



Learning from the Past

Delivery of water and sanitation services to the poor in nineteenth century Britain

Introduction

At the turn of the 19th century, Britain was undergoing enormous changes, in response to the need for labour in manufacturing industries. There was an unprecedented scale of migration from rural to urban locations, leaving urban settlers with poor housing options and standards of public health. This led to high incidences of killer diseases such as cholera and high infant mortality rates.

This briefing note summarises the historical development of the provision and financing of water and sanitation services in 19th century Britain, outlining the involvement of the private sector and government initiatives and legislation to effect change. It also summarises the drivers behind those changes – both social and economic – and documents the pace at which change occurred.



Headline facts

What were the factors leading to the provision of water and sanitation services for the poor in nineteenth century Britain?

- *Social and demographic change*
 There was inadequate housing, water and sanitation provision to meet the demands of a rapidly growing urban population in the developing manufacturing towns and cities.
- *Drivers for change*
 There was growing social concern about water and sanitation related health issues and the high incidence of death and disease. However, the major factor behind public health and sanitary reform was the economic benefit of ensuring a healthy workforce.
- *Changes in governance*
 Public health legislation, at the same time as local government reform, had a slow and limited impact. The financing of improved service provision was not achieved in a systematic way and was limited by the lack of central government funding and the reliance on individual responsibility.



Illustrated Times 1863

Social and Demographic Change

During the 19th century there was a rapid migration of rural workers to the new manufacturing towns. This was due to several factors - the loss of agricultural livelihoods with the enclosure of common land, the system of poor relief and the response to the introduction of the factory system. It led to unprecedented population growth, e.g. between 1821 to 1831 there was an average increase of 2.5% per annum in English and Welsh cities.

Although accommodation was built in response to increased demand, living conditions for the urban working classes were extremely inadequate, with many housed in cramped tenements, back-to-back and cellar dwellings.

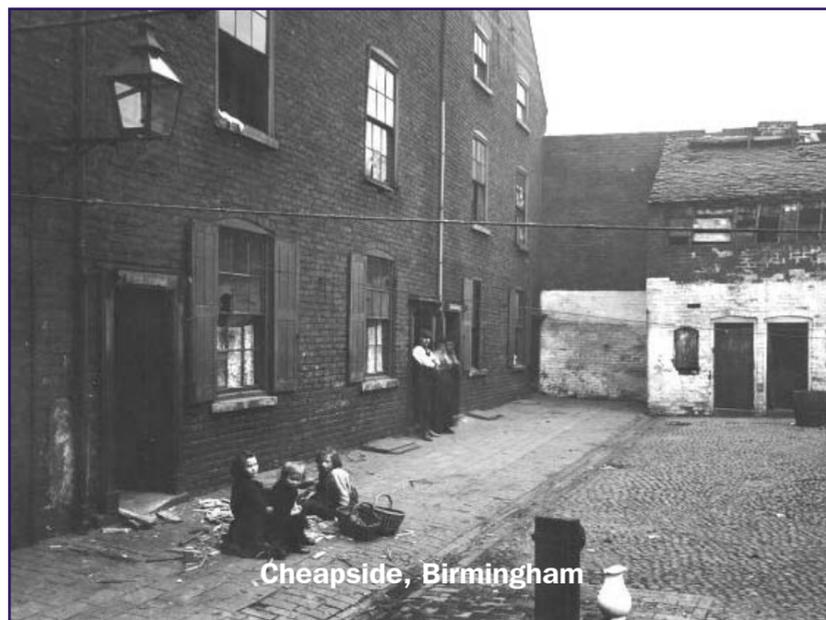
- In 1840, a quarter of the population in Liverpool lived in overcrowded, unventilated courts and ten per cent lived in cellars.
- An investigation into a cholera outbreak in Newcastle-upon-Tyne in 1854 revealed that half of all working families lived in a single room, having no independent water supply or toilet facilities.

Public Welfare

The 1601 Poor Law had provided relief for the poor within their parish, financed by the poor rate (a tax based on land and buildings). Outdoor relief was given in the form of food and clothing to the able bodied poor; the workhouse provided indoor relief for the sick, the elderly and those incapable of finding employment.

By 1780, the Poor Law system was strained, and came to be seen as encouraging large families and reducing potential benefits to the 'deserving poor'.

The 1834 Poor Law Amendment Act was designed to reduce the costs of poor relief. The workhouse became the focus of provision, based on the principle of 'less eligibility', i.e. that conditions in the workhouse should be worse than the lowest living standards outside, thereby acting as a deterrent to others.



Cheapside, Birmingham

Drivers for Change

Social concerns

Public concern were raised about the health of the working classes:

- Housing conditions were reported by journalists, social commentators and writers such as Dickens, Gaskell and Engels.

These houses of three or four rooms and a kitchen form, throughout England, some parts of London excepted, the general dwellings of the working-class. The streets are generally unpaved, rough, dirty, filled with vegetable and animal refuse, without sewers or gutters, but supplied with foul, stagnant pools instead. Moreover, ventilation is impeded by the bad, confused method of building of the whole quarter, and since many human beings here live crowded into a small space, the atmosphere that prevails in these working-men's quarters may readily be imagined.

Condition of the Working Class in England (Fredrich Engels 1845)

- Improved record keeping procedures by doctors, parishes and county councils provided statistical evidence that the poor were increasing in number, while their life expectancy was decreasing.
- More was learned about the causes of water and sanitation-related disease. Public awareness was raised about issues such as drainage, safe water, air, light and housing, with the emergence of many Health and Sanitation Associations acting as pressure groups and petitioning Parliament for improvements.
- Royal Commissions were set up by the government to investigate the living conditions of the poor and carrying out numerous investigations during the 19th century.

Seminal events

An important factor affecting the political will to bring about improvements in public health was peoples' own experience of death and disease related to poor water and sanitation, or the fear of them. This affected all classes, including the powerful and wealthy, as all were potential victims. A number of events further strengthened support for sanitary reform:

- *Cholera epidemics*
Cholera first affected Britain in 1831 and became the country's biggest killer. Subsequent outbreaks in 1848, 1853 and 1866 resulted in thousands more deaths.
- *1852 The Grand Experiment*
From 1845-52, an experiment was carried out involving 300,000 people, half of which drank water contaminated with sewage from the Thames and half drinking clean water from the Lambeth Waterworks Company. Mortality patterns by water source were compared, strengthening John Snow's hypothesis of a link between cholera transmission and water (below).

John Snow and the 1854 Broad Street Pump Incident

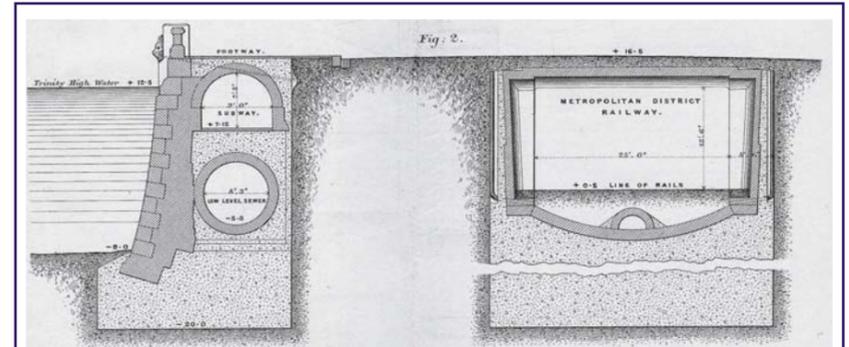
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500 deaths occurred in Soho, London within ten days in 1854, of people of all classes. John Snow mapped out these cases, thereby implicating a single, contaminated well in Broad Street. When the pump handle was removed, the spread of cholera stopped.

Snow also demonstrated that water drawn by suppliers from downstream in the Thames, into which many sewers flowed, caused a death rate 14 times that of water from companies drawing upstream. In spite of these findings, public health improvements in Soho were slow to come about.

1858 The Great Stink

By 1853, most London houses were connected to sewers. However, these discharged into the Thames resulting in extreme unsanitary conditions and stench, causing the river to become known as the Great Stink. A high enough level of taxes could not be imposed to solve this and finally in 1859, measures outlined in the 1852 Metropolitan Water Act were adopted, with water supply intakes moving upstream of sewerage outlets and the construction of an intercepting sewer system to improve the flow of water.



Section through Victoria Embankment including sewer.

Economic concerns

The level of investment in public health and sanitary reform was low. The main drivers for improvement were based on firm economic benefits:

- The benefits of these reforms for the nation were valued according to the costs incurred of losing a productive worker, which would far exceed the cost of sanitation investment.
- Improvements in the nation's health would also reduce Poor Law costs, which would in turn offset the increase in water and sanitary expenditure.
- The initial costs of connecting to a water supply were placed on the householder. As far as the poor were concerned, they were not in a position to make this investment. They were not well informed about the benefits, and drainage and water supply required neighbourhood cooperation, their tenancies were short term and in any case, many were simply too poor.
- Ultimately, the economic benefit derived from a fit workforce was more persuasive than any moral obligation to the needy. If the initial investments offered improved health, then this made good economic sense. Fewer deaths of labourers also reduced the burden of support to their families. The trade unions were also active in the sanitary reform movement, they too having economic motives which would benefit workers' earning power.

Economic considerations were central to both the incentives and penalties relating to water and sanitation service improvements. This is an explanation of the reluctance by some local authorities to install arterial drainage systems:

"the difficulties of sewage disposal, including the probable penalties of river pollution, together with an inherent reluctance to the spending of large sums of money in sewerage operations and in the provision of an improved water supply necessitated by the adoption of water carriage" (1898).

Changes in Governance

Laissez-faire to state intervention

Government involvement in social policy and public health was minimal, while laissez-faire principles were dominant. These were based on the ideas of the political economist Adam Smith, who advocated free trade, in turn stimulating competitiveness and innovation, leading to economic growth and benefits for all. Taxes were raised mainly to fight wars, with any notion of public welfare being the responsibility of the local parish. By the mid 19th century the ideal of laissez-faire was deeply entrenched in British society and consequently in 1869, only 2.1 % of all state expenditure went on government departments.

Unprecedented population growth outstripped economic growth during the 1800s. For this reason, government began to move towards a more central interventionist stance on social and economic matters, including public health, to mitigate some of the impacts of uncontrolled capitalism. This state intervention was only grudgingly conceded and had a limited impact until later in the century. It came about more due to the need to protect the workings of a free trade economy than out of a concern for public welfare. There was both a fear that the prevailing insanitary conditions could threaten the livelihoods of the rich and a belief that improvements would make cities not only healthier but more efficient.

Direct tax revenue and charges

From 1835 onwards, several different types of rates became payable, which included payments for 'improvements' 'main sewer rates', 'lamp rates', 'highway rates' and a 'borough rate' to fund the Police Force. As an example, in Leeds the 'main sewer rate' was imposed from 1848 onwards on areas designated as drainage districts, served by the main sewerage system. In 1893 these various rates were combined into the 'consolidated rate'.



A court for King Cholera

Local government reform

At the turn of the 19th century, about 15% of the urban population lived in towns under corporation rule. This did not necessarily mean they enjoyed effective local government, as corporations were private rather than public institutions, protecting their members' property interests more than the welfare of their citizens.

Political reform began with the 1832 Reform Act by extending the franchise to non-property owners, but this did not affect local corporations. A later bill in 1835 required the election of corporations. The reform acts were administered by the middle classes who favoured low rates and supported an inefficient and unjust taxation system, producing inadequate sources of revenue. Consequently, these changes did not impact positively on the low levels of spending on drainage and water supply. The 1867 Municipal Corporations Act extended the eligible electorate further, giving them limited influence in municipal matters.

The 1835 Municipal Corporations Act and the 1848 Public Health Act had little impact on local responsibility for health matters. By 1861, only 3% of the population of Birmingham could vote for town council members and thereby influence investment in sanitation (this figure was 13% for Leeds).

Local Improvement Trusts & Boards

Based on the belief that strong central authority was needed to supervise local sanitary services, improvement commissioners worked to counter corruption and inefficiency.

Nottingham Borough records (1883) show the existence of a variety of improvement committees, including the Improvement Committee (roads, water, land and buildings), the Water Bill Committee, the Water Supply Committee, the Waterworks Bill Committee and the Sanitary Committee.

Public health legislation

Due to the Sanitary Reform Movement, a series of acts were passed in an attempt to improve conditions in the growing urban areas, many of them based on the findings of Royal Commissions. Central government achieved the transition from permissive to compulsory legislation by establishing measures to replace local municipal autonomy with the imposition of duties on local authorities. However, improvement was slow and patchy, and it was not until the latter half of the century that significant reductions in mortality and morbidity were seen. Although legislation required there to be household connections to water and sewerage systems, the effect was limited as there was no direct Treasury funding and householders themselves often had to bear these costs.

Some of the main legislative measures were:

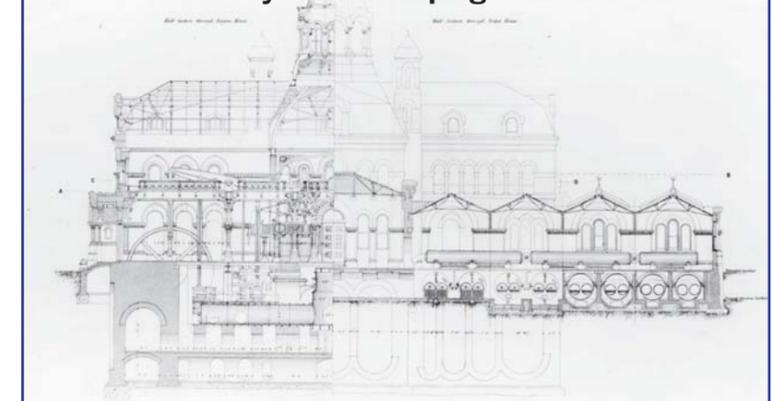
- **1844 Metropolitan Buildings Act** required that all newly constructed buildings within 30 feet of the common sewer had to have connections to it, with improved drain construction.
- **1847 Town Improvement Clauses Act** legalised the discharge of sewage into rivers and the sea, and allowed its sale for agricultural purposes. It also encouraged drainage, paving, cleansing and lighting.
- **1848 Public Health Act** was the first of its kind and created a Central Board of Health with powers to supervise street cleaning, refuse collection, water supply and sewerage disposal. The act was only mandatory in towns where the death rate exceeded 22 per thousand. Householders were obliged to pay for sewer connections. Progress was slow: after only 30 years 12% of houses had water closets.

At such times, a stranger, looking from one of the wooden bridges thrown across it at Mill Lane, will see the inhabitants of the houses on either side lowering from their back doors and windows, buckets, pails, domestic utensils of all kinds, in which to haul the water up; and when his eye is turned from these operations to the houses themselves, his utmost astonishment will be excited by the scene before him. Crazy wooden galleries common to the backs of half-a-dozen houses, with holes from which to look upon the slime beneath; windows, broken and patched, with poles thrust out, on which to dry the linen that is never there; rooms so small, so filthy, so confined, that the air would seem too tainted even for the dirt and squalor which they shelter; wooden chambers thrusting themselves out above the mud, and threatening to fall into it - as some have done; dirt-besmeared walls and decaying foundations; every repulsive lineament of poverty, every loathsome indication of filth, rot, and garbage; all these ornament the banks of Folly Ditch.

Description of Jacob's Island creek on the Thames, from *Oliver Twist* (Charles Dickens 1837)

- **1852 Metropolis Water Act** required water filtering by water company suppliers at a cost of £7 million.
- **1866 Sanitary Act** was a response to the failure of previous legislation and allowed action to be taken against local authorities providing inadequate sewer services and water supply. It called for comprehensive sewerage and water connection of all houses, street cleaning and legislated against overcrowding, to be enforced by Sanitary Inspectors.
- **1872 Public Health Act** divided England and Wales into Health Authority districts, having responsible sanitary authorities with an appointed Medical Officer of Health and an Inspector of Nuisances.
- **1875 Public Health Act** was the most comprehensive legislation to date, covering housing, sewage, drainage, water supply and contagious disease. All new sewers were public and the property of the local authority. All new housing had to have 'self contained sanitation and water services'.
- **1890 Housing of the Working Classes Act** aimed to rationalise and strengthen existing legislation, providing housing standards, slum clearance and council house building.
- **1936 Public Health Act** exemplified the slow pace of change, as this 20th century legislation empowered local authorities to require that water closets replaced privy, pail and earth closets. Householders had to pay half the cost of conversion and were responsible for emptying cesspools and providing water closets with water.

Abbey Wells Pumping Station



Corporation takeovers took place in Manchester (1847), Leeds (1852) and Bradford (1854). The Edinburgh Water Company was superseded by a Water Trust for the city and district in 1869. The Nottingham Waterworks Company remained in private hands until 1880, when it was compulsorily purchased under the 1879 Improvement Act. The nine London water providers remained in place, despite frequent debate about buying them out, and it was not until 1902 that London's water finally passed into the hands of the Metropolitan Water Board.

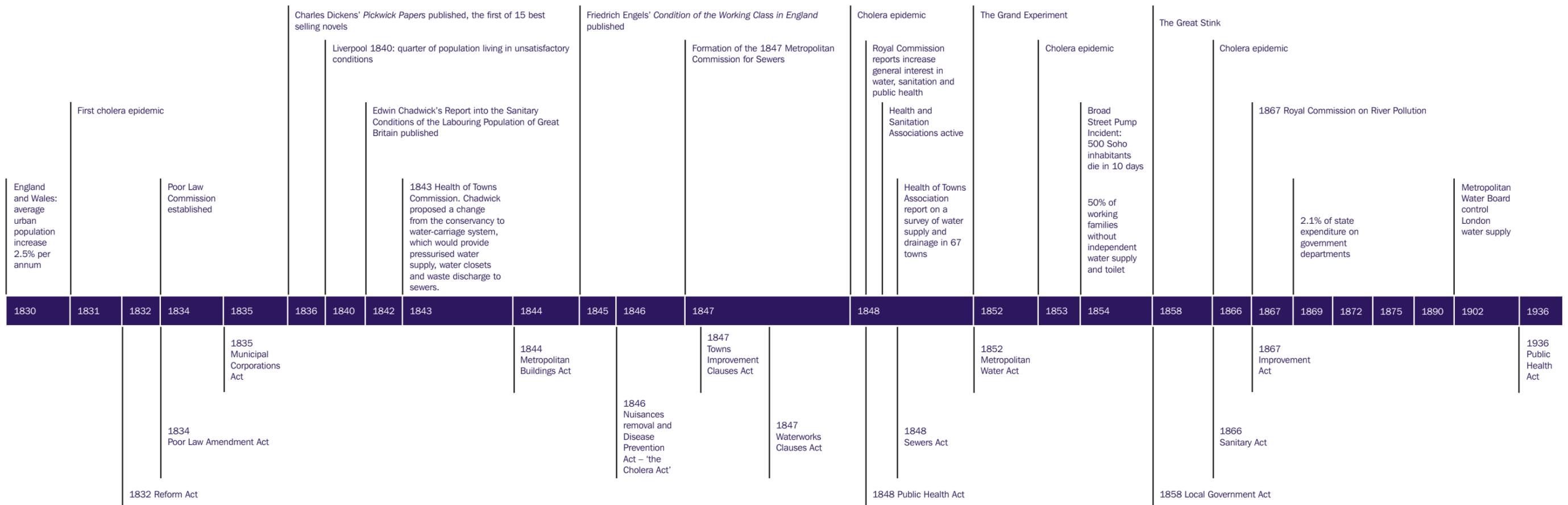
Public and private sector involvement

The number of water companies increased during the early 19th century, with provision transferring to the private sector in many cities. Although these companies sometimes improved and extended service provision, private enterprise failed to provide adequate supply to the poor. In Bath in 1845, seven companies supplied the city's water as well as the Corporation, but there were only three stand pipes for use by the poor at certain times. Prior to the Waterworks Clauses Act (1847), charges paid to water companies were unregulated. This legislation standardised some practices and charging for domestic and industrial purposes. Although water meters were installed in the late 1800s, universal metering was never carried out. However, things turned full circle as the 1835 Municipal Corporations Act and later Improvement Acts allowed their compulsory purchase by civic authorities.

At the same time, there was a succession of privately funded sewer construction developments. Not until the 1848 Public Health Act were local authorities compelled to implement sanitary law, and even then the financial burden was on the householder. After the 1867 Improvement Act it was possible for local authorities to take out loans at favourable rates to develop services, raising the level of investment dramatically. Regulations governing local authority borrowing were a major factor in the financing of sewerage developments, and the level of investment in sewage disposal rose dramatically from 1870. The increased wealth of the labouring urban classes also led to higher spending on their own standard of living, including sanitation.

Some costs were offset by the sale of nightsoil as manure. However, this became a less economically viable option. In 1842, Chadwick noted that London had two hundred thousand cesspools. The cost of emptying these by nightsoil men was approximately one shilling each. These charges compare unfavourably to the average daily wage of a workman at the time of three shillings. Chadwick's inspectors found night soil in cellars to a depth of three feet, from overflowing privies and cess pools because people could not afford these charges. The high cost was partly due to the fact that the urban mass of cities was expanding, making farms ever more remote, combined with the fact that an alternative fertiliser in the form of guano (solidified bird droppings) was available cheaply from South America.

Timeline



Lessons Learned

Economic Drivers of Change

Whilst there were widespread social concerns about the conditions in which poor people lived, this was insufficient on its own to force the pace of change. It was only when taken in combination with powerful economic concerns about the need to have a healthy and therefore productive workforce that sanitary reform gathered pace. If investments in better water supply and sanitation offered improved health, then this made good economic sense and drove change.

This offers lessons for latter day advocacy work in international development. Whilst it might be less comfortable to go for playing a strong “economic card” of the healthy workforce supplying labour to the economy, it worked in the past.

Governance

Public health reform moved ahead in 19th century England through a combination of broader political reform and specific policy legislation. The process of urban decentralisation was gradual, incorporating greater influence of an expanding electorate with an increase in authority of municipal bodies over public health matters. There was no consistent approach to financing and a lot of improvements were the responsibility of householders. Involvement of the private sector was complex. Urban water supply was largely in the hands of the private suppliers and was gradually taken over by public bodies, but there remained the problem of supplying the urban poor.

Time frame for change

The changes described in this Note cover a period of 100 years during which a complex mix of political reform, policy legislation and economic drivers of change came together. Yet in the 1930's in industrial towns in England and Scotland, George Orwell could still report graphically on the appalling housing and sanitary conditions in several industrial towns. The world is a very different place from England in the 1860's, but in its drive to achieve development targets within 10 years, the international development community could do well to reflect on these early developments in sanitary reform.



This Briefing Note summarises the historical development of the provision and financing of water and sanitation services in 19th century Britain.

Key references

- Williamson, J.G., (1990) *Coping with city growth during the industrial revolution*. Cambridge; Cambridge University Press.
- Thompson, B., (1984) *Infant mortality in nineteenth century Bradford*. In Woods, R. and Woodward, J. Urban disease and mortality in nineteenth century England. London; Batsford Academic and Educational Ltd.
- Black, M., (1996) *Thirsty cities: water, sanitation and the urban poor*. WaterAid.

Full details of all the material used in support of this briefing note are available at www.Lboro.ac.uk/well

DFID Resource Centre in Water, Sanitation & Environmental Health
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Photographs supplied by the British Library, The Institute of Civil Engineers, Birmingham Library Services (Local Studies and History) and Sarah Parry-Jones.

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IWSD, Harare, Zimbabwe
LSHTM at University of London, UK

TREND, Kumasi, Ghana
SEUF, Kerala, India
ICDDR, B, Dhaka, Bangladesh
NETWAS, Nairobi, Kenya

This note was funded by the UK Department for International Development (DFID).
The views expressed, however, are not necessarily those of DFID.

Published by WEDC on behalf of WELL

Social and Demographic Change

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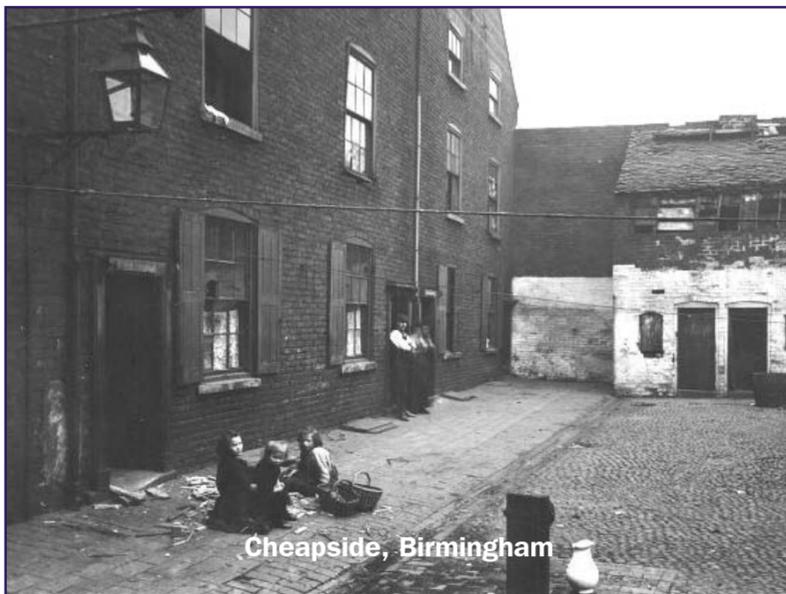
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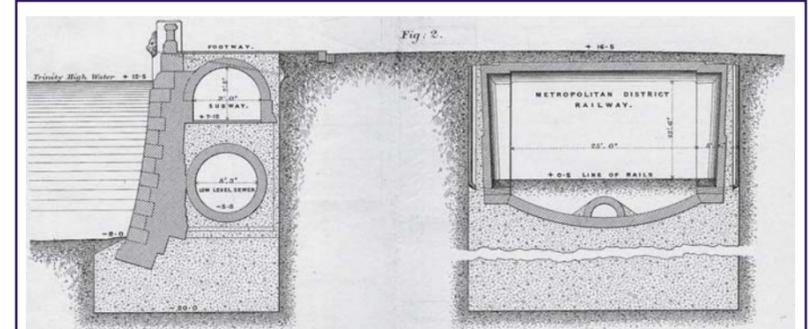
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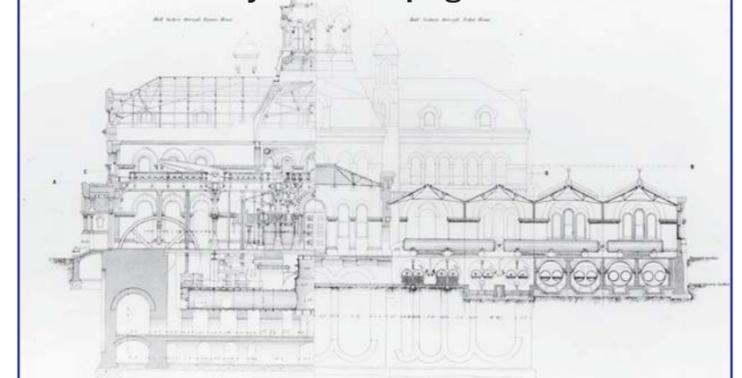
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- **1847 Town Improvement Clauses Act** legalised the discharge of sewage into rivers and the sea, and allowed its sale for agricultural purposes. It also encouraged drainage, paving, cleansing and lighting.
- **1848 Public Health Act** was the first of its kind and created a Central Board of Health with powers to supervise street cleaning, refuse collection, water supply and sewerage disposal. The act was only mandatory in towns where the death rate exceeded 22 per thousand. Householders were obliged to pay for sewer connections. Progress was slow: after only 30 years 12% of houses had water closets.

At such times, a stranger, looking from one of the wooden bridges thrown across it at Mill Lane, will see the inhabitants of the houses on either side lowering from their back doors and windows, buckets, pails, domestic utensils of all kinds, in which to haul the water up; and when his eye is turned from these operations to the houses themselves, his utmost astonishment will be excited by the scene before him. Crazy wooden galleries common to the backs of half-a-dozen houses, with holes from which to look upon the slime beneath; windows, broken and patched, with poles thrust out, on which to dry the linen that is never there; rooms so small, so filthy, so confined, that the air would seem too tainted even for the dirt and squalor which they shelter; wooden chambers thrusting themselves out above the mud, and threatening to fall into it- as some have done; dirt-besmeared walls and decaying foundations; every repulsive lineament of poverty, every loathsome indication of filth, rot, and garbage; all these ornament the banks of Folly Ditch.

Description of Jacob's Island creek on the Thames, from *Oliver Twist* (Charles Dickens 1837)

- **1852 Metropolis Water Act** required water filtering by water company suppliers at a cost of £7 million.
- **1866 Sanitary Act** was a response to the failure of previous legislation and allowed action to be taken against local authorities providing inadequate sewer services and water supply. It called for comprehensive sewerage and water connection of all houses, street cleaning and legislated against overcrowding, to be enforced by Sanitary Inspectors.
- **1872 Public Health Act** divided England and Wales into Health Authority districts, having responsible sanitary authorities with an appointed Medical Officer of Health and an Inspector of Nuisances.
- **1875 Public Health Act** was the most comprehensive legislation to date, covering housing, sewage, drainage, water supply and contagious disease. All new sewers were public and the property of the local authority. All new housing had to have 'self contained sanitation and water services'.
- **1890 Housing of the Working Classes Act** aimed to rationalise and strengthen existing legislation, providing housing standards, slum clearance and council house building.
- **1936 Public Health Act** exemplified the slow pace of change, as this 20th century legislation empowered local authorities to require that water closets replaced privy, pail and earth closets. Householders had to pay half the cost of conversion and were responsible for emptying cesspools and providing water closets with water.

Abbey Wells Pumping Station



Corporation takeovers took place in Manchester (1847), Leeds (1852) and Bradford (1854). The Edinburgh Water Company was superseded by a Water Trust for the city and district in 1869. The Nottingham Waterworks Company remained in private hands until 1880, when it was compulsorily purchased under the 1879 Improvement Act. The nine London water providers remained in place, despite frequent debate about buying them out, and it was not until 1902 that London's water finally passed into the hands of the Metropolitan Water Board.

Public and private sector involvement

The number of water companies increased during the early 19th century, with provision transferring to the private sector in many cities. Although these companies sometimes improved and extended service provision, private enterprise failed to provide adequate supply to the poor. In Bath in 1845, seven companies supplied the city's water as well as the Corporation, but there were only three stand pipes for use by the poor at certain times. Prior to the Waterworks Clauses Act (1847), charges paid to water companies were unregulated. This legislation standardised some practices and charging for domestic and industrial purposes. Although water meters were installed in the late 1800s, universal metering was never carried out. However, things turned full circle as the 1835 Municipal Corporations Act and later Improvement Acts allowed their compulsory purchase by civic authorities.

At the same time, there was a succession of privately funded sewer construction developments. Not until the 1848 Public Health Act were local authorities compelled to implement sanitary law, and even then the financial burden was on the householder. After the 1867 Improvement Act it was possible for local authorities to take out loans at favourable rates to develop services, raising the level of investment dramatically. Regulations governing local authority borrowing were a major factor in the financing of sewerage developments, and the level of investment in sewage disposal rose dramatically from 1870. The increased wealth of the labouring urban classes also led to higher spending on their own standard of living, including sanitation.

Some costs were offset by the sale of nightsoil as manure. However, this became a less economically viable option. In 1842, Chadwick noted that London had two hundred thousand cesspools. The cost of emptying these by nightsoil men was approximately one shilling each. These charges compare unfavourably to the average daily wage of a workman at the time of three shillings. Chadwick's inspectors found night soil in cellars to a depth of three feet, from overflowing privies and cess pools because people could not afford these charges. The high cost was partly due to the fact that the urban mass of cities was expanding, making farms ever more remote, combined with the fact that an alternative fertiliser in the form of guano (solidified bird droppings) was available cheaply from South America.

Timeline

