols. 194v, 135v; D. Mills, *Recycling the Cycle: The City of Chester and Its Whitsun Plays* (Toronto, 1998), 20, 25, 28–9.

⁹⁹SA/C/4/3/1/4, assembly book, fol. 163r; Allen, ‘Public water supply’, 41–2.

¹⁰⁰BA/F/AU/1/15, mayor’s audit book 14, 84.

¹⁰¹www.stmaryredcliffe.co.uk/the-pipe-walk, accessed 9 Dec. 2021; H.C.M. Hirst, ‘Redcliffe conduit, Bristol, and Robert de Berkeley’, *Bristol and Gloucestershire Archaeological Society*, 46 (1924), 354–5; Lobel, ‘Bristol’, 19; <https://openplaques.org/plaques/30350>, accessed 13 Nov. 2022.

financially and symbolically through the built environment. Public services, like water provision, therefore provide a lens through which to study the interconnectivity of urbanization, the development of specific industries and the emerging middling sort.

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