



RESEARCH ARTICLE

Waterworks, municipal government and the environment in twentieth-century Britain

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Abstract

From the nineteenth century onwards, municipal authorities vested increasing amounts of power in experts, those who could provide specialist knowledge on areas outside the remit of local councillors. This, though, was attached with risk, as municipal resources could be wasted. This article takes the example of the Ure Valley waterworks project, a scheme developed by Leeds Corporation at the start of the twentieth century. What was deemed a necessary and straightforward project to alleviate future water shortages became embroiled in engineering difficulties and financial issues which resulted in only one of the five planned reservoirs being built. This case-study shines a light on the inner workings of local government, as well as the confluence between politics, economics and the urban–rural hinterland environment.

The development of towns and cities in Britain, from 1835 onwards, was shaped by elected representatives. Councillors and aldermen held a responsibility to manage the urban landscape. As the nineteenth century progressed, local government became responsible for the provision of amenities, as the benefits of purchasing and managing waterworks, gas supply and, by the end of the century, electricity became embedded into municipal practice. Acquiring and managing these amenities, though, required specialist knowledge that few councillors possessed. This led to a reliance on salaried experts, such as medical officers of health, town clerks and borough engineers. While this reliance often benefited the management of local government, there were occasions where the exercise of municipal power by unelected officials had disastrous consequences for the city, for example the potential for corruption.¹ It could also have implications for the environmental effect the city had on its rural hinterland, as well as for a local authority's financial well-being.

Although histories of local government form a key element of British urban history, the intersection between local government and the environment in the early

¹J. Moore and R. Rodger, 'Who really ran the cities? Municipal knowledge and policy networks in British local government, 1832–1914', in R. Roth and R. Beachy (eds.), *Who Ran the Cities? City Elites and Urban Power Structures in Europe and North America, 1750–1940* (Aldershot, 2007), 53.

twentieth century has been less well covered. This is in spite of the increased role played by key employees such as engineers in municipal affairs, as elected officials relied on expertise in order to reinforce their ability to govern.² Acknowledging their role in how cities impacted the rural hinterland can help to produce more holistic urban-environmental histories. In recent years, the relationship between the city and rural water sources has become the subject of increased attention from environmental historians, who seek to move beyond the characterization of rivers as ‘organic machines’ to show the impact of urban development on rivers and vice versa.³ For example, the development of Vienna was driven by and drove the evolution of the River Danube, which changed markedly over the past 500 years to develop new arms and bisect different parts of the landscape, to which urban development responded.⁴ Urban infrastructures like reservoirs have also been seen as within a framework of control; the creation of ‘productive works’ entailing large financial outlays was a way for colonial governments to control natural resources such as rivers.⁵ While on a much smaller scale than the reconstruction of the Danube over centuries or colonial power systems, the case of the Ure Valley in North Yorkshire, England, demonstrates the ability of cities to impact the rural environment as well as the agency of nature in urban development.

There were several successful, large-scale waterworks projects completed in the late nineteenth and early twentieth centuries in Britain. This article, though, will explore a case-study that was not so straightforward: the Ure Valley waterworks scheme undertaken by Leeds Corporation in the early twentieth century. What was expected to be a conventional waterworks project to provide water for the city’s population and industries became a protracted saga due to the failure of expert engineers to identify problems with the landscape, as well as the city’s newspapers to hold the Corporation to account. Studying this incident can provide an insight into how Leeds Corporation operated from the beginning of the twentieth century until the inter-war period. It also has ramifications beyond Leeds, not least by highlighting the ways in which waterworks projects could impact towns and cities, and their rural hinterlands; in the case of the Ure Valley, we will see environmental, political, economic and consumer impacts. In so doing, the article stresses the importance of studying urban hinterlands; that is, places outside the legal boundaries of the city but still important sites of urban governance where we can observe a confluence of politics and environment.

Waterworks projects such as reservoirs were hybrid products made of social and natural forces.⁶ Viewing infrastructures like reservoirs as socio-natural entities

²M. Dagenais and P.-Y. Saunier, ‘Tales of the periphery: an outline survey of municipal employees and services in the nineteenth and twentieth centuries’, in M. Dagenais, I. Maver and P.-Y. Saunier (eds.), *Municipal Services and Employees in the Modern City: New Historical Approaches* (Aldershot, 2003), 20.

³M. Evenden, ‘Beyond the organic machine? New approaches in river historiography’, *Environmental History*, 23 (2018), 708.

⁴S. Hohensinner, B. Lager, C. Sonnlechner, G. Haidvogel, S. Gierlinger, M. Schmid, F. Krausmann and V. Winiwarter, ‘Changes in water and land: the reconstructed Viennese riverscape from 1500 to the present’, *Water History*, 5 (2013), 145–72.

⁵A. Ramesh, ‘Indian rivers, “productive works”, and the emergence of large dams in nineteenth-century Madras’, *Historical Journal*, 64 (2021), 285.

⁶E. Swyngedouw, ‘“Not a drop of water...”: state, modernity, and the production of nature in Spain, 1898–2010’, *Environment and History*, 20 (2014), 67–92.

enables historians to go beyond the nature–culture divide to see the economic and material flows between the city and the countryside.⁷ This is especially the case in the Ure Valley, where issues with the landscape halted efforts to build Colsterdale Reservoir. Despite the best efforts of Leeds Corporation and its engineers to tame the environment, the Ure Valley became a truly socio-natural landscape, re-made by its relationship to the urban and the rural. Using archival documents and evidence from local newspapers, the examination of this case-study is organized into two sections. The first section will explore the mismanagement of the Ure Valley scheme and the failure to build the first proposed reservoir at Colsterdale, near the rural market town of Masham in North Yorkshire. The second section builds on the aftermath of the failure of Colsterdale and the economic and consumer issues that were raised during the building of Leighton Reservoir, to the south-west of Masham, the one and only reservoir to be built in the Ure Valley.

Colsterdale and the failure to ‘tame the wilderness’

The engineers of Leeds had been eyeing the waters of the Ure Valley for a number of years before the project was officially recommended in the late 1890s. A scheme to utilize the waters of the rivers Burn and Laver had originally been suggested by the Leeds borough surveyor Edward Filliter in 1866. In that instance, Leeds Corporation decided to construct a system of reservoirs in the Washburn Valley, around seven miles north of Leeds; however, Filliter suggested building a future system on the Burn and Laver, unofficially marking those rivers as a catchment area for the town.⁸ The possibility of the scheme was returned to in 1887, as Bradford Corporation proposed to build its own waterworks system on the rivers. Ultimately, Leeds Corporation managed to reach agreement with its Bradford neighbour to protect its ‘moral’ claim to the waters of the Burn and Laver.⁹ While Bradford began to construct much-needed reservoirs on the River Nidd in the 1890s, Leeds began the process of planning a system of reservoirs near the town of Masham, North Yorkshire, known as the Ure Valley scheme. This occurred during a period of growth for the water industry in England more broadly. In addition to the activities of Leeds and Bradford, major waterworks schemes were undertaken by Liverpool (1881–88), Manchester (1886–94) and Birmingham (1893–1904) in areas of northern England and the Welsh uplands. Major industrial cities were undertaking an expansion of their water supply systems both to cope with ever-increasing demand and to facilitate future growth.¹⁰

This scheme, initially designed by the borough surveyor for Leeds Robert Hewson and put forward for parliamentary approval in 1901, proposed to build a series of reservoirs at Colsterdale, Leighton and Healey in the Burn Valley, and Carlesmoor

⁷A. Ramesh, ‘Flows and fixes: water, disease and housing in Bangalore, 1860–1915’, *Urban History* (FirstView online publication, 2021), 3.

⁸E. Filliter, *Report on the Best Mode of Obtaining an Additional and Purer Supply of Water for the Borough of Leeds* (Leeds, 1866).

⁹A. McTominey, ‘Bad neighbours? Water supply and the civic rivalry of Leeds and Bradford, c. 1850–1887’, *International Journal of Regional and Local History*, 12 (2017), 24–41.

¹⁰H.L. Platt, *Shock Cities: The Environmental Transformation and Reform of Manchester and Chicago* (London, 2005); H. Ritvo, *The Dawn of Green: Manchester, Thirlmere, and Modern Environmentalism* (Chicago, IL, 2009); O. Roberts, ‘Developing the untapped wealth of Britain’s “Celtic Fringe”: water engineering and the Welsh landscape, 1870–1960’, *Landscape Research*, 31 (2006), 121–33.

and Laverton in the Laver Valley.¹¹ The primary reservoir of the scheme was to be Colsterdale, approximately six miles from Masham, which would dam the River Burn. An article in the *Yorkshire Post* reported that Colsterdale would have a capacity of 1,800 million gallons of water, more than double the capacity of Swinsty and Fewston Reservoirs, the primary waterworks for Leeds.¹² While Leeds had fared better than other areas of the West Riding during the droughts of the 1880s, seen in the Corporation's ability to provide water to certain parts of Bradford in 1884, the case was made that by the end of the nineteenth century additional water from the Ure Valley was necessary.¹³ In a lecture to the Yorkshire College Engineering Society in 1902, the new borough engineer, E.J. Silcock, stated that Leeds was consuming 16 million gallons of water a day, a rate that stretched the resources of Leeds to its limits. The scheme, which would have a combined total capacity of 5,641 million gallons, was projected to supply the city with 33 million gallons per day, costing £2.2 million, funded in the first instance by central government loans.¹⁴ This was, then, a sizeable project by the Corporation with a major outlay to supply the city with clean water into the twentieth century.

The Ure Valley was a prime location for the abstraction of water for several reasons. First, it was the closest source of water to Leeds that could provide the quantity needed. As Silcock noted in his lecture at the Yorkshire College, and as can be seen in [Figure 1](#), sources of water to the north and west of the Washburn Valley works, principally Wharfedale and Nidderdale, had already been utilized by the municipal authorities of Bradford, Yeadon, Shipley and others.¹⁵ The Ure Valley was an untapped resource that would provide the requisite amount of water necessary and, because of its location to the north-east of the Washburn Valley, could connect to those reservoirs, meaning that large conduit work would not be required between Masham and Leeds. Second, Filliter's report from 1866 outlined the quality of the rivers Burn and Laver, both in terms of purity for consumption and softness for industry, which was beneficial for the textile industry when washing cloth.¹⁶ Third, as an article in the *Yorkshire Post* from 1901 highlighted, the area was sparsely populated, save for a small number of farms and lands owned by Lord Masham, which meant that the Corporation would not have to engage in an expensive and protracted series of compulsory land purchases in order to protect the water from pollution as they were doing in the Washburn Valley at that time.¹⁷

The first indication that nature would not be so easily tamed in the Ure Valley came during an arbitration case between the Corporation and Lord Masham for land to construct the reservoirs. As they had done previously with large landowners in the Washburn Valley, the Corporation offered a monetary sum to Lord Masham as well as exclusive sporting rights to the reservoirs. Indeed, in defence of his client, Corporation lawyer Balfour Browne employed notions of Romanticism, arguing that Lord Masham's view 'would probably be very much improved...the valley would be a

¹¹*Yorkshire Post (YP)*, 3 Jan. 1901, 6.

¹²*Ibid.*, 30 Aug. 1901, 6.

¹³McTominey, 'Bad neighbours?', 32–3.

¹⁴*Leeds Mercury (LM)*, 15 Feb. 1902, 19; 31 Jul. 1903, 4.

¹⁵*Ibid.*, 31 Jul. 1903, 4.

¹⁶Filliter, *Report*.

¹⁷*YP*, 30 Aug. 1901, 6.



Figure 1. Map showing the Ure Valley, North Yorkshire, and the position of proposed Leeds waterworks (in roman) in relation to Bradford waterworks (in italics).

great deal more beautiful by the existence of these reservoirs'.¹⁸ The notion of reservoirs, as feats of urban engineering, improving the countryside was well established by the early twentieth century both in Britain and abroad – beautifying the landscape and further taming nature was often an important justification for waterworks projects.¹⁹

However, the suitability of the land for reservoir construction was first questioned by the noted geologist Professor Boyd Dawkins from Owens College, Manchester, who was consulted as expert witness at the arbitration. He argued that, after examining the borings at the proposed site of Colsterdale Reservoir, the land was composed of boulder clay, sand and gravel at least 135 feet below the surface, meaning that a safe foundation for the reservoir could only be established beyond that depth. As well as also having to break through a line of coal to reach this safe level, Dawkins also argued that carving out an embankment and water-tight trench would be an expensive venture.²⁰ While these same issues did not affect the proposed site for Leighton Reservoir, the engineering expertise of Leeds Corporation was brought into

¹⁸LM, 8 Jun. 1903, 5.

¹⁹F. Zimmer, 'Nature, nation and the dam. Narratives about the harnessed waterfall in early twentieth-century Sweden', *International Journal for History, Culture and Modernity*, 7 (2019), 171–208.

²⁰LM, 8 Jun. 1903, 5.

question by this evidence. These fears were less than assuaged by the testimony of Henry Rofe, a civil engineer from Westminster who later acted as a consultant for the Corporation on the scheme.²¹ He argued that the site was not ‘specially adaptable, but it was suitable enough’.²² Although Rofe’s assessment was not as damning as Dawkins’, it is clear that there were concerns over the suitability of the Colsterdale site that Leeds Corporation had not accounted for in its original assessment.

These warnings, though, went unheeded by the members of Leeds Corporation. The lack of investigation into these claims reflects poorly on members of the Waterworks Committee and the wider Corporation, as well as the city engineer, E.J. Silcock, perhaps driven by their faith in the ‘Promethean Project’, the idea that urban engineering could overcome and improve upon the rural wilderness.²³ There is no evidence in the minutes of the Waterworks Committee that a reappraisal of the geological evidence would take place in light of Dawkins’ testimony. It was also forgotten by the city’s newspapers which had reported on the arbitration. This was a strange omission given the role that local newspapers played in holding local government to account during this period, particularly the conservative and fiscally conscious *Yorkshire Post*, as well as their role in reporting the actions of local government to an increasingly large and literate electorate.²⁴ Much of the coverage from the Leeds newspapers following the arbitration concentrated on efforts to obtain parliamentary powers to construct a light railway system in the Ure Valley, first in conjunction with Harrogate Corporation, which was in the process of constructing Roundhills Reservoir in the area, and then a separate bill that was rejected due to fears of damage to land owned by local residents.²⁵ Plans for the building of Colsterdale Reservoir, though, continued apace, with the Corporation awarding the construction tender in March 1905 to Messrs Robert McAlpine and Sons for £296,863.²⁶

The potential issues that had been highlighted by Dawkins soon came to pass, demonstrating that the ability to tame nature was not absolute. In June of the same year, members of the Waterworks Committee were alerted to ‘serious slips in the side of the Valley’, resolving to appoint Rofe to assess the damage.²⁷ The new city engineer, George Hensell, reported to the Waterworks Committee in September that work on Colsterdale Reservoir could not proceed at that time due to the need to make alterations to the plans ‘owing to the nature of the strata through which the puddle trench will have to be sunk’.²⁸ The construction of Colsterdale Reservoir was fast becoming unmanageable, culminating in a meeting of the Corporation in October. The Corporation had sought further consultation from the civil engineers Charles Hawksley and James Watson of Bradford.²⁹ The main issue stemmed from the

²¹West Yorkshire Archives Service (WYAS) LCC22/1/8, ‘Leeds Waterworks Committee minutes vol. 8, 1903–1910’, 90.

²²*LM*, 11 Jun. 1903, 3.

²³M. Kaika, *City of Flows: Modernity, Nature, and the City* (Abingdon, 2005), 12.

²⁴C. O’Reilly, ‘Creating a critical civic consciousness: reporting local government in the nineteenth century provincial press’, *Media History*, 26 (2020), 249.

²⁵*YP*, 20 Nov. 1903, 4; *LM*, 27 Apr. 1904, 3.

²⁶WYAS/LCC22/1/8, ‘Leeds Waterworks Committee minutes vol. 8, 1903–1910’, 79–80.

²⁷*Ibid.*, 90.

²⁸*Ibid.*, 104.

²⁹*YP*, 5 Oct. 1905, 4.

position of the embankment, which, as Dawkins had suggested, was to lay on unstable land, and the trench. The chairman of the Waterworks Committee, J.H. Armitage, stated that he was so worried about the position of the embankment and the trench, having undertaken survey work himself, that he contacted Hensell before he began his role as city engineer. Inspecting the site together, Hensell stated, “If I am appointed to Leeds I shall accept no responsibility in any shape or form if the embankment and trench are to be constructed in this way.”³⁰ Armitage then proceeded to criticize the former city engineer Silcock who had presided over the planning of the scheme:

In four years no less than £4000 was paid Mr. Silcock, civil engineer, for engineering work in the city. Of that amount £2008 was paid to that gentleman for drawings and plans and surveys which, in the ordinary course of things ought to have been done in the Engineer’s office. Nine guineas a week were being paid for assistance which could have been done in the City Engineer’s office by men at 50s a week.³¹

An editorial in the *Yorkshire Post* further quoted Armitage, stating that the evidence of examinations undertaken by Hawksley, Watson and others had revealed “one of the most shocking exposures...in connection with the work of any city”. The editor continued that such was the state of the scheme that no one within or outside of the Corporation had any idea how much the scheme would eventually cost.

Despite the warnings of Dawkins two years earlier, the Corporation had faith in Silcock’s ability to tame the wilderness, even if that faith had been misplaced. Although geological tests had been undertaken in 1902, the composition of the land at Colsterdale and the integrity of the area on which the embankment was due to be constructed were either underestimated or seen as issues that could be overcome.³² It is clear that lessons had not been heeded from the subsidence of land in the Washburn Valley as a consequence of the construction of reservoirs in that area less than 25 years earlier, emphasizing the impact that cities could have on rivers and landscapes.³³ The criticism of Silcock, though, highlights an issue beyond the construction of a reservoir; it shows a dysfunctional element of Leeds’ local government during the early twentieth century, especially in its members’ attitudes towards the environment. Not only did the Corporation pay Silcock for his services, which were found to be lacking in the case of Colsterdale, but work was completed at a higher cost than necessary. It emphasizes the shift in power within local government to experts, those who were deemed to have the necessary understanding of specialist issues who could then inform councillors of the best course of action to take. This power dynamic had clearly gone askew in the case of Colsterdale

³⁰*Ibid.*

³¹*Ibid.*

³²WYAS/LCC22/1/7, ‘Leeds Waterworks Committee minutes vol. 7, 1896–1903’, 304–5.

³³A. McTominey, ‘A tale of two Yorkshire villages: the local environmental impact of British reservoir development, c. 1866–1966’, *Environment and History*, 26 (2020), 331–58; Evenden, ‘Beyond the organic machine?’, 708.

Reservoir, signalling the potential dangers of imbuing such powers into the hands of the wrong expert.³⁴

Armitage, as chairman of the Waterworks Committee from 1905 to 1906 when he retired due to ill-health, was a key factor in bringing the failures of Colsterdale to light. By November, the tender to McAlpine and Sons had been rescinded, although Colsterdale Reservoir was not completely abandoned until August 1906 after further consultation with Rofe.³⁵ The liberal *Leeds Mercury* was scathing in its assessment of the Conservative-run Corporation and their handling of this project. Although the project had started when Liberals had controlled the Corporation:

the Tories then came to power, and in their zeal for wild-cat improvement schemes in the centre of the city, neglected the question of a water supply until they suddenly discovered that Harrogate had gone to Parliament with a bill to secure all the best part of the [Ure] valley that Liberals had previously prospected. Leeds also rushed in with its bill, but it only amounted to locking the stable door after the horse had been stolen. Harrogate won the day, and secured the best of the watershed, and Leeds had to content itself with the rest.³⁶

The *Mercury* then contended that of the 29 contract drawings prepared, over 300 serious mistakes were discovered, including the supposed depth of the embankment, which would have required an extra £227,000 to complete in addition to the original £300,000 estimate for Colsterdale.³⁷ A further article in the *Mercury* the following day argued that Conservative members of the Corporation were attempting to deflect blame onto Silcock, as well as experts that had appeared in the arbitration with Lord Masham who had argued positively for the Colsterdale site. However, the *Mercury* wrote:

Yet in spite of these and many other explicit warnings, the Tory party went merrily into their scheme. They took none of the extra precautions which the experts stated to be necessary... In view of these facts, it is impossible to resist the conclusion that Leeds has had a narrow escape from what might have proved an almost overwhelming disaster.³⁸

While it was easy for the *Mercury* to play politics with the issue, and it is important to remember that the paper did not highlight negative testimony raised during the arbitration phase, it is evident that serious mismanagement of municipal affairs occurred during the period of Conservative majority in the Corporation.

The scheme to construct Colsterdale Reservoir came to an end in 1906, although the Ure Valley project continued. A special report by the *Leeds Mercury* described a visit to Colsterdale to examine the land. Although the original site had been found defective, the paper reported that surveyors had tested the land around the original site in order to find a more suitable location for the reservoir. As the reporter for the *Mercury* noted, 'Colsterdale should form a really fine gathering ground, for it is all

³⁴B.M. Doyle, 'The changing functions of urban government: councillors, officials and pressure groups', in M. Daunton (ed.), *The Cambridge Urban History of Britain*, vol. III: 1840–1950 (Cambridge, 2000), 287–314.

³⁵WYAS/LCC22/1/8, 'Leeds Waterworks Committee minutes vol. 8, 1903–1910', 116, 166.

³⁶*LM*, 29 Aug. 1906, 5.

³⁷*Ibid.*

³⁸*Ibid.*, 30 Aug. 1906, 5–6.

open moorland around... Such few homesteads as exist in the lower part of the valley, threatened under the original scheme, may now possibly escape demolition.³⁹ Damage had already been inflicted by the incident though, not only in wasted time and a lack of a fresh water supply for the city, but also financially. The *Mercury* reported that total expenditure on the scheme by September 1906 was £371,000, a sum that had returned nothing for the Corporation or the residents of the city.⁴⁰ To put that figure into context, the Washburn Valley scheme, featuring three functioning reservoirs and conduits, cost around £550,000.⁴¹

The *Mercury* was pretty clear that blame rested at the feet of the Conservative majority on the Waterworks Committee and the wider Corporation, in addition to Silcock, who was responsible for technical aspects of the project. As Harold Laski noted, the more technical the subject matter, the more power the expert was able to wield over the committee.⁴² The composition of the Waterworks Committee itself largely followed the patterns of earlier iterations of Leeds Corporation, occupied by men from a variety of backgrounds including retail, manufacturing, banking and the legal profession, none of which required technical knowledge of water engineering. Members of the committee also served on other committees within the Corporation, so water supply was not their sole priority. Laski was keen to praise 'the curious combination of amateur and expert' that made up committees in local government, which often worked due to the 'reasonable standards of education' amongst elected officials.⁴³ In the case of the Ure Valley, though, a lack of technical understanding, or an inherent belief in the ability to deal with problems thrown up by the landscape, meant that the system did not work as well as it could.

In terms of party politics, the Conservatives held a majority on the Waterworks Committee for much of the 1890s; however, it was the Liberal councillor Alf Cooke who held the chairmanship during the instigation of the Ure Valley scheme. Liberals were as culpable in signing off on Colsterdale as the Conservatives. Furthermore, this incident fitted a pattern of municipal mismanagement that had long affected Leeds; as E.P. Hennock has highlighted, a typhoid epidemic in the middle-class suburb of Headingley in 1889 and a violent gas workers' strike a year later did much to end the electoral hopes of Liberals towards the end of the 1890s. It was hoped that the Conservative majority would sweep away entrenched interests, particularly on the aldermanic benches; however, this incident demonstrates that the Corporation's woes were not behind them.⁴⁴ It also partly explains why the Colsterdale incident had seemingly little effect on the municipal elections of 1906, which saw the Conservatives gain a seat from the Liberals. As for Silcock, he went on to have a distinguished career, his reputation unaffected by Colsterdale, although he moved into sanitary engineering rather than waterworks construction following his time in Leeds.⁴⁵

³⁹*Ibid.*, 4 Sep. 1906, 6.

⁴⁰*Ibid.*, 6 Sep. 1906, 6.

⁴¹*Ibid.*, 3 Apr. 1875, 10.

⁴²H.J. Laski, 'The committee system in local government', in H.K. Laski, W.I. Jennings and W.A. Robson (eds.), *A Century of Municipal Progress 1835–1935* (London, 1935), 93.

⁴³*Ibid.*, 106; A.M. Carr-Saunders and P.A. Wilson, *The Professions* (Oxford, 1933), 486.

⁴⁴E.P. Hennock, *Fit and Proper Persons: Ideal and Reality in Nineteenth-Century Urban Government* (London, 1973), 231–46.

⁴⁵*Yorkshire Observer*, 8 Apr. 1938, 4.

Communication between the Waterworks Committee and the borough engineers often went unrecorded, reports written only when major incidents occurred, so the level of scrutiny applied to experts is missing from the archival record. However, in the report submitted to the Waterworks Committee after Armitage's and Henzell's discovery, Henry Rofe attempted to provide some cover for himself and his beleaguered colleagues: 'We all acted together. I was as responsible as Mr Hewson or Mr Hill for the selection of those sites'.⁴⁶ In admitting as much, Rofe was demonstrating the trait of engineers to close ranks in the face of mishaps and accidents, as happened following the collapse of Dale Dyke Reservoir, Sheffield, in 1864.⁴⁷ There was blame to go around, from committee members to engineers to the local press, who had previously held local government to account on issues around water supply. But above all, this incident demonstrates the attitudes of municipal authorities to the environment, seen by engineers and councillors alike as a malleable entity to be shaped as needed. It cost several hundreds of thousands of pounds for those in Leeds to discover that the environment was not as malleable as they thought, and would affect water politics in Leeds in the years that followed.

Waterworks and consumer politics in Leeds

Despite the mismanagement of the Colsterdale Reservoir scheme, and the financial costs it had incurred, the city of Leeds was still in need of a new source of water. The joint report by Rofe and Henzell to the Waterworks Committee that recommended abandoning Colsterdale also recommended the Corporation begin immediate preparations for the construction of Leighton Reservoir, the second of the original five reservoirs in the Ure Valley.⁴⁸ This recommendation was approved by the committee, and then the full Corporation, within a matter of days of the report being produced.⁴⁹ The *Leeds Mercury's* visit to the Ure Valley noted that work on trial holes, in order to examine the geology of the proposed site, were already underway, one day before the Corporation agreed to proceed with Leighton, highlighting the urgency shown by engineers to make up for lost time.⁵⁰ The threat of a water shortage also loomed over Leeds, which may have hastened the actions of engineers. Indeed, the *Leeds Mercury* proposed that the Corporation purchase Roundhills Reservoir from Harrogate Corporation in order to avoid a water famine that was believed to be less than three years away.⁵¹ However, like the proposal to build a joint railway for their respective waterworks, neither town proceeded further with this prospect.

The worries reported by the *Mercury* belied two wider concerns. First, Leeds Corporation was not used to being in a position of inferiority with regard to neighbouring towns. The opening of Leeds Town Hall in 1858 by Queen Victoria presented Leeds as a key industrial town of the British empire, emphasized by the presence of the monarch and the opening of a landmark civic building that was larger

⁴⁶WYAS/LLD1/3/47/112, 'Colsterdale Reservoirs reports of engineers', 17.

⁴⁷S. Ewen, 'Sheffield's great flood of 1864: engineering failure and the municipalisation of water', *Environment and History*, 20 (2014), 177–207.

⁴⁸WYAS/LCC22/1/8, 'Leeds Waterworks Committee minutes vol. 8, 1903–1910', 116, 167.

⁴⁹*Ibid.*, 168.

⁵⁰*LM*, 4 Sep. 1906, 6.

⁵¹*Ibid.*, 29 Sep. 1906, 4.

and grander than any other in the West Riding.⁵² From that point, Leeds Corporation had further displayed its civic authority through successful competition with Bradford for water gathering grounds.⁵³ Leeds' councillors, therefore, were accustomed to projecting the Corporation's civic authority, aided by the reporting of local newspapers that sought to boost the reputation of Leeds, rather than relying on neighbouring towns. Indeed, the failure of Colsterdale had been picked up by a number of newspapers in other towns and cities including Nottingham, Hull, London and Sheffield.⁵⁴ In a multi-part series on rival towns, the *Sheffield Daily Telegraph* wrote critically of Leeds' water history, completely ignoring their own, more fatal, dam disaster in the process.⁵⁵ The second issue related to the growth of consumer politics during the late nineteenth century. The development of constant water supply to cities in Britain in the 1880s, and the further implementation of baths and toilets, led to the normalization of water supply to the home.⁵⁶ Thus, disruption to water supply in the form of drought was not just a climatic issue, but also a consumer issue as water had been incorporated into the 'politics of everyday life'.⁵⁷ A potential disruption to water supply in Leeds as a consequence of municipal mismanagement, then, was a threat to civic status and may have potentially resulted in political mobilization.

Despite fears of drought, the process to begin the construction of Leighton was a drawn out affair. Tenders for the construction of the reservoir were not sought until 1908, with reports from Hawksley, Watson and Henzell produced in order to decide between Messrs Morrison and Mason and Messrs H. Arnold and Sons, with the latter awarded the contract for £437,182.⁵⁸ Ground was broken by Fred Ogden, chairman of the Waterworks Committee, in July 1908, with construction expected to last eight years.⁵⁹ A reason for the delay may have been the desire of the Corporation to resuscitate Colsterdale Reservoir, which was clearly meant to be the crowning achievement of the Ure Valley scheme. The *Leeds Mercury* reported in November 1906 that proposals were to be put to parliament 'to put right some of the huge blunders committed while the city was in the hands of the Tory administration', taking time to not repeat the mistakes made at Colsterdale.⁶⁰ Despite the clear desire to keep Colsterdale alive, it was ultimately deemed to cost too much money: Henzell and Rofe estimated that it would cost an eye-watering £1 million.⁶¹

Although the Corporation pushed ahead to try and plan for another Colsterdale Reservoir, a further issue that would be associated with Leighton Reservoir until the late 1920s was first aired: whether the Ure Valley scheme was needed at all. This is a contradiction of sorts, given the repeated calls of the Corporation from the 1880s onwards that a new source of water for the city was urgently required, but a number of

⁵²S. Gunn, *The Public Culture of the Victorian Middle Class: Ritual and Authority in the English Industrial City 1840–1914* (Manchester, 2000), 165.

⁵³McTominey, 'Bad neighbours?', 31–5.

⁵⁴See *Nottingham Evening Post*, 29 Aug. 1906, 7; *Hull Daily Mail*, 6 Sep. 1906, 4; *London Evening Standard*, 15 Jan. 1907, 7.

⁵⁵*Sheffield Daily Telegraph*, 15 Jun. 1912, 8.

⁵⁶V. Taylor and F. Trentmann, 'Liquid politics: water and the politics of everyday life in the modern city', *Past & Present*, 211 (2011), 199–241.

⁵⁷*Ibid.*, 239.

⁵⁸WYAS/LCC22/1/8, 'Leeds Waterworks Committee minutes vol. 8, 1903–1910', 116, 264, 281.

⁵⁹YP, 15 Jul. 1906, 9.

⁶⁰LM, 23 Nov. 1906, 3.

⁶¹WYAS/LLD1/3/47/112, 'Colsterdale Reservoirs reports of engineers', 16.

factors subsequently became apparent. The first was that the city had a seemingly stable water supply. In a meeting of the Corporation in May 1907, Owen Connellan, secretary of the Leeds Trades and Labour Council, posited that the construction of Leighton Reservoir was not necessary at that time, given that the city's reservoirs held 183 days of water. He put forward that the scheme should be delayed, given that it would not be 'remunerative for many years'.⁶² In response, Councillor Ogden, chairman of the Waterworks Committee, argued that the scheme would proceed so that the supply of water to the city increased alongside population. The Waterworks Committee, then, were focusing on future need rather than present demand, an approach taken by other cities in Britain and abroad.⁶³ Additionally, the city's supply would be found wanting if a series of dry summers were to occur.⁶⁴ Although Connellan was a lone voice on this occasion, questions over the need for Leighton Reservoir reoccurred over the course of its construction.

The construction of Leighton Reservoir, though, went ahead. Although positive progress was made on the project, financial issues once more appeared. In assessing the financial aspects of this case, we can begin to see the ways in which waterworks projects could impact not just environment but urban economics and politics, thereby heeding recent calls to pay closer attention to urban economics.⁶⁵ Although the Waterworks Department had turned a profit since 1900, by 1910 the waterworks finances were such that a raise in the rates was necessary. Councillor Arthur Willey, chairman of the Waterworks Committee, claimed that the only money put towards the Ure Valley scheme from this raise would be for Leighton Reservoir, as well as the cost of land and parliamentary expenses relating to a new site for Colsterdale Reservoir.⁶⁶ It is clear that the cost of the Ure Valley venture was starting to tell on the city's finances. According to Willey, £888,000 had been spent on Leighton Reservoir, presumably including the cost of the failed Colsterdale scheme. In addition to an accrument of £100,000 of interest, a further £500,000 would be needed by 1921 to complete the scheme. Without a raise in the rates, the completion of the scheme would not be possible; indeed, Willey was keen to stress that, once completed, Leighton would produce an income of £42,000 a year.⁶⁷

The Ure Valley scheme, then, had not only failed to produce a new source of water for the city by 1911, but had led to an increase in the rates and further burdened ratepayers. It also highlights the weaknesses of municipal socialism in the context of Leeds, a general desire for more infrastructure to cater to future demand rather than a coherent ideology as in other countries.⁶⁸ Given the Conservative control of the Corporation during this period, as well as the lack of ideology, the term municipal

⁶²LM, 2 May 1907, 3.

⁶³M. Cook, L. Frost, A. Gaynor, J. Gregory, R.A. Morgan, M. Shanahan and P. Spearitt, *Cities in a Sunburnt Country: Water and the Making of Urban Australia* (Cambridge, 2022).

⁶⁴*Ibid.*

⁶⁵R. Rodger, 'Putting the economy back in to the city', *Urban History*, 42 (2015), 157–68; R. Harris, *How Cities Matter* (Cambridge, 2021), 16.

⁶⁶LM, 8 Sep. 1910, 3.

⁶⁷*Ibid.*

⁶⁸D.E. Booth, 'Municipal socialism and city government reform: the Milwaukee experience, 1910–1940', *Journal of Urban History*, 12 (1985), 51–74; J. Schmidt, 'Public services in Erfurt and Frankfurt am Main compared (c. 1890–1914): capabilities in Prussia?', *Urban History*, 41 (2014), 247–64.

enterprise would be more appropriate, as Robert Millward has highlighted.⁶⁹ As has been shown with both Leighton and Colsterdale, the literal cost of such an approach could get out of control quickly. It is within this context that the events of 1913 must be viewed. A short article in the *Leeds Mercury* in August 1913 reported that Leeds Corporation had agreed to supply Doncaster, South Yorkshire, with 500,000 gallons a day.⁷⁰ This plan was further examined a month later when it was proposed to also supply Tadcaster, a brewing town in North Yorkshire. The *Yorkshire Post* explained that, following the expected completion of Leighton Reservoir, there would be a daily surplus of 2 million gallons, which would be doubled following the construction of the new Colsterdale Reservoir.⁷¹ Both Doncaster and Tadcaster, as well as the mining area of Hemsworth, were in need of water supplies and had struggled to acquire gathering grounds due to the ongoing competition between urban centres for water. Leeds Corporation could sell its surplus to these towns, thereby making money on the additional waters impounded. This would, the *Yorkshire Post* noted, be welcomed by the ratepayers, as the additional income could be used to lessen the water rates.⁷² The reasons for this surplus were expanded upon by the *Leeds Mercury*, which highlighted the work that the waterworks engineer George Henzell had undertaken to assess how water was being lost within the city's existing infrastructure.⁷³ Information on the relationship between the Waterworks Committee and its engineers is scarce; however, Henzell was certainly in post for longer than Silcock, retiring in 1925 after 20 years with the Corporation, during which time he served as honorary secretary of the British Waterworks Association.⁷⁴ The construction of Leighton Reservoir had already begun when these improvements were undertaken, hence a surplus would accrue once the project was complete.⁷⁵ Although it was difficult to foresee how much infrastructural improvement would benefit the city's water supply in the early 1900s, this is further evidence that the Ure Valley scheme was not as necessary as first thought.

The financial difficulties encountered because of the Ure Valley scheme, as well as the prospect of additional income from selling water to towns in North and South Yorkshire, emphasize the issues towns and cities faced when financing capital infrastructure projects. Up until 1914, central government was unwilling to provide funds for much-needed public infrastructure.⁷⁶ This led cities like Leeds to develop their municipal enterprises, the profits of which were used to fund other infrastructural projects.⁷⁷ The financial burdens brought about by capital projects, as well as an increase in the local tax base as population increased during the period, meant that ratepayers were a politically powerful group.⁷⁸

⁶⁹R. Millward, *Private and Public Enterprise in Europe: Energy, Telecommunications and Transport, 1830–1990* (Cambridge, 2005); E.P. Hennock, 'Central/local government relations in England: an outline 1800–1950', *Urban History Yearbook*, 9 (1982), 38–49.

⁷⁰*LM*, 23 Aug. 1913, 3.

⁷¹*YP*, 10 Sep. 1913, 4.

⁷²*Ibid.*

⁷³*LM*, 10 Sep. 1913, 3.

⁷⁴*Ibid.*, 18 Aug. 1934, 6.

⁷⁵*Ibid.*, 10 Sep. 1913, 3.

⁷⁶R. Millward and S. Sheard, 'The urban fiscal problem, 1870–1914: government expenditure and finance in England and Wales', *Economic History Review*, 48 (1995), 526.

⁷⁷*Ibid.*, 527.

⁷⁸Millward, *Private and Public Enterprise in Europe*, 49.

While the proposed scheme was presented as an opportunity for the Corporation to make money from the surplus water held by the new waterworks, and thereby help to alleviate the financial issues caused by the scheme, it was not seen in this manner by the ratepayers of the city. Criticism came from A. Aspinall, secretary of the Leeds Ratepayers Association, who argued that when Leighton was completed, the city would face interest and sinking fund charges to the amount of £80,000 a year. Under the terms of this plan, Doncaster would have access to nearly half of the supply generated by Leighton for £6,083 a year, a thirteenth of the cost to Leeds. He argued that the full supply would be available to Leeds 'if through unforeseen circumstances it is required, and, if not, Doncaster can feel comfortable that it is running away without costing the town anything'.⁷⁹

This reaction resulted in a ratepayer poll, which saw the motion to supply surplus water to Doncaster, Tadcaster and Hemsworth defeated 5,414 to 4,446.⁸⁰ This was undoubtedly a blow to the areas that would have been supplied with water and Leeds Corporation, which lost a potential source of revenue. Although the Corporation respected the outcome of the vote in the immediate aftermath, Alderman Willey commented that if the scheme did not eventually come to pass then a further raise of the rates was likely.⁸¹ He was later reported by the *Leeds Mercury* as noting: 'It was passed [sic] his comprehension that Leeds people should prefer to let the water run to waste rather than sell it at more than cost price... Nearly every authority on the road to Doncaster was screaming for water.'⁸² Indeed, such were the potential benefits to Leeds and Doncaster that, despite the ratepayer poll, the scheme was back on the table by June 1914. The *Leeds Mercury* reported that this new scheme would involve both Leeds and Harrogate, who were also struggling with a surplus of water from their Roundhills Reservoir in the Ure Valley.⁸³ The article reported that Harrogate Corporation were interested in Leeds purchasing Roundhills so long as they were guaranteed a certain level of supply, showing that Leeds Corporation was not the only municipal authority to overestimate current water demand and the need to construct ever more reservoirs. The outbreak of World War I stopped the progress of these schemes, which were not returned to following the conclusion of hostilities in 1918. If nothing else, the episode demonstrated a growth of interest in water politics amongst certain residents of Leeds, mirroring earlier developments in other cities like London and Sheffield.⁸⁴ It also demonstrates the importance of the economic aspects of waterworks management, a factor sometimes neglected within environmental histories of the city.

Conclusion

World War I disrupted construction at Leighton Reservoir, the base of which became a training ground for the Leeds' Pals Battalion. Work on the reservoir did not resume until 1921.⁸⁵ Initial work was completed in 1926; however, a contract was taken out

⁷⁹*LM*, 29 Oct. 1913, 3.

⁸⁰*Ibid.*, 4 Feb. 1914, 3.

⁸¹*Ibid.*

⁸²*Ibid.*, 30 Jun. 1914, 3.

⁸³*Ibid.*, 8 Jul. 1914, 3.

⁸⁴Taylor and Trentmann, 'Liquid politics', 199–241.

⁸⁵*YP*, 5 Nov. 1921, 10.

with the Francois Cementation Company in 1928 to complete remedial work. This meant that water from the Ure Valley did not reach Leeds until 1933.⁸⁶ Leighton was also the last waterworks project to be completed in the Ure Valley by Leeds. A memorandum from the Ministry of Housing and Local Government from 1955, when Leeds Corporation was applying for powers to construct a fourth reservoir in the Washburn Valley, noted that further geological tests had taken place at the proposed sites for Carlesmoor and Laverton reservoirs. It concluded that reservoirs on these sites would be 'doubtful propositions' that were prohibitively expensive, particularly when considered in relation to their probable yield.⁸⁷

Although Leighton Reservoir was not required to supply water to Leeds when completed in 1926, the use of the reservoir from 1933 onwards shows that it was a necessary project in the long run. This was further emphasized by the water shortages of the 1950s that saw Leeds Corporation construct a fourth reservoir in the Washburn Valley. It could be argued, then, that the Ure Valley project was prudent forward planning. However, the project did not deliver for the city for a number of decades, long after the predictions of water shortages in the early 1900s had failed to materialize. As John Hassan has noted, despite the growth of high-pressure water systems facilitating changes in standards of living such as indoor toilets and plumbed baths, the effects of these changes on water demand were not felt until after World War II.⁸⁸ Ultimately, the Ure Valley project was marred with ecological and financial problems throughout. It was during the project's inception in the 1900s that the nexus of poor municipal decision-making, inadequate expert knowledge and a lack of oversight from the city's newspapers came together, resulting in the Corporation wasting hundreds of thousands of pounds.

Two themes emerge from this analysis. First, it emphasizes the role that engineers, as expert municipal employees, played in governing the city into the twentieth century. In other words, it further highlights the role of unelected experts as agents of urban governance. As municipal departments grew and policy became more complex, more power was ceded to the expert.⁸⁹ While councillors maintained overall control of their departments, the lack of understanding of the intricacies of, in this instance, large-scale water engineering, meant that the municipal engineer was trusted to know how best to transform the rural landscape. As Moore and Rodger have noted, the effects of leaving control in the hands of permanent officials could be disastrous for the city.⁹⁰ Not only was Colsterdale poorly planned, showing an insufficient understanding of the landscape, but the need for the Ure Valley scheme was called into question. The expert engineer had failed in producing a viable scheme and in estimating the needs of the city. Instead of instigating a cheaper examination of water infrastructure, as was done by the incoming engineer George Henzell, Leeds Corporation was enticed by what Maria Kaika has termed the 'Promethean Project', the desire to shape the rural environment with urban engineering, to emphasize the scientific prowess of the city.⁹¹ However, while the Colsterdale scheme was the result

⁸⁶WYAS/LLD1/1/A7306, 'Work at Leighton Reservoir'; *LM*, 18 Sep. 1933, 7.

⁸⁷The National Archives, Housing and Local Government files 127/29 memorandum from C.J. Pearce, 21 Mar. 1955.

⁸⁸J. Hassan, *A History of Water in Modern England and Wales* (Manchester, 1998), 53–5.

⁸⁹Doyle, 'The changing functions of urban government', 297.

⁹⁰Moore and Rodger, 'Who really ran the cities?', 53.

⁹¹Kaika, *City of Flows*, 12.

of too much power being ceded to the expert engineer, the work of Henzell from 1906 onwards emphasizes that this model could work. The issue for Leeds Corporation was that it had misplaced this power in the wrong expert and paid the price throughout the project's lifetime.

Second, the article shows the multiple ways in which waterworks projects could impact cities and their environments. Despite mounting evidence that Colsterdale was an unsuitable site for a reservoir, the Waterworks Committee and the wider Corporation continued to advocate for a structure on that land through the early 1900s and even into the 1950s, underlining their belief in the ability of the engineer to tame the wilderness and provide natural resources for the city. Colsterdale stands as an example of the limits of this environmental attitude. This failed project negatively affected the city's sense of civic identity, but it also became an avenue through which ratepayers became involved in the water politics of the city. Leeds Corporation spent around £300,000 for no return at Colsterdale. This fact, as well as the reaction of ratepayers to proposals to sell surplus water to Doncaster and Tadcaster, illustrates the enormous economic impact that waterworks projects had on civic finances, as well as the interest of certain sections of the city's population to engage with how the city conducted its affairs. As such, the Ure Valley became a site of socio-nature, a space remade by social, economic, political and natural forces.

Waterworks schemes were difficult for local governments to manage because they were enormous and costly infrastructural projects that likely entailed setbacks. As seen in the case of Leighton, even when the project was progressing well, what to do with surplus water became a thorny issue that brought economics and consumer politics to the fore. While other major industrial cities in England such as Liverpool and Birmingham were able to complete their own waterworks projects in spite of minor issues, the scale of the failure of Colsterdale seems unique to Leeds. Studying the water history of a city like Leeds, then, can help to provide a more holistic history of the urban arena, bringing together environmental, economic and political histories of the city. Waterworks projects were enormous cultural symbols of the city's ability to tame nature for the benefit of urban populations, but they also impacted the environmental, political, economic and consumerist attitudes of the city.

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