



BRISTOL
WATER

175 YEARS

of
BRISTOL WATER

A social history
1846 – 2021



A social history of Bristol Water 1846 – 2021

This pictorial and social history is not intended to be comprehensive or chronological. It deliberately focuses on some of the personal stories, engineering feats, technological advances and social interactions to illustrate the story of Bristol Water at the time of its 175th birthday on 16 July 2021. Wherever possible, the articles and information written at the time have been used. We deliberately mix chronological and thematic stories.

The hope is that this record will share the inspiration and learning that has driven the current staff at Bristol Water to focus on its social purpose and the positive impact that the provision of clean water can have on the wellbeing of society. We hope this history helps to inspire the current and future generations to value water supplies and to want to work in the water industry. It complements the Bristol Water Foundation and Resource West initiatives that are our current partnerships seeking to build on this history.

Iain McGuffog

Acknowledgements

- Members of the Bristol Water history group, who share a passion for Bristol Water's history
- Professor Chad Staddon, University of the West of England and ever enthusiastic fount of knowledge on water history
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- Frederick C Jones, *The Bristol Waterworks Company 1846 – 1946*
- A Hodgson, *The Story of Bristol Waterworks Company 1939 – 1991*
- J. Thornton & P. Pearson (2013), *Bristol Water Works Company; a study of nineteenth century resistance to local authority purchase attempts*



Introduction

On 16 July 1846, Bristol Water Works Company (later known as Bristol Waterworks and finally Bristol Water) was formed by an Act of Parliament. Among the founders was a philanthropic core including Francis Fry, Quaker George Thomas, six-times Lord Mayor Sir John Kerle Haberfield and William Budd, a man of significant medical talent who was among the first exponents of the germ theory and the importance of sanitation. Life expectancy in Bristol at the time was 29, 10 years less than in the surrounding area.

The Act authorised the development of infrastructure to support the company's supply of water from three main sources: the cold springs of Barrow Gurney, the spring at Harptree Coombe and the springs at Chewton Mendip, the latter of which was most important. Many aspects of water and environmental protection to this day have roots in this Act, from controls on abstraction to social tariffs.

The Line of Works, an 11-mile aqueduct, carried water from the Mendips to Barrow Gurney via a gravity-fed route of tunnels and bridges and onwards to Bristol.

A reservoir was built at Barrow Gurney to receive the water, and compensation reservoirs at Sherborne and Chew Magna were constructed to maintain the flow of the River

Chew. In addition, service reservoirs were built at Bedminster Down, Clifton and Durdham Down to help maintain a constant flow of water to the city.

Bristol Water has continued operating from 1846 to this day, and retains a clear social purpose to protect public health through clean water, as well as addressing the social, climate and ecological crises of today.

175 YEARS of BRISTOL WATER



Water in Bristol before Bristol Water

An example of an original wooden "trunk" main



Water supplies in Bristol existed as far back as medieval times. There were three main pipe systems: the Quay pipe, St John's pipe and All Saints' pipe, with conduits that ran from Brandon Hill to College Green and St Mary Redcliffe. In 1376 a plumber, Hugh White, was responsible for the maintenance and in return was allowed to collect £10 a year from the rent received from properties on Bristol Bridge. However, if the supply failed for more than six days, he was fined £10. This is probably the first example of economic regulation with outcome incentives in the water industry!

Bristol Corporation (the predecessor to Bristol City Council) only maintained the springs at Boiling Wells and the Quay pipe, reflecting the attention placed on the city's ports as international trade and fortunes grew (including wealth made from the slave trade). Other supplies fell into disuse and by the 17th century the supplies in the city had become polluted.

The first Bristol Water Works Company was set up on 5 February 1695. It proposed taking water from outside the city on the River Avon at Hanham Mills and received Royal Assent in 1696. It was to be funded by a Water Rate of £2 per house and the system was completed by 1698.

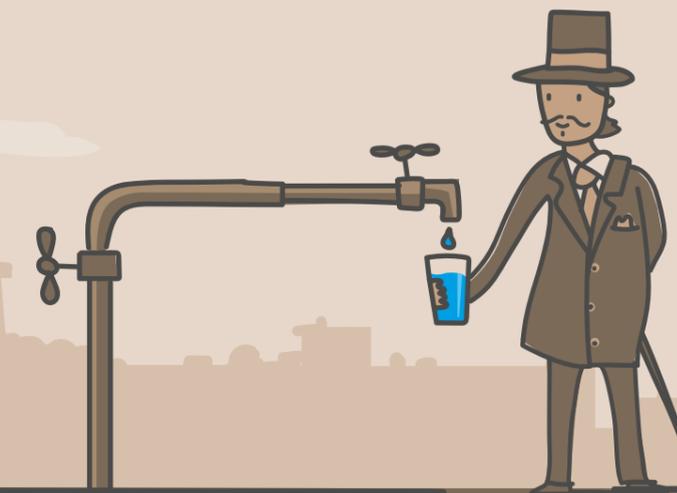
It went bust in 1782 and laid dormant until 1811. There had been a Bath to Bristol canal scheme planned in 1720, which an Act of Parliament attempted to reinvigorate in 1811. This came to nothing as the Bristol Corporation were not helpful, demanding replacement of the wood pipes with lead pipes on Bristol Bridge as part of the scheme.

The Merchant Venturers set up Bristol and Clifton Water Works in 1840. This was an organisation which had a monopoly on the city's maritime trade and was often difficult to separate from the Bristol Corporation – for instance, managing the Quay on its behalf. They proposed to improve the water supply, but only to residents living in Clifton, employing Brunel as the engineer to design and supervise the works.

A rival group, the Bristol Waterworks Company, proposed a scheme to supply the whole city, bringing in clean water from the Mendip Hills. The two schemes were debated in the House of Commons in 1846. The result was a preference for the Bristol Waterworks scheme and as a result, Bristol Waterworks was founded.

Our history

We were founded to allow the city and communities to grow and prosper



1840

The beer in Bristol is better for you than the water.

1845

Two groups wanted to supply water — merchants for the wealthy parts and the philanthropists for the whole of the city.

1846

Act of Parliament approved the philanthropists to supply everyone, not just the wealthy few.

1847

Pure water from the Mendips first supplied to Bristol.

Who set up Bristol Waterworks?

Dr William Budd

Dr Budd argued that the best way to limit the spread of cholera was by supplying the city's residents with water from "healthy quarters ... or sources beyond the reach of contamination" (see right).

Sir John Kerle Haberfield

Six-times Lord Mayor of Bristol, solicitor and attorney who was Chairman of Bristol Waterworks from 1852 to 1857.

Francis Fry

The son of Bristol chocolatier, J.S. Fry, Francis Fry was Chairman of Bristol Waterworks from 1874 to 1886. He helped to introduce railways in the west of England, was a collector of rare Bibles and preserver of local beauty spots.

The 1846 Act authorised the design of an 11-mile Line of Works to carry water from the Mendips to Bristol, and a reservoir at Barrow Gurney. Additional acts allowed two further reservoirs to be built in 1862 and 1882. The acts include detailed plans for the supply to the city.

James Simpson, the engineer, wrote to the directors on 2 October 1847 to advise that water had successfully been distributed to the city from Barrow.



XIV. And be it enacted, That *George Eddie Sanders, John Kerle Haberfield, John Bates, George Thomas, Richard George Shum Tuckett, Charles Bowles Fripp, William Hooper, Philip Jones, William Budd, Richard Fry, Francis Fry, and Robert Leonard*, shall be the first Directors of the Company.

Dr William Budd

Dr William Budd recognised that clean sources of water were needed to avoid the spread of Cholera. In the early 1840s, the Bristol Medico-Chirurgical Society had used a microscope to examine "rice-water" – the highly liquid stools from those suffering from cholera. A common organism was found. At the same time Budd was examining drinking water using a microscope and found the same organism.

Budd had identified that both in Bristol Quay and on the River Thames, sailors in port were particularly susceptible to cholera, as they were drinking water from stagnant water where sewage sediment existed in the silt of the river. This supported his hypothesis that the disease was waterborne and linked to water polluted from sewage.

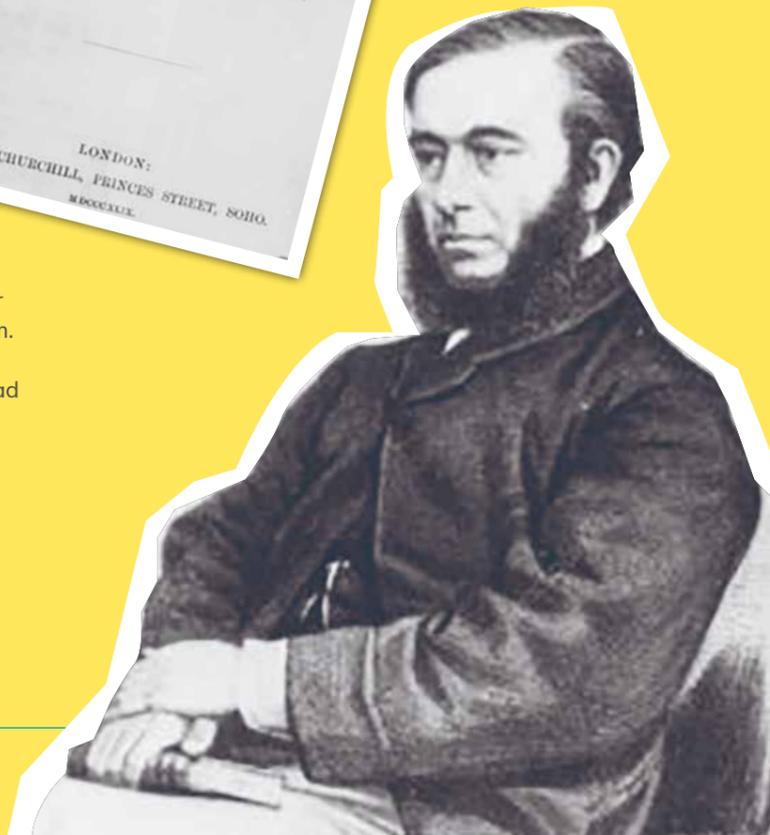
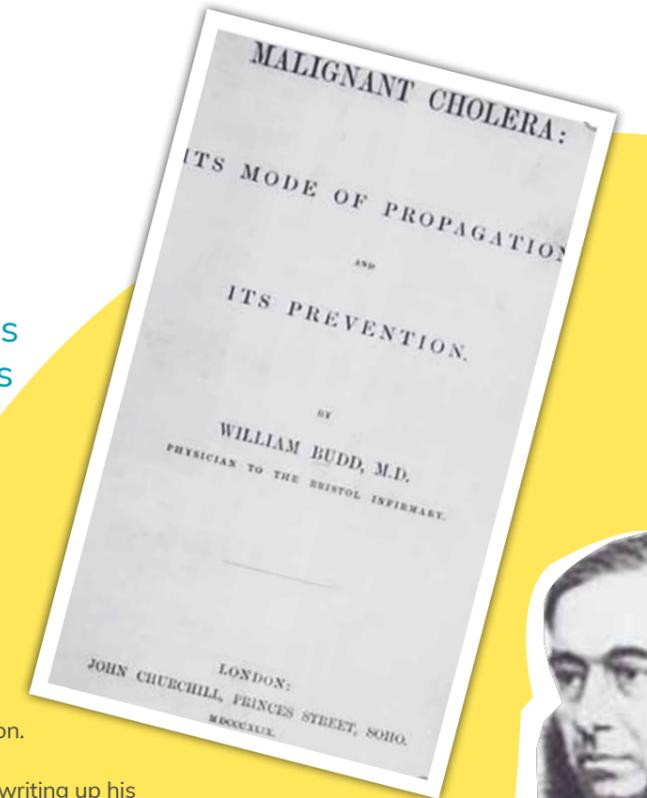
Budd concluded that clean water was essential to avoiding disease, as well as disinfection playing a role in reducing the spread of cholera. This finding went against the perceived wisdom at the time that disease was spread through bad smells in the air.

Although Budd incorrectly believed the organism he had identified to be a fungus, it supported the independent analysis that fellow physician Dr John Snow had

undertaken of the spread of cholera around the Broad Street pump in London.

Budd was not aware of this work until writing up his conclusions several years later, but acknowledged Dr Snow's discovery in his work identifying the organism.

By the time he had written his findings in 1849, he had already seen Bristol Waterworks start to bring clean water from the Mendip springs in order to supply the people of Bristol.



Budd's social purpose

It is clear that Budd saw a social duty, through common humanity, to provide a solution to cholera to the rich and poor in society alike.

Budd's concluding words at the time feel just as relevant for climate and ecological emergencies today.

"I cannot conclude these observations on cholera, and its mode of propagation, without remarking how important it is – even in regard to their own interests – for the Rich to attend to the physical wants of the Poor. To do this is one of our first and plainest duties. The duty itself we may evade, but we cannot evade the sure penalties of its neglect. By reason of our common humanity, we are all more nearly related here than we are apt to think. The members of the great human family are, in fact, bound together by a thousand secret ties, of whose existence the world in general little dreams. And he that was never yet connected with his poorer neighbour by deeds of Charity or Love, may one day find, when it's too late, that he is connected with him by a bond which may bring them both, at once, to a common grave."

"From this day forward, let the people of infected districts be supplied with water from healthy quarters, or from sources beyond the reach of contamination; or if this be not feasible, let steps be taken to rid the water they are compelled to drink of the deadly poison it holds. This, probably, might be done by very simple means. It is more than probable, even, that the act of boiling would suffice. But if boiling the water should not succeed, it might be distilled rather than fail. Such a process as this could, of course, not be employed to purify the drinking-water of a large community, but many a family now living in fear and trembling in a tainted district would be too happy to purchase the slightest addition to its means of safety at so small a cost."

Supplying clean water to the whole of the city through a private company was one of the first examples of the fusion of a commercial venture with a strong social purpose, benefiting rich and poor alike. Budd did not just write about the need to act, but was instrumental in the founding of the Bristol Water Works company.

Extract from Budd's "Malignant Cholera: Its causes and propagation"

1. In the fact, that—from the manner in which the discharges of cholera patients are disposed of—it is into water (through the sewers) that the poison commonly passes in the first instance, and always in the greatest quantity; and that in water, therefore, it must always most abound.
2. In the well-known tendency of cholera to follow the course of streams.
3. In its known partiality for low levels.
4. In the striking immunity (on the whole) of persons who only *visit* infected places, and who do not eat and drink there.
5. In the singular concentration of the disease, in many instances, in courts and other limited localities, while the inhabitants of the immediate neighbourhood remain perfectly healthy.
6. In the successive outbreak of cholera, in its most violent form, in different parts of the same town, separated from one another by large healthy districts, but between which, *communication by water (through sewers) may be shown to be ready and direct.*
7. In the frightful fatality of the disease in particular parts of infected towns, in which the drinking-water of the inhabitants has been *known* to be contaminated by the contents of sewers.
8. In the fatality of the disease in vessels in the rivers of infected towns; and especially in such vessels as draw

Francis Fry

Francis Fry was one of the three sons of the founder of the Bristol chocolate firm, J.S. Fry & Sons. Under the three Fry brothers, they were the largest commercial producer of chocolate in the UK. In 1847 the Fry's chocolate factory, located in Union Street, Bristol, moulded a chocolate bar suitable for large-scale production. The firm began producing the Fry's Chocolate Cream bar in 1866. More than 220 products were introduced in the following decades, including production of the first chocolate Easter egg in the UK in 1873.

Fry played a part in the introduction of railways in the west of England and was a member of the board of the Bristol and Gloucester Railway, which held its first meeting on 11 July 1839, retaining his position during various amalgamations of the line until its union with the Midland Railway. He was also a director of the Bristol and Exeter Railway and other companies.

He was a Quaker and collector of rare Bibles, known in particular is his discovery and reproduction of William Tyndall's New testament (*The First New Testament printed in the English Language* (1525 or

1526), translated from the Greek by William Tyndale, reproduced in facsimile, with an Introduction, Bristol, 1862).

Fry was known as a preserver of local beauty spots.

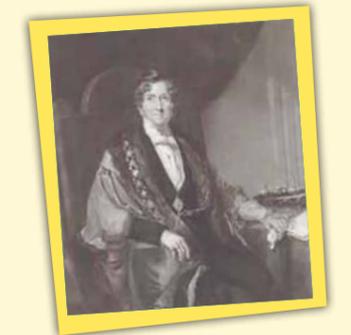
All of these interests appear linked to his impact on Bristol Water. He designed the great seal of the company, which was inspired by Cheddar and the Biblical story of Moses smiting the rock, and took a major share in managing the Bristol Waterworks Company (1846). He became Chairman in 1874 and held this position until his death in 1886.



Sir John Kerle Haberfield

Haberfield was Mayor of Bristol no less than six times and was probably better known for this role rather than for his profession as a solicitor and attorney. He was said to be a convivial man who enjoyed presiding over the banquets, dinners and festivities which often came his way as Mayor (Chief Magistrate). It was also said his "showy equipage with postillion, in the old style, was familiar with most inhabitants" (*Bristol Worthies* by AB Freeman, 1907).

Prior to the establishment of Bristol Water, a question arose about the quality of water provided in the courtroom and a sample was handed up for the opinion of the magistrates. Sir John declined the offer, saying he had not tasted water for 30 years and did not feel qualified to pass his judgement upon it. This opinion may have driven his later interest in Bristol Waterworks providing clean water and reducing the public's reliance on beer (which was safer to drink than water – and no doubt contributed to the number of court cases over which he had to preside).



Together with the other directors (including Francis Fry and William Budd), Sir John took part in the annual inspection of the Line of Works from the Mendip springs to the Barrow tank reservoirs.

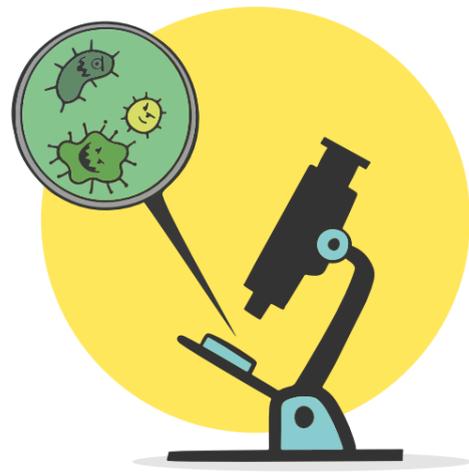
Sir John became Chairman in 1852 and held this post until his death in 1857. His obituary described him as being "open as the day to melting charity" and noted that he regarded all citizens of Bristol as equals, irrespective of background.

His time at 10 Guinea Street in Bristol was featured in the BBC production *A House Through Time*. This period included his role as Mayor in avoiding further riots in Bristol following the voting down of the second Reform Bill of 1831. It was this air of reform in Bristol that maintained Sir John's interest at the first meeting of Bristol Waterworks at the White Lion Inn on 15 October 1846.

The battle to provide Bristol with water

In 1840 a government commission stated that “there are few if any large towns in England in which the supply of water is as inadequate as at Bristol”.

While Bristol Waterworks (BW) and the Merchant Venturers went head-to-head to improve water supplies, another battle was building between those who believed the water supply needed to improve and those who wanted to focus on drainage and street cleaning (scientific consensus at the time was that cholera was spread through the air).



The average age at death in Bristol was 29 years, 10 years lower than of Tetbury and Cirencester. This was believed to be due to atmospheric impurity linked to defective drainage and poor cleaning due to the lack of proper water supplies. The increasing impurities of well-water was recognised, but effective drainage was believed to be able to resolve this (it was the hardness of the well-water that was seen as an issue).

A recently discovered report reveals that there was another rival to BW – The Town Improvement Company (TIC), which attacked the proposals of Budd and co.

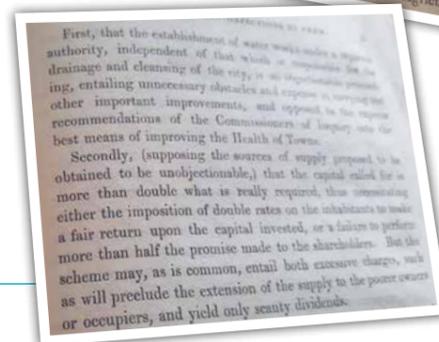
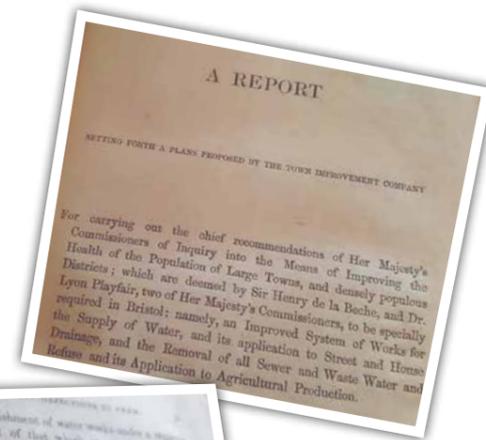
Thomas Baring Esq, MP for Huntingdon, was a trustee of the TIC and, alongside his fellow trustees, proposed spending less than BW on water infrastructure (£80,000 instead of £200,000), with the balance of capital spent on drainage and street sweeping. They would only serve c20,000 properties out of 60,000, using pressurised pipe supply rather than tanks in properties.

The TIC published a pamphlet stating that citizens and BW shareholders had been misinformed by the following objections:

1. A waterworks separate to drainage and cleansing authorities
2. The capital is double what is really required, and would therefore result in excessive returns on investment and charges

The TIC wanted a pressurised and continuous rather than intermittent supply with tanks, but would only serve the rich areas. This was on the grounds that water-carriers charge 1/2d per pailful but BW would supply 280 gallons to the poorest households for 3 1/2d. They objected to the cross subsidy to higher users and the middle/upper classes.

The TIC hired scientists to survey the Chew River water that BW planned to use and stated it was too hard for a water supply. They estimated that it would cost households £20,000 in additional soap costs for cleaning.



Some of the concerns of the TIC were correct, but were anticipated in the BW Act proposals. Clean water began to flow to the city from the Mendip springs in 1848. Despite this, it was 10 years before the first dividend was paid and then only a modest amount. The average for the next three years was only 2% and the £25 share sold much below par, often only for £8. It wasn't until 1872 that the anticipated 10% dividend could be paid for the first time.

The original shareholders retained their confidence in the approach, considering BW to be a “not for profit” company, with the Act including profit sharing and dividend controls, alongside a lot of other components of public water service expectations that still feature in statutory and regulatory expectations for the water sector today.

Voting rights of the stockholders were limited to 20 each, irrespective of the number of shares owned. This arrangement continued until Bristol Water became a PLC in 1990. The new regulatory framework introduced at the time of the privatisation of the 10 regional water and sewerage companies did not readily allow for such deliberately restrictive arrangements to continue.

Clauses contained within the Bristol Water Works act of 1846

Clause	
VIII	Gearing controls – Mortgages limited to £66,000 on top of £200,000 equity
IX	Special administrator appointed if more than £20,000 outstanding on interest/mortgage payments
XVIII	Dividend limited to 10%
XX	Profit sharing – if contingent fund exceeds £20,000, water rent reduced – monitored by local Justice of the Peace in an annual submission
XXI	Accounts available for public inspection, including executive salaries
XXII	Plans available to public – search fee of 1/6d “per 100 words copied”
XXIV	Land entry powers
XXVIII	Abstraction rights and minimum flow provisions
XXXI	Reservoir engineer completion certificates
LIII	Over abstraction penalties - £20 per day
LVIII	Obligation to supply / provide tanks
LIX	Obligation to maintain and clean tanks once a year
LXIV	Power to dig up streets etc
LXV	Aqueduct to be covered to protect from surface water run off
LXVI	Have to leave road passable when digging up
LXVIII	Highway permit notice (48 hours, unless an emergency)
LXIX	Requirement for supervision by Highways authority
LXX	Streets to be reinstated without delay, with 12 month defect period
LXXI	£5 for each instatement offence, plus 40/ per day “not filling in, making good and taking rubbish away or if not fenced or guarded
LXXIII	Provisions for right to install communication paper to company mains (providing 14 day notice provided to BWW)
LXXXVI	Rateable value charging limits for domestic. 1/ per £1 RV, plus 10/ per Water closet. 10/ private bath or cattle trough
LXXXVII	Principle that Owner or occupier is liable to pay water. Social tariff – reduced tariff based on poor rate rather than rack rate
LXXXVIII	Right to charge all houses even if shared supply pipe
XCI	Non-domestic supply terms by agreement
XCII	Disconnection for non payment
XCIV	Penalty of 20/ per day for refusal/neglect to provide supply (unless in consequence of frost, excessive drought or other unavoidable cause or accident)
XCVII	Separate mains for fire fighting purposes, firefighting water provided free of charge
C	Duty on persons using water to provide a stopcock, and cisterns with ball and stopcock to stop waste. Duty on persons to keep taps in good condition
CII	£5 penalty for wasting water
CIII	Company can repair pipes wasting water and recover cost from occupier.
CIV	Company inspector can enter homes between 10 & 4, having given 12 hours notice when company is concerned on improper use
CVI	£2 penalty for taking water without agreement
CVIII	£10 penalty for bathing in reservoir, or allowing dogs or other animals to do so. £10 penalty for throwing gravel, rubbish or other offensive things in reservoir. £10 penalty for washing clothes, or other things in reservoir

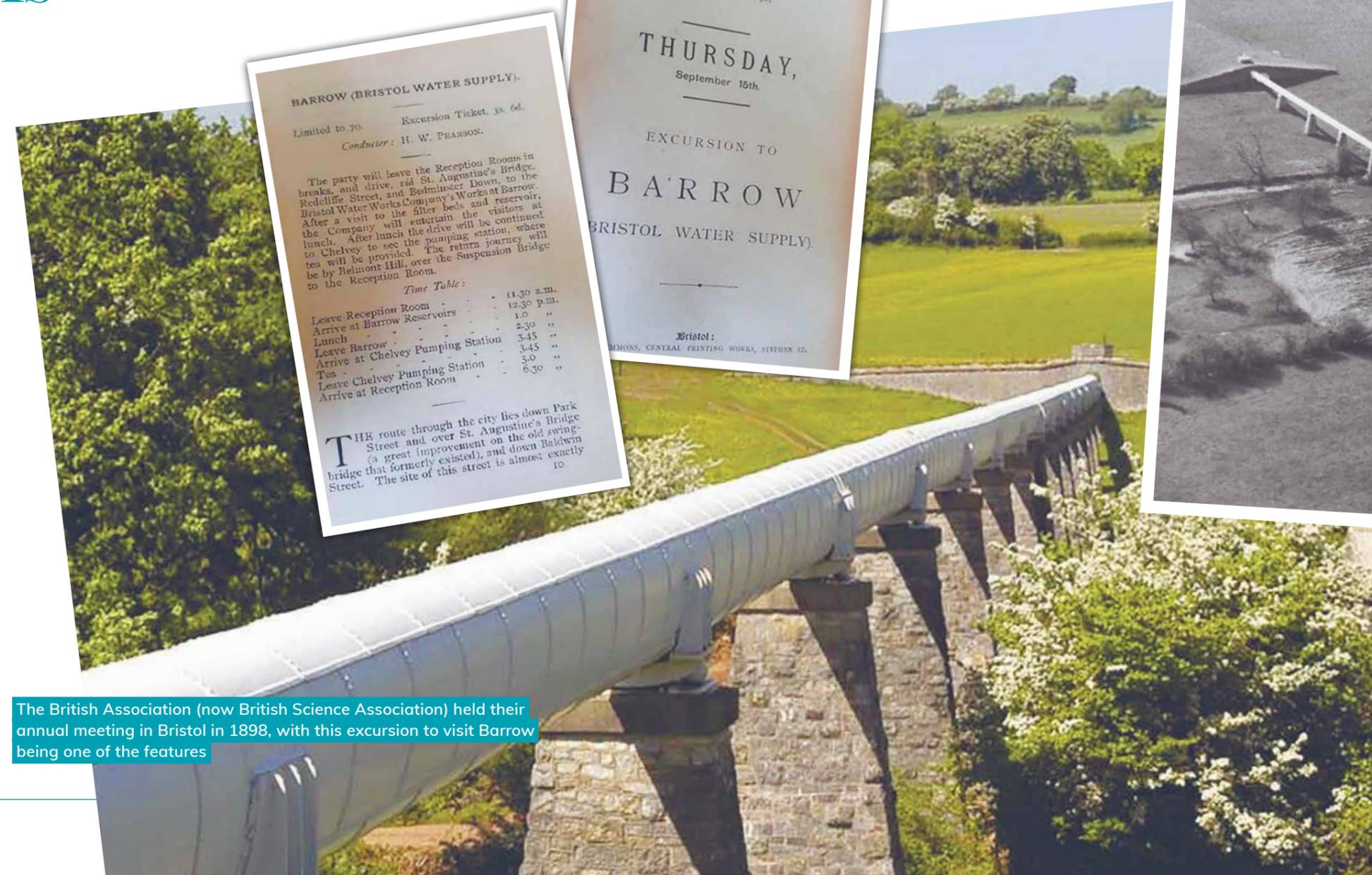
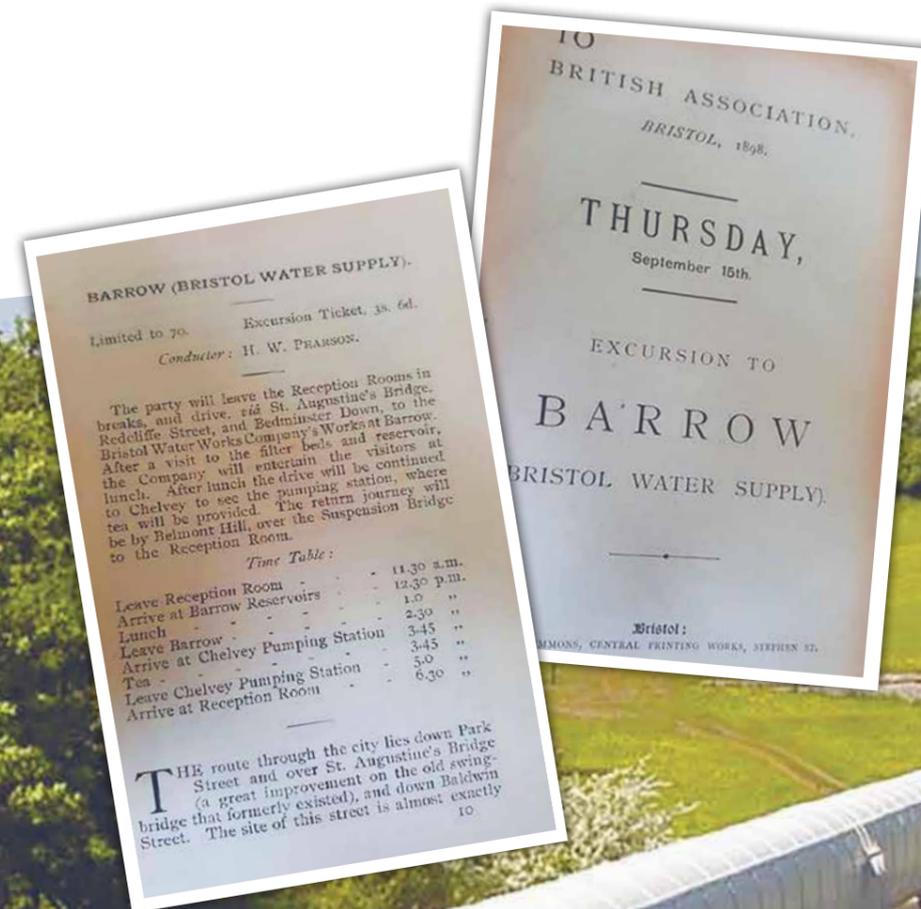
Line of Works

Reservoirs at Barrow Gurney, collecting the water delivered by the Line of Works from the various Mendip springs, facilitated the development of technology for water treatment and supply.

Described as the most magnificent work of its kind in England, the 11-mile Line of Works (part tunnel, pipe and culvert) brought the first sweet, clear waters from Chewton Mendip via Barrow to Bristol – and all by gravity. The original capacity of the supplies were around 50 megalitres a day, approximately half of the treatment capacity at Barrow today.

The new supply of water was not without its challenges. There was a severe outbreak of cholera in 1848, followed by a drought in 1849 and a major leak at Barrow Reservoir in 1854. But by the beginning of the next century, the technology of water supply collection, treatment and distribution had been modernised and provided Bristol with a fully treated and reliable supply.

The British Association (now British Science Association) held their annual meeting in Bristol in 1898, with this excursion to visit Barrow being one of the features



Winford tubes, part of the Line of Works.

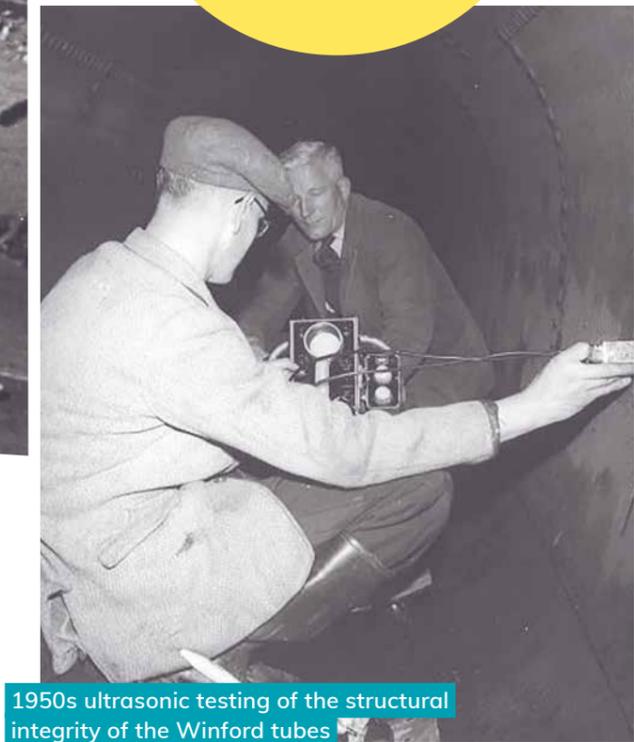
The Grade II-listed aqueduct was completed in 1851 by engineer James Simpson.

It is formed of a wrought iron tube, limestone piers and abutments. A run of around 260m of wrought iron pipe of ovoid section, approximately 1.4m deep and 1m at its widest, carried across the valley and over Watery Lane on 14 piers. The pipeline, still in use, is probably the oldest surviving example of such engineering.



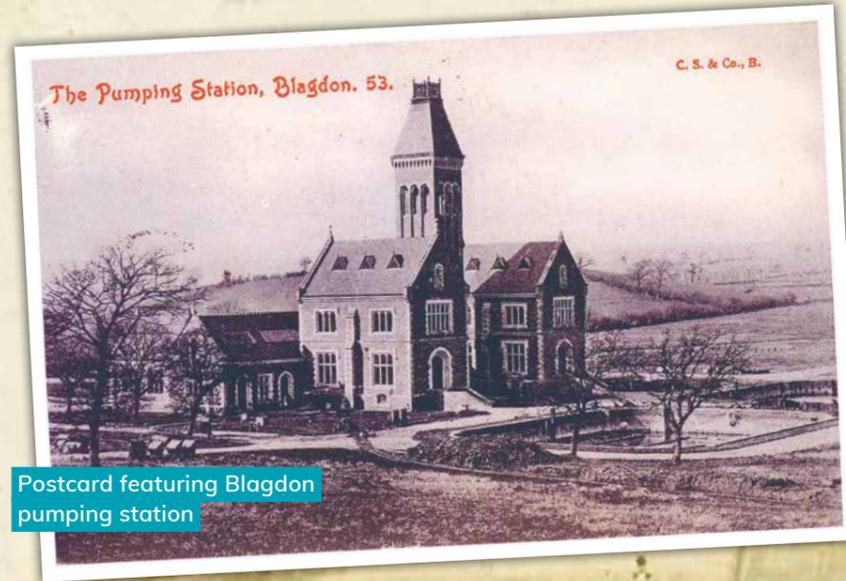
SABOTAGE?

On 18 July 1849 the valve at the Barrow Gurney spring was closed and the spindles of the tank at the spring were stolen. There was no water supply for the entire day to the City of Bristol.



1950s ultrasonic testing of the structural integrity of the Winford tubes

Blagdon Reservoir and pumping station



Postcard featuring Blagdon pumping station

Acts of 1888 and 1889 gave Bristol Waterworks powers to increase its capital and commence work on the Yeo (Blagdon) reservoir. It was completed in 1901.

While the reservoir was filling up, work started on the pumping station needed to pump water from Blagdon to the treatment works at Barrow. The pumping station was designed by the nationally important civil engineer and architect Charles Hawksley and completed between 1902 and 1905

Four Glenfield and Kennedy beam engines with a capacity of 7.5 million gallons a day were used to pump the water to Barrow for treatment. Two of the beam engines have been preserved and are electrically operated for demonstration purposes.

The Bristol Waterworks Company supported the construction of the Wington Vale Light Railway by the Great Western Railway, which opened in 1901. A public station was built and a short branch with siding station (disused since 1950) led to the pumping station, initially to deliver building materials and later to supply coal. Bristol Water's link to the railway line continued in 2018 with the 'Southern Resilience Scheme' (a major new ring main) following some of its route.

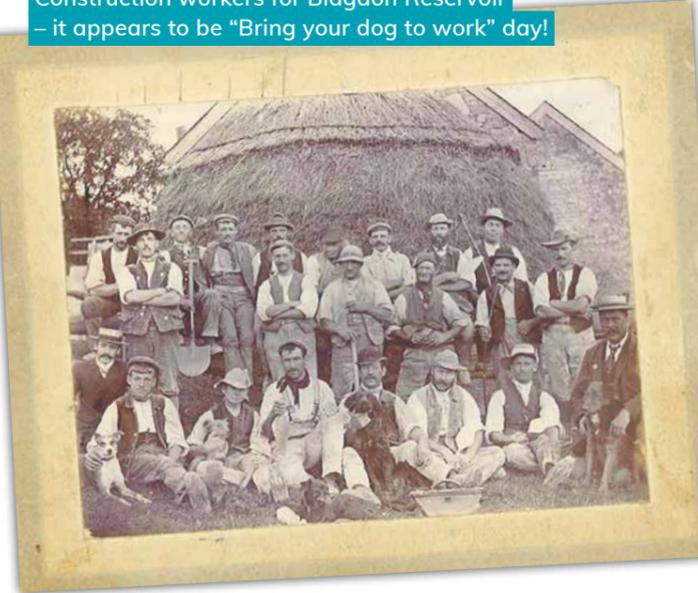


Blagdon Reservoir construction c1895

The ability to pump water from Blagdon to Barrow reduced the drought risk when there was insufficient water from the springs to replenish the reservoir tanks at Barrow. It also allowed a continuous 24-hour supply – before this point the water supply had often been turned off at night.

In 1890 two additional sand filters were added to Barrow Treatment Works, ensuring that everyone in Bristol received drinking water that had been treated.

Construction workers for Blagdon Reservoir – it appears to be “Bring your dog to work” day!

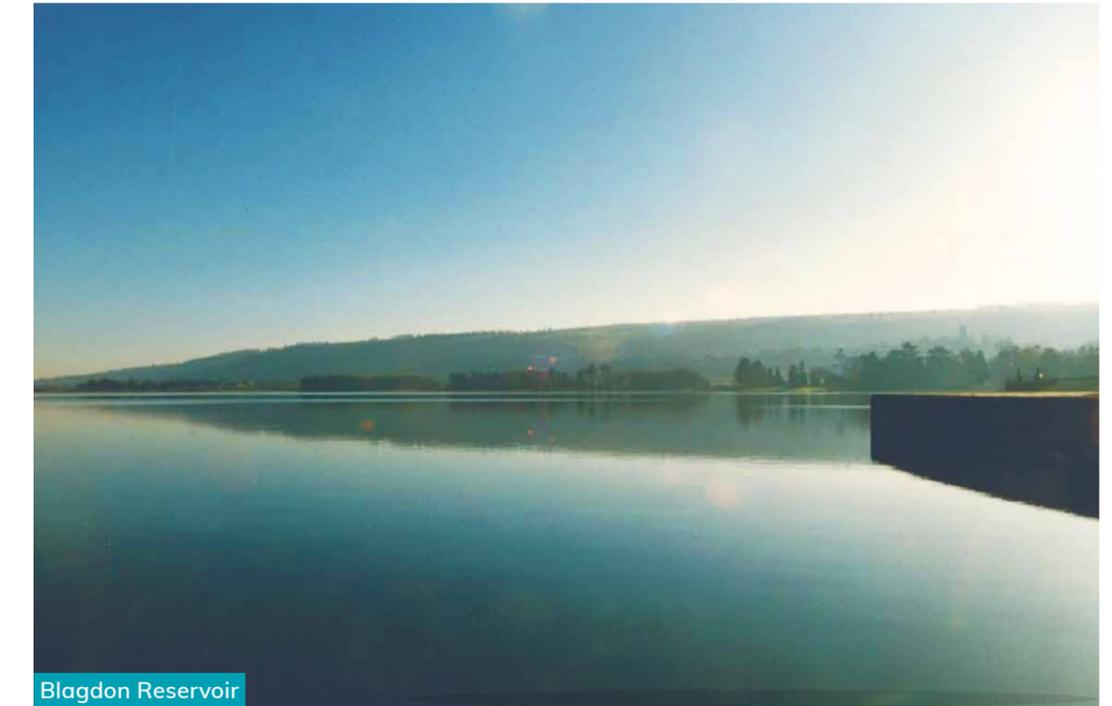


Blagdon pumping engine



Directors and officials at Blagdon Inspection House, 1902

“Directors and Officials outside the newly built Inspection House at Blagdon in the Autumn of 1902. Back Row: A. J. Alexander (Sec. & G.M.), E. J. Swain, K. N. Abbot, C. B. Hare, A. W. Saunders, G. W. Cape-Prater, Frank Wigg (Architect). Front Row: Sir W. H. Wigg Bart, M.P., G. Bush (Chairman), C. Thomas.”



Blagdon Reservoir

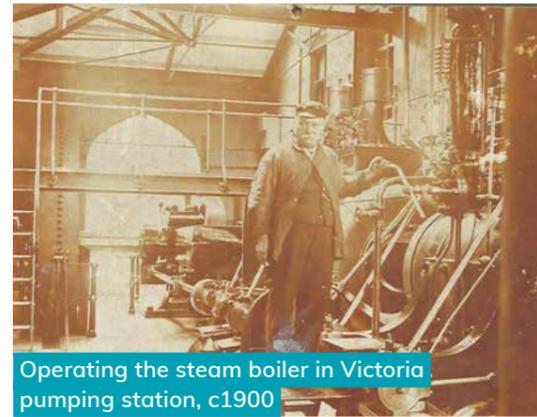
The art of pumping

The works at Blagdon started an era that saw the art of pumping, moving both raw and treated water around the emerging water supply network.

The original supply had been gravity fed, but treated water service reservoirs at Bedminster and Durham Down and Victoria in Clifton were needed as part of the system. Most of the service water reservoirs were initially open air, although were covered in the 1930s.

As pumping technology developed, groundwater springs and other supplies such as at Chelvey were developed (1865 – 68) to pump water to Barrow.

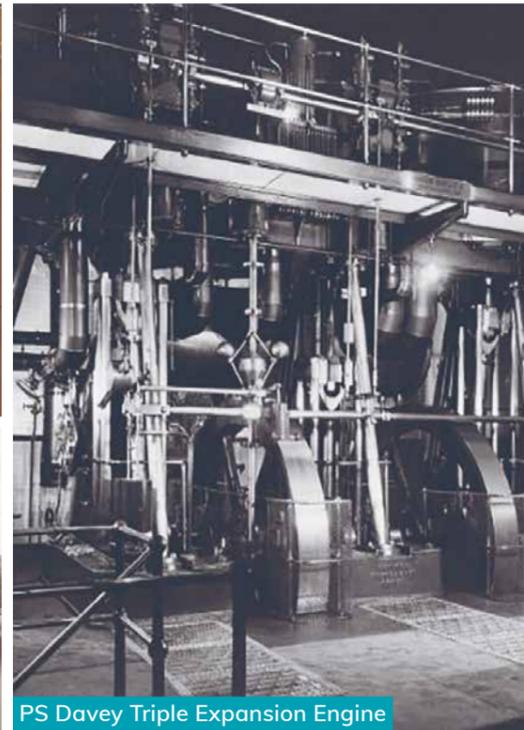
Different water rates for low and high level were only abolished in 1947, alongside the additional charges for baths and extra WCs!



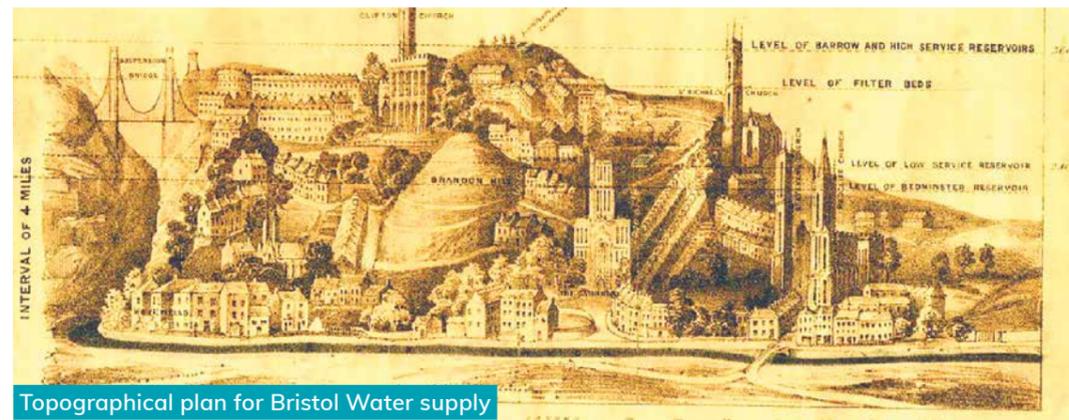
Operating the steam boiler in Victoria pumping station, c1900



Victoria Reservoir and pumping station, 1910



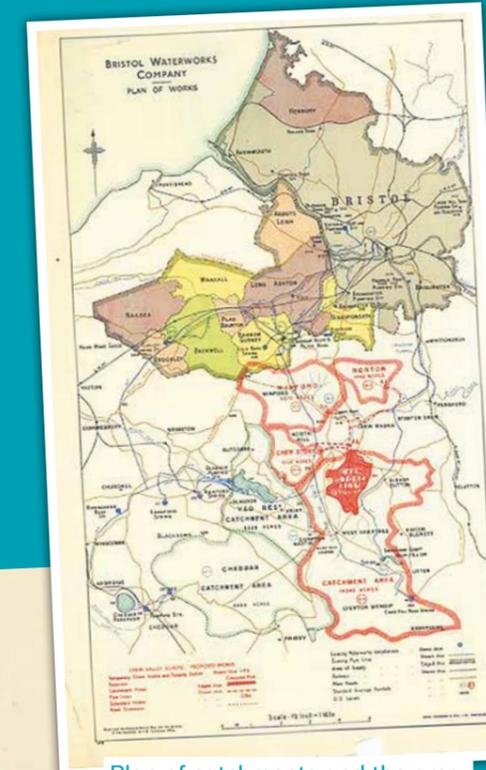
PS Davey Triple Expansion Engine



Topographical plan for Bristol Water supply

Barrow reservoirs

Once the Line of Works was completed, a reservoir was built at Barrow to store the water, with two further reservoirs added in 1864 and 1886. Sand filters were added to clean the water, with chlorination in 1935 and microstrainers in 1945. Between 2002 and 2016, Rapid Gravity Filters, ozonation and UV disinfection modernised the water treatment.



Plan of catchments and the area served by the end of the 1930s, indicating the plan for Chew Valley Lake



30-inch pipe being laid from Barrow to Bristol



Barrow Slow sand filters in operation c.1910

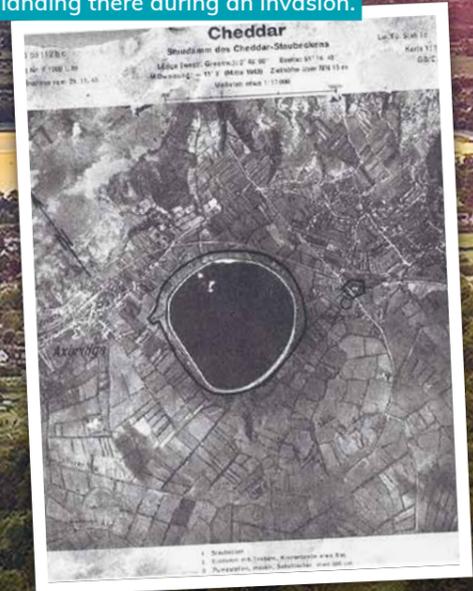


Breaking ice at Barrow to maintain supplies in winter

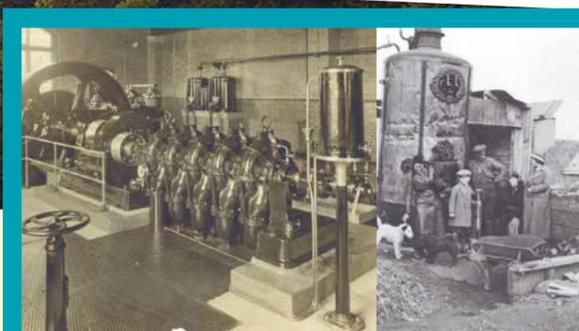


Original pipework being replaced at Bristol Bridge

The Germans prepared plans to target reservoirs during the second world war as the aerial photography of Cheddar reservoir shows. Tree trunks were laid across the reservoir to prevent aircraft landing there during an invasion.



Dinner celebrating the opening of Cheddar Reservoir



Legislation in 1917 allowed Bristol Water to abstract from the Cheddar Gorge springs and the River Axe and to pump this water to Blagdon Reservoir. These pictures show Cheddar pumping station in 1922.

Cheddar reservoir

By 1927 further legislative power was provided so that Bristol Waterworks could build a new reservoir. Fed from the springs in Cheddar Gorge, the bowl-shaped reservoir was completed in the late 1930s and continues to pump water to Barrow as well as supplying the area to the south of the region.

The engineers and inspectors involved in the construction of many of these early schemes took their knowledge on to neighbouring water companies and further afield. For instance, George Tomkings, who had been involved in the construction of the Cheddar to Blagdon pipeline and Rowberrow Tunnel over 1920 to 1927. He later went on to join the Portishead Water Company and helped to connect its water supply system into the Bristol Water supply network.



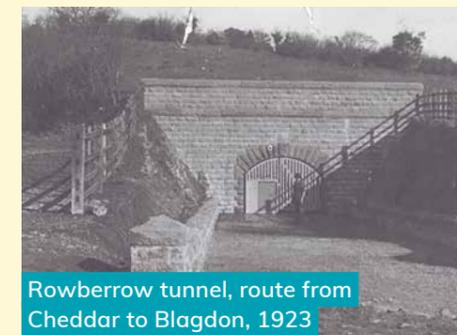
Fortunately the initial reports of a risk of cheese pollution to Cheddar reservoir, received in 2019, did not in fact affect the reservoir or treatment works!



Construction of Cheddar Reservoir, 1934



Princess Anne at the inauguration of the new Cheddar Treatment Works, 1st October 1985



Rowberrow tunnel, route from Cheddar to Blagdon, 1923



No. 3. Flooding at Cheddar Cliffs



No. 4. Damaged 9" main in Cheddar Gorge - P.V.C. pipes for diversion route being unloaded

The 1960s saw a range of extreme weather, including flooding in Cheddar Gorge and in the Chew Valley that washed away many bridges and water mains. Temporary diversion pipes were laid to restore supplies.

A growing city

Connected water resources and expanding treatment capacity outside the city saw the start of an era of expansion to a wider supply area.

Bristol was growing. The mains supply relied on crossings using the city's bridges. The Hotwells tunnel resolved this resilience risk in 1933, with the construction of a tube up to 83 feet below the quay and 35 feet below the bed of the River Avon. Improvement works like this ensured that Bristol Waterworks continued to receive public support, which meant the Bristol Corporation did not proceed with its plans to take it over. As the local paper stated at the time: "The citizens who take their water supply for granted too often ignore the work which is constantly proceeding for their benefit."

Water consumption grew rapidly after the Second World War and in 1949 Bristol Waterworks contributed its thoughts: "There is no doubt that the more general provision of water heating apparatus contributes to the increase. When the hot water tap is turned on, cold water standing in the pipe is allowed to run to waste until the hot water appears. Many housewives (perhaps husbands more often) use running water for dishwashing. This is a method particularly common in large institutes, canteens, etc. and there has been a considerable increase in the number of these for industrial and school

purposes. Information already obtained by the Company where meters have been fixed on both hot and cold supplies, indicate that more than half of the water has been hot water."

This trend has continued. Up to 70 per cent of water use in the home today is hot water. Even though Bristol Water currently has adequate water resources, if we are to reach net zero and address climate change, we need to save water to save energy.

Other water events in 1949 included:

- Bristol Waterworks retired staff association formed
- Discussions in Parliament concerning proposals for hot water supplies to customers
- A permit was needed to fill a watering can with an outdoor tap (but not indoors!)
- Bristol Water was chosen as a test site for a new electric method of leak detection, but there was great scepticism and the technology did not prove to be successful



The Hotwells tunnel continues to be used and was refurbished in 2020.

Durdham Down Tower

Durdham Down Tower was built in 1954 at the site of the service reservoir. The predictions at the time that the site might not need a major overhaul until 2066 were slightly optimistic, as there was a major refurbishment in 2020. Its construction became a well-known Bristol landmark, in part due to its octagonal design.

Working for Bristol Water

Bristol Waterworks employed a large number of turncocks who were responsible for operating the water network in a particular area. Sidney Breley was a shipping turncock for 50 years and recalled this work in his memoirs (pictured). Fire turncocks were replaced in 1960 with a radio controlled response van.

We also provided a service fixing leaks – but we can't find any records for employing deep-sea divers, as suggested in a local newspaper cartoon!

Between 1899 and 1950 working hours had reduced from 65 hours a week to 44, and pay by this time was around seven times higher.



Don't despair, sir, if the plumber can't pop in until the summer, if stop-taps fail to function, twist them, without compunction.

Or waste so many hours in swiping with a hammer at your piping—Bristol Waterworks may bring, sir, deep-sea divers if you ring, sir!

(Cartoon by Jewell "Evening Post")

Durdham Down
The renovated reservoir, which has successfully passed its final tests, will soon be back in service again. 110 years without major overhaul is not a bad record. We shall all be satisfied if it remains fit until 2066! The tower is in full commission and fulfilling its purpose (although quietly) in all respects.

(4) SIDNEY J. BRELEY (formerly Shipping Turncock)

Life was rough though varied when I started work for the Company in Small Street in 1899 at the age of 21. The late H. Pearson was Chief Engineer, and A.J. Alexander was General Manager. The hours were 6 a.m. to 5 p.m. and my wages were 20/- per week rising to 22/6 per week when I became Assistant Shipping Turncock to William Brown. No one was afraid of work or weather in those days. I remember pushing my heavy handcart all the way to Soundwell Road at Kingwood to supply a circus; dragging it to Rovers Ground at Eastville, and going out one day to Speedway, Knowle, to fill a very large tank in which a motor cyclist was billed to ride round the rim through blazing petrol. Altogether I spent fifty years and six months in the Company's service, retiring at Christmas 1949. Looking back it seems only yesterday.

If you ask what are my happiest recollections, I would say the sailing ships. The City Docks were often full of them, mostly full rigged, and a lovely sight to see when their canvas was hanging out to dry after a four to six months voyage. From my little wooden cabin on wheels near Prince Street Bridge I could see them all. There were barques, brigantines, schooners, ketches, coasting vessels and large steamers; and there was the smell of the farryard about these ships. Every week three or four steamers come across from Ireland bringing thousands of cows, sheep and pigs, which on being landed were driven through the streets to the cattle market, and to fields to fatten miles away. Sailing vessels on extra long voyages often took a pig or pen of fowls with them.

BRISTOL WATERWORKS COMPANY
REQUIRE
ABLE-BODIED LABOURERS FOR TRENCHWORK
Commencing rate of pay 3/5 an hour (150/4 per week) for a 44-hour week
Promotion to permanent and pensionable staff after 12 months' satisfactory service.
Opportunities exist for promotion to other occupations in the Company's service.
APPLICATIONS to the EXCAVATION DEPARTMENT, QUEEN CHARLOTTE STREET, BRISTOL 1.



Chew Valley Lake

Construction of Chew Valley Lake was originally planned to start in 1939, but was delayed due to the war. Work finally began in the early 1950s, with more than 300 people employed.

One of those employed was Acker Bilk, who worked on the dam by day and played with friends on the Bristol jazz circuit by night. He later went on to have the UK's biggest selling single of 1962.

During the work many archaeological buildings and artefacts were found, including a Roman villa where wooden writing tablets (the first in the UK) with ink writing were found. These tablets were sent to the British Museum.

Chew Valley Lake, which was officially opened by HM The Queen on Tuesday 17 April 1956 and now regularly attracts more than 200,000 visitors every year. It is a haven for birdlife, one of the finest trout fisheries in the country, boasts a fine sailing club and home to a great restaurant and family picnic spots. Upgraded and new facilities are currently being developed to give this important habitat and recreational destination an exciting future.



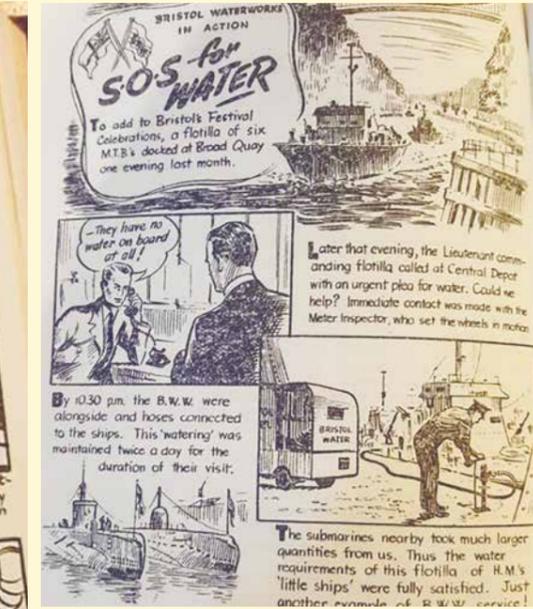
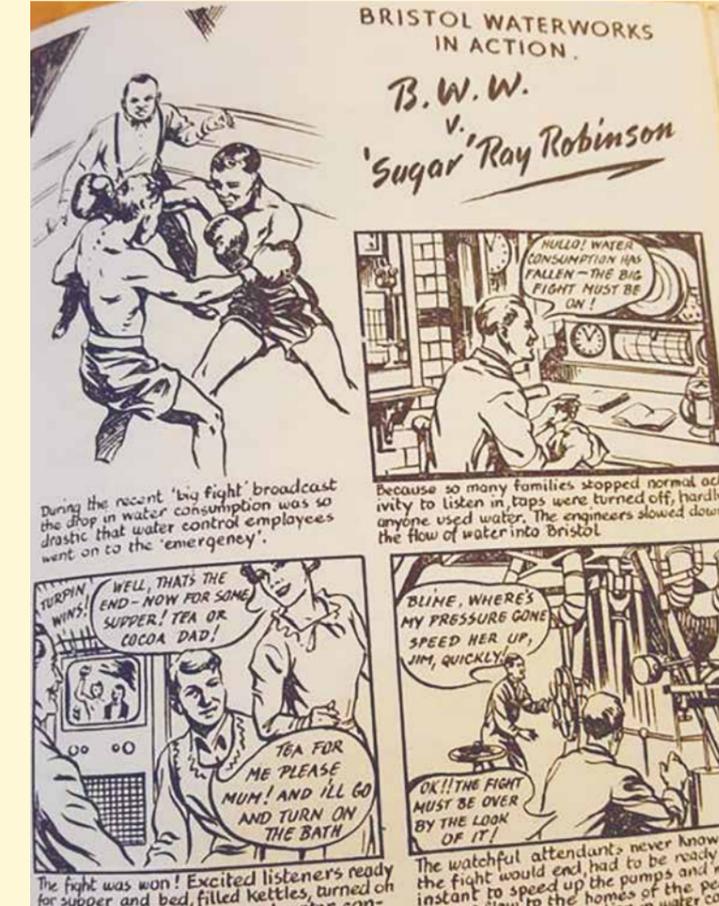
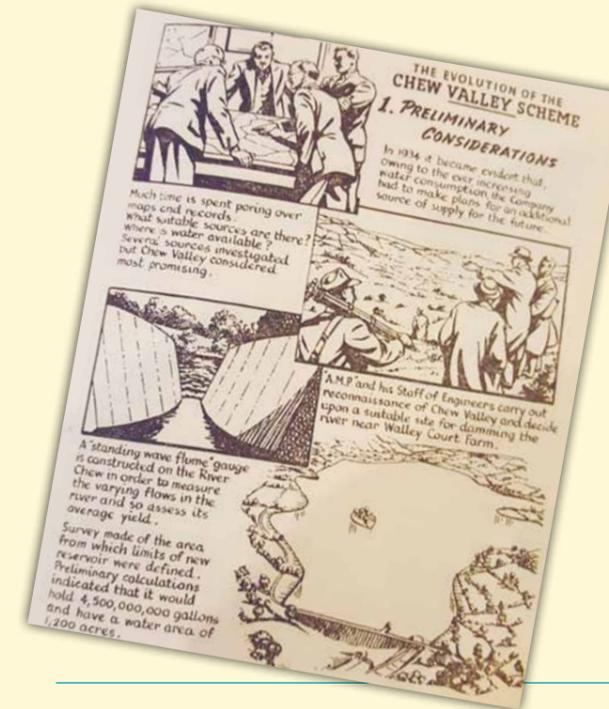
Ahead of the grand opening, a series of illustrations was developed to promote Chew Valley Lake to Bristol's residents.

The campaign was called "Bristol Waterworks in Action" and told a great story of how sudden fluctuations in water demand were monitored and managed at the Lake. Bristol's Festival celebrations in 1951 also provided the opportunity to show how the company provided a local and responsive service.

Today, there is artificial intelligence embedded in a system called IPSOS which helps to keep the flow of water running.

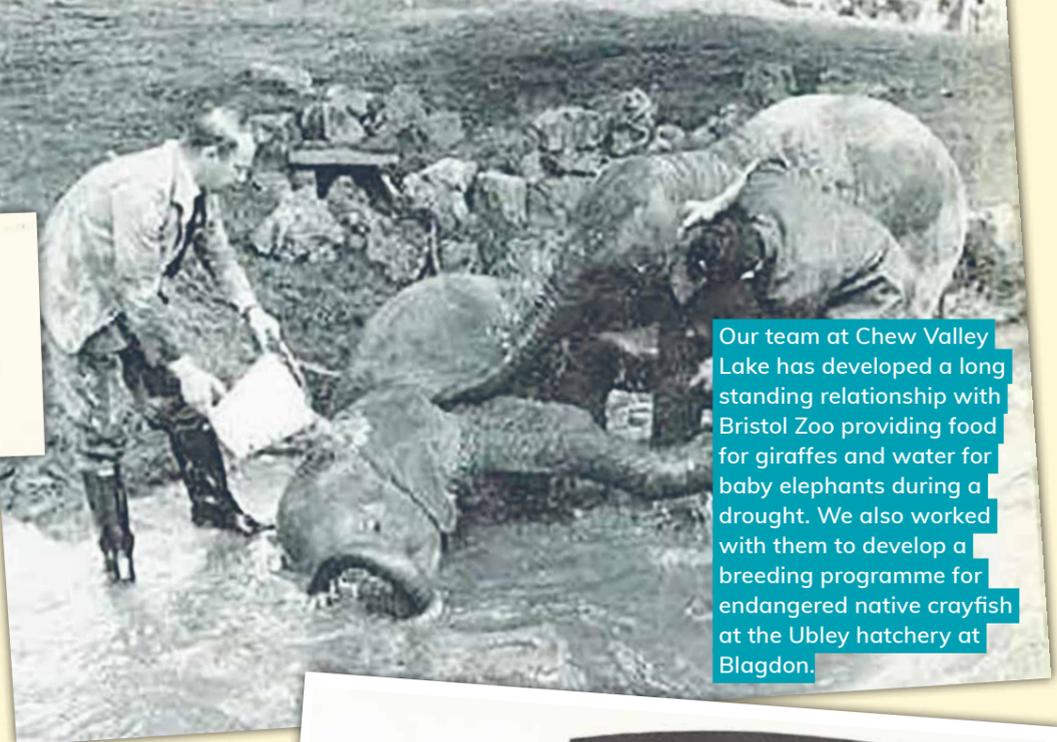


The Bristol Evening Post had a different take on the opening of a new reservoir!



Bristol Waterworks' Chairman Foster Robinson caught the first fish at Chew Valley Lake on 24 July 1955!

Chew Valley Lake
 Fish were caught by rod and line for the first time on Friday 24th July 1955.
 1st fish - Stickleback, 2nd fish - Brown Trout $\frac{3}{4}$ -lb,
 3rd fish - Brown Trout $\frac{5}{8}$ -lb.
 Fisherman - Foster Robinson Esq.



Our team at Chew Valley Lake has developed a long standing relationship with Bristol Zoo providing food for giraffes and water for baby elephants during a drought. We also worked with them to develop a breeding programme for endangered native crayfish at the Ubley hatchery at Blagdon.

Extract from the fishing register

	2	4	1	Rainbow
		2	8	"
R. H. Hale	677	3	3	15
"		3	12	Brown
"		4	3	"
H. S. Hale	676	4	5	8
"		3	7	"
		3	12	Rainbow



In 1969 Len Bays from Bristol Waterworks uncovered an emerging problem for reservoirs – algal blooms. During an interview on the BBC, he explained these blooms were caused by nutrient run off from agriculture. Today the Mendips Lake Partnership continues to work on catchment management to resolve this challenge.

MR BAYS ON TV

Chief chemist Mr Len Bays took the starring role in 'The Day the Algae Bloomed' on BBC television on 17 April.

He told viewers the story of the algae bloom in Chew Valley Lake last year and the detective work that eventually uncovered the cause—the wider problem of eutrophication.

Eutrophication means the loading of water with nutrients. These are mainly nitrates and phosphates which are finding their way into the water supplies from a variety of sources. The culprit is intensive farming which adds them in the shape of unused fertiliser washed off the land.

After the story of 'The Day the Algae Bloomed' there followed a discussion on the problem of eutrophication between Mr Bays, Dr Kenneth Mellanby, chairman of the Research Advisory Committee of the Soil Association and Mr C. P. Millway, chief engineer of the Northern Ireland Ministry of Development.

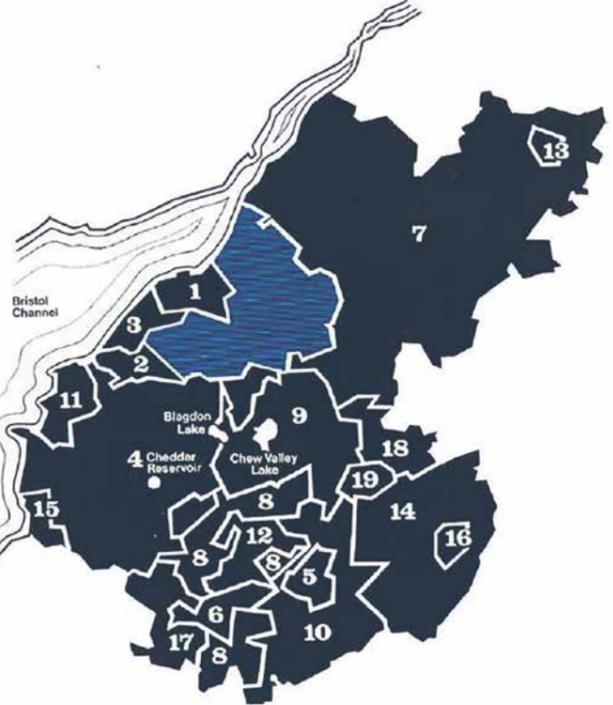
A growing company

The 1950s and 1960s was a time of growth as the government encouraged water undertakings to merge in order to improve the quality of supplies.

The investment that Bristol Waterworks had been able to make in improving water supplies together with high levels of support from its customers, demonstrated the strength of the privately owned water company model and Bristol Water was a leading company. This led to a large number of mergers with other local water companies and transfers of water services run by local authorities. Bristol Waterworks often helped to provide bulk supplies of water and lent support and expertise, but mergers allowed for modernisation of technology and working practices.

The first of these amalgamations took place in 1952 with the Portishead District Water Company.

In total there were 19 mergers in 12 years. This was an astonishing expansion from the original supply area, but finally incorporated the area around Chew, Blagdon and Cheddar where the major supplies of water had been developed over the previous 100 years.



BRISTOL WATERWORKS COMPANY.
 ON 16TH NOVEMBER 1953
 THE CHAIRMAN OF THE BRISTOL WATERWORKS COMPANY
FOSTER G. ROBINSON ESQ.
 INAUGURATED THE CHELVEY - PORTISHEAD
 TRUNK MAIN AND SUBSIDIARY WORKS BY
 OPENING THE INLET VALVE TO DRY HILL RESERVOIR
 AND THEREBY INTRODUCED WATER
 FROM BRISTOL SOURCES TO PORTISHEAD.

UNDERTAKINGS AMALGAMATED		UNDERTAKINGS AMALGAMATED	
1	Portishead District Water Company 1952	11	Weston-super-Mare Corporation 1960
2	Long Ashton Rural District Council 1952	12	Wells Corporation 1961
3	Clevedon Water Company 1953	13	Tetbury Rural District Council 1961
4	Axbridge Rural District Council 1958	14	Frome Rural District Council 1962
5	Shepton Mallet Waterworks Company 1959	15	Burnham-on-Sea Urban District Council 1962
6	Glastonbury Corporation 1959	16	Frome Urban District Council 1962
7	West Gloucestershire Water Company 1959	17	Street Urban District Council 1962
8	Wells Rural District Council 1959	18	Bathavon Rural District Council 1963
9	Clutton Rural District Council 1960	19	Norton Radstock Urban District Council 1964
10	Shepton Mallet Rural District Council 1960		



Weston-super-Mare

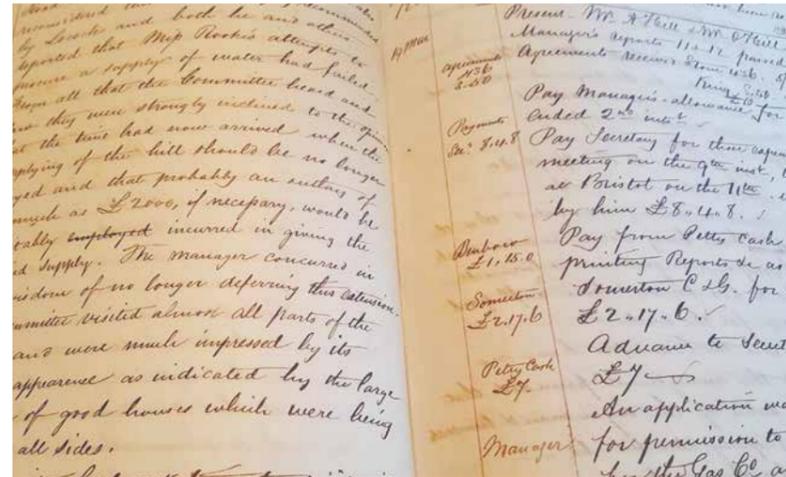
The Weston Water Company was established in 1853 as a private supply, based on the Bristol Waterworks model. It relied on a well in Milton Road, which provided slightly brackish water. The town council purchased the company in 1878.

In 1923 Bristol Waterworks sold the source at Banwell spring to the town council and this became the principal source of supply for a population that had grown from 5,000 in 1853 to 25,000 in 1923.

Efforts in the 1920s and 1930s to improve the supply caused controversy given the impact on ratepayers, reminding us of the benefit of private investment in long-term water quality improvements!

A peak summer population of 100,000 by 1949 resulted in an agreement for Bristol Waterworks to supply two million gallons of water a day. The Town Council built a new treatment works at Banwell, which opened in October 1958.

Bristol Waterworks got the Banwell works back when the system was amalgamated in 1960. Banwell, Cheddar and Barrow continue to supply Weston-Super-Mare today.

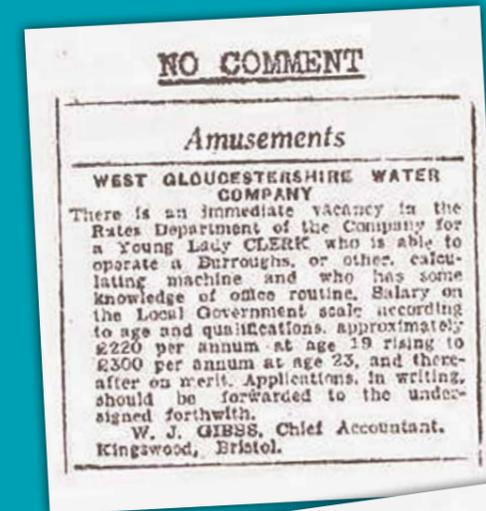


An extract from the management committee minute book of the Weston Water Company gives fascinating insights into the work of the time:

- On 11 January 1859 the Directors agreed that the pumping house stoker could benefit from the sale of furnace ashes.
- On 4 February 1859 the Manager had his remuneration set at 10 per cent of net revenue as an incentive to improve collection.
- On 15 February 1859 they agreed a falling block tariff for Roger's Hotel – 1/3d per 1,000 gallons if less than 30,000 gallons, but only 1/ per 1,000 gallons if higher usage.
- On 22 March 1859 the Committee got fed up with waiting for the Manager to send out letters to those who hadn't payed, so they wrote the letters themselves!
- On 24 May 1859 a price of 1/ per 1,000 gallons was agreed for the Bristol & Exeter Railway Company, but only if they made sure that water wasn't carried away from the drinking water fountain at the station!

West Gloucestershire Water Company

There was a particular rivalry between Bristol Waterworks and the West Gloucestershire Water Company, which was one of the later companies to be formed in 1884. The extract below from the Bristol Waterworks staff newspaper in 1956 provides some indication of this!



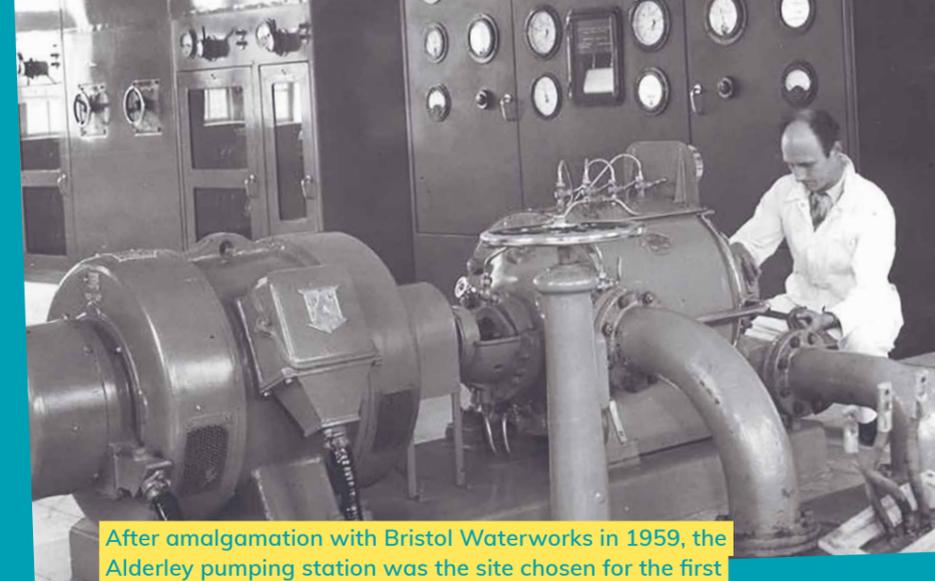
("Western Daily Press" 22/12/55)

One of the founders of the West Gloucestershire Water Company was Henry Grace, brother of the great cricketer W.G. Grace.

One of the mysteries is the name, as the company initially covered South Gloucestershire, not West Gloucestershire, although it had expanded over time in a similar way to Bristol Water.

The initial source of water was from an old iron mine. Most of the initial waterworks at springs weren't successful until, in the late 1920s, Sipton Moyne on the edge of the Cotswolds and a service reservoir at Tolldown meant excess water could be exported to Bath and Bristol during difficult times.

Chew Valley Reservoir was originally designed to support both supplies to the West Gloucestershire Company and also to the Bath corporation.



After amalgamation with Bristol Waterworks in 1959, the Alderley pumping station was the site chosen for the first example of robotic automation. The control room had a machine that could dial up the remote Alderley pumping station and start and stop the pumps.

Alderley was the first fully automated control system in the water industry. If the duty pump failed, the control system would automatically ring it up and check how it was working! The first fully automated pumping station was then introduced at Axbridge in November 1962.



Emergency Supply to Burnham-on-Sea

Since our last issue, yet another urgent request from a local authority has been met and water is now flowing from Cheddar Reservoir to Burnham via the new Weston pipeline. The Company's staff fixed the under-pressure connection and 500 yards of pipe have been loaned.

Here is a report from the staff newsletter in 1956 of the type of support Bristol Waterworks was supplying to neighbouring authorities before amalgamations took place.

Glastonbury and Wells



Edgarley Reservoir sits underneath Glastonbury Tor. Bristol Waterworks took over from Glastonbury Corporation in 1959.

We're not sure what our inspector made of this customer complaint back in 1961.



A complaint of smelly water was received at Wells recently and forthwith an Inspector called at the house. He drew off and examined some water from the tap and remarked that it appeared to be perfectly all right, whereupon the good lady of the house explained, "Ah, it's after it's been stood all night." "Oh," said the Inspector, "you mean that when on the tap, then the water smelts?" "No," said the lady, producing a bucket and mop of some water in this bucket and let my floor smelt awful."



While amalgamating with other companies, Bristol Waterworks continued to innovate in water treatment. The Accelerator introduced at Stowey in 1954 was a state-of-the-art clarification and water softening plan.



It's not a druid performing his devotions at the high altar, it's a Waterworks Engineer 'phoning his office."

This is how the local press in Glastonbury saw the new remote monitoring technology at the new service reservoir.

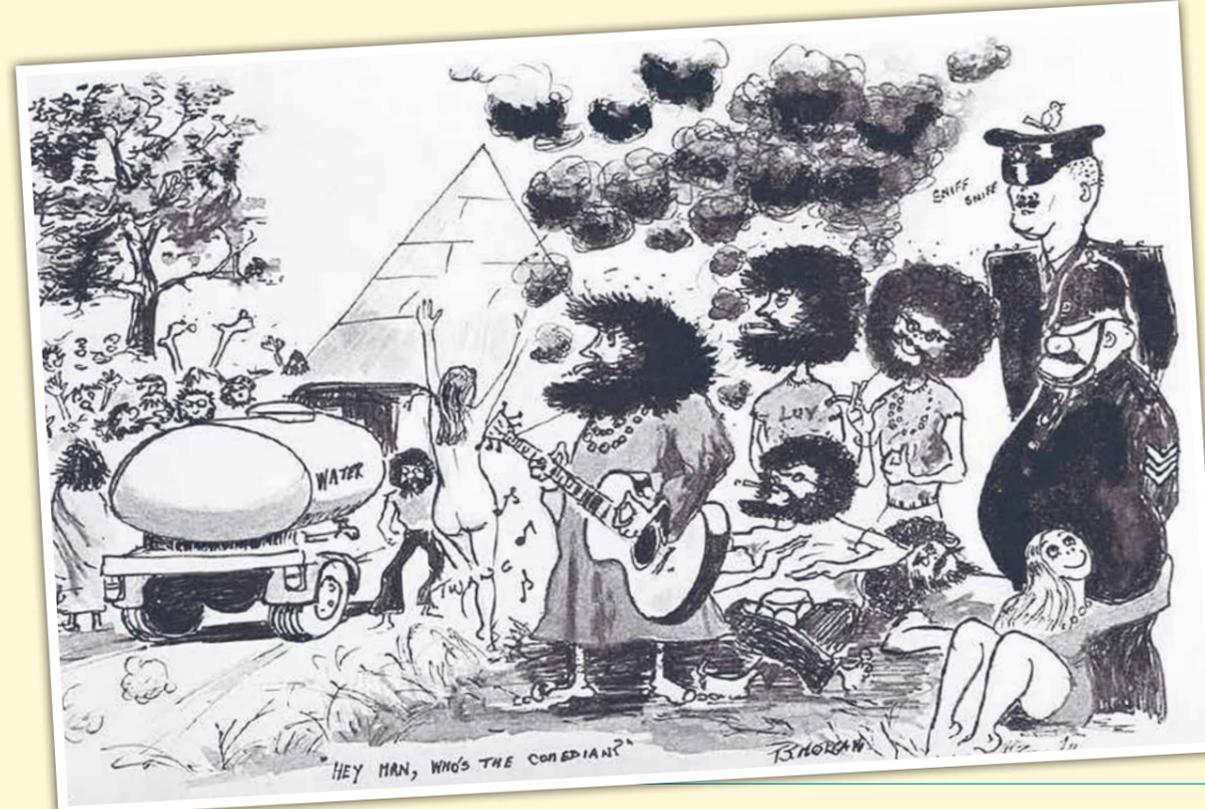
The Wells Water Company had been taken over by Wells Corporation before it transferred to Bristol Water in 1961. The long running argument in the city went back to this story from 1902, with an unusual water supply dispute!

In the Arbitration case between the Corporation of Wells and Wells Water Company (1902) the Arbitrator for the Company referred to the fact that the Cathedral authorities were only charged a lump sum of £25 for water for blowing the organ. He thought this charge could be increased. At the wish of the Corporation they preferred to have no music on Sundays and weekdays in the services of the Cathedral because there was no water to blow the organ.

The Arbitrator added that for a long time they had continued to supply the Cathedral for a mere song and the result at the end was that there was no music!

Of course, Glastonbury is now home to a rather famous music festival and Bristol Water gears up its water supply and network to make sure there is enough water for festival-goers and local residents.

Back in 1971 the Bristol Waterworks staff magazine reported the first gathering of "15,000 to 20,000 hippies on a farm at Pilton, near Glastonbury". Although we supplied water tankers at the time, the staff magazine cartoonist wondered what the festival goers made of this!



COCK-A-DOODLE-DOO
The Engineers have strongly denied rumours that they are starting a poultry farm.
They do this because of a postcard received from the South Western Electricity Board warning the Company that they were going to temporarily suspend supplies to Withywood Rooster Station.

A LEAK
The Company received a complaint from a person in Bristol saying that there was a water leak in the house.
This person was given instructions on how to turn off the water supply and stop the leak only to find later that it was a hole in the kettle that was causing the water on the floor.

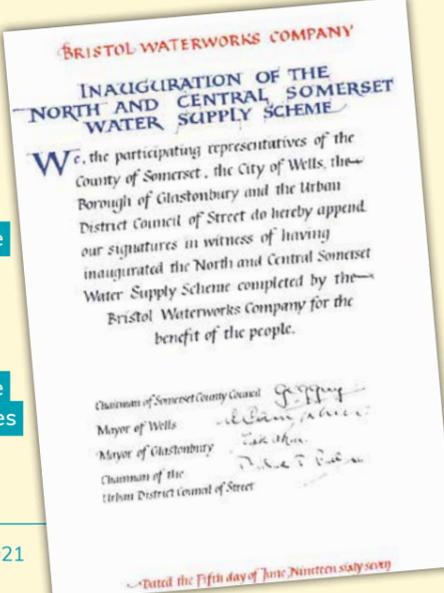
At a 'moose end'.
L.R. Lane, (Waste Dept.) had a very unfortunate experience recently whilst cycling in Bristol. He was proceeding along Easton Road with a colleague and while passing a stationary lorry, he and his bicycle suddenly parted company. He found himself on the ground with a rope around his neck! Apparently his passing of the lorry coincided with the driver throwing a rope over his load, and by accident it caught our colleague around his neck. Naturally, he was badly shaken and lacerations on his neck required medical attention. We are pleased to report that he has now returned to work.

Working in water has always required a sense of humour, as this excerpt from the staff newsletter welfare section from 1949 shows. A health and safety warning to others!



Here is a modern-day example of Bristol Water's character and sense of humour. If your roadworks over Easter are causing a disruption in Wells, you can always employ the Easter bunny to make up for it.

The amalgamation of the companies allowed for resilience of the water supply system to benefit all the areas served, as was recognised on the completion of the improvement schemes in 1967.

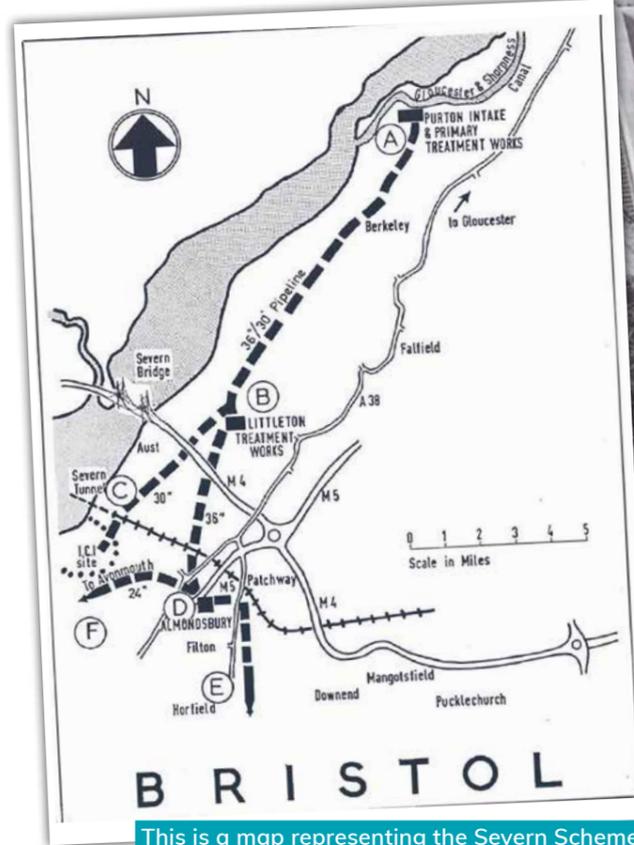


The Severn scheme

Bristol continued to grow in the 1950s and by the 1960s the major development of an ICI chemicals plant at Avonmouth required a large amount of water.

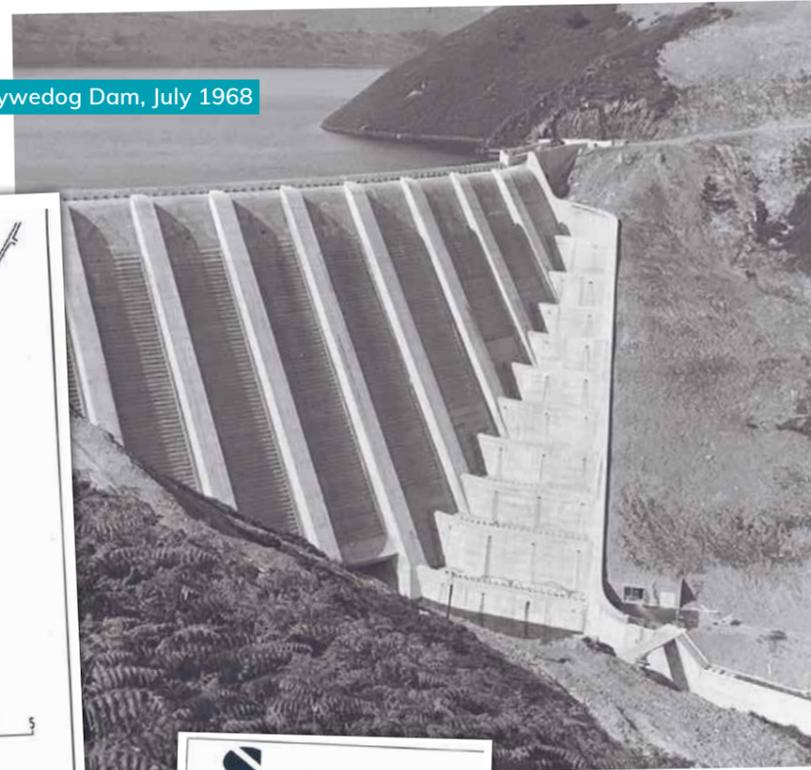
The original plan looked to go back to the 1698 system and use abstractions at Hanham Weir and St Anne's Board Mill on the River Avon. However, this wouldn't support large abstractions in the summer, and suffered from trade effluent discharge issues.

To overcome this, the Sharpness Scheme was developed to use water from the Gloucester and Sharpness Canal, with new treatment plants built at Littleton and, later, Purton. In order for there to be enough water supply to the canal, which to that point had been fed from the rivers Cam and Frome, Bristol Waterworks and ICI joined with 12 other water undertakings in the construction of Clywedog Reservoir in Wales to regulate the River Severn so that it could be used.



This is a map representing the Severn Scheme. Bristol Waterworks was eventually repaid its £500,000 (9.82%) share of the construction costs of Clywedog in 1975 by the Severn Trent Authority, to coincide with abstraction charges being introduced. Bristol Water had shared around 40% of the contribution with ICI.

Clywedog Dam, July 1968



A 1968 Bristol Waterworks advert, explaining the growth in domestic appliances and Bristol Waterwork's contribution to the Severn Scheme.

A reservation charge was introduced for industrial users, to reflect the fixed cost irrespective of the water used.

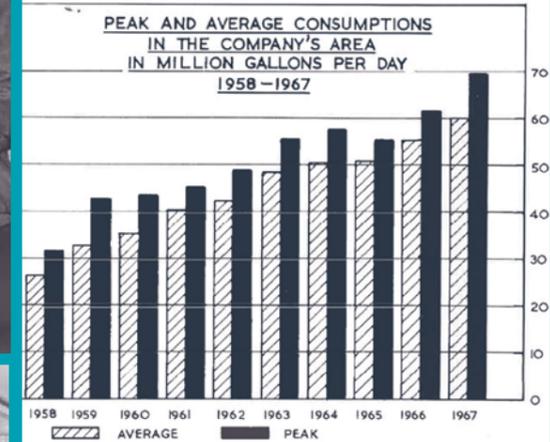
Littleton Treatment Works

A temporary pilot water supply plant had been installed at Littleton in 1964, using water abstracted at Purton from the Gloucester and Sharpness Canal. The treatment works was completed in March 1965. Littleton and the Severn Scheme were opened just in time for another spurt in peak and average water consumption. It was inaugurated by the Duke of Beaufort.



Littleton was the first site to use ozone in water treatment

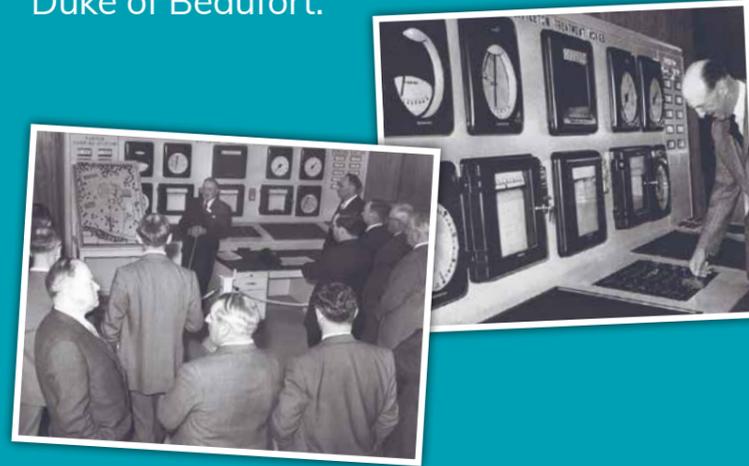
Littleton and the Severn Scheme were open just in time for another spurt in peak and average water consumption



The team involved in the construction process



A grand banquet was held to celebrate the opening including a tour of the the new water chemistry lab

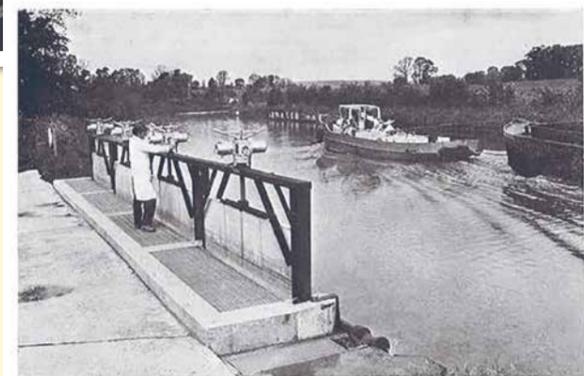


Purton

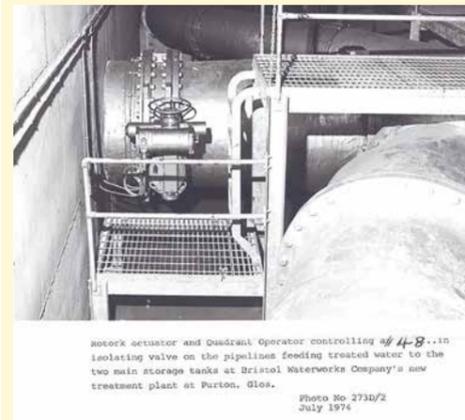
A new water treatment works at the site of the abstraction from the Gloucester and Sharpness Canal at Purton was inaugurated by HRH Prince Charles on 16 October 1973. This completed the Severn Scheme. At opening it was the largest Bristol Waterworks facility with a capacity of 120 megalitres a day.

The plant included the latest automated control equipment for both the intake and the works itself. There are two bankside raw water storage reservoirs which are located on the other side of the canal to the treatment works.

Some of the supply-chain relationships built as part of the Severn Scheme went global. For instance, consulting engineers Binnie & Partners worked with Bristol Waterworks' distribution system experts and together used their computer to design the water supply system for Kathmandu, Nepal, as part of a project for the World Health Organisation. Bristol Water still works with Binnies to this day and in 2021 partnered on a groundbreaking water supply project entered into Ofwat's Water Breakthrough Challenge innovation competition.



This picture, taken on the bank of the Gloucester and Sharpness Canal at Purton, shows modern technology face to face with an earlier age, as traditional cargo barges are towed past the main intake penstocks of BWW's new treatment works. "Penstocks" is the engineer's word for the sluices which control how much water flows from the Canal into the works. There are four of them here and on top of each can be seen the latest Rotork electrically powered actuator used to open and close the penstocks. These are normally operated remotely from the control centre. In this picture, however, David James, one



Rotork actuator and Quadrant Operator controlling a 4-8" air isolating valve on the pipelines feeding treated water to the two main storage tanks at Bristol Waterworks Company's new treatment plant at Purton, Glos.

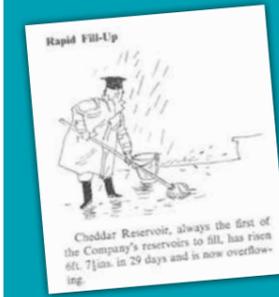
Photo No. 2730/2 July 1974

of the shift controllers, is demonstrating how on-the-spot manual control of the penstocks can take over from powered operation when required. BWW is currently able to abstract up to 25 million gallons of raw water a day from the Canal for treatment at Purton or for primary treatment and then pumping on to the works at Littleton 12 miles to the south. The Canal is fed not only from the River Severn (at Gloucester) but also from the Rivers Frome and Cam which run into it a few miles above Purton, so there is no fear of the water supply requirements interfering with the older uses of the Canal.

Climatic events

Over the years a number of climatic events have challenged the team at Bristol Water

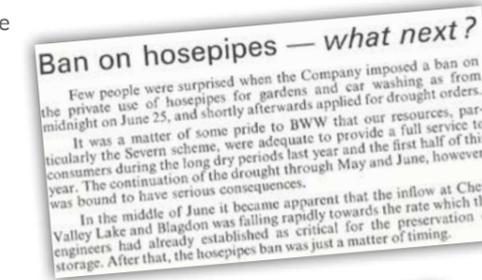
Rainfall during the September, October and November months of 1960 was 50 per cent above the standard average. Bristol Waterworks had never had so much water in store so early in the autumn and by the end of October, all reservoirs were overflowing.



Cheddar filled in September; Blagdon was full by 6th October and Chew Valley Lake by 29th October.

The following decade, the region experienced the driest October to April in 1976 since company records began in 1855. Warnings were issued to the press in February 1976 as Bristol Waterworks became seriously concerned about the situation. April brought just four wet days, creating what was called an "absolute drought." Despite Bristol Waterworks' varied water sources, a hosepipe ban was imposed and not lifted until 17 October and future capital works to distribute more water were brought forward.

The drought of 1995 was comparable to 1976 – this time caused by prolonged groundwater drought associated with greatly reduced groundwater recharge. Customers heeded calls to reduce demand in order to protect water supplies.



"The most severe peacetime emergency in the company's history."



From December 1962 the coldest year in Bristol in modern times began, with a 76-day cold period and a 34-day sub-zero spell. Bristol Water experienced frozen service pipes and mains due to the penetrating frost, a frozen Bristol Harbour and 668 burst pipes, more than enemy action from World War II. Residents in Clifton were without water for six weeks. Employees worked from dawn to dusk repairing damage, removing ice and driving water tankers. Their efforts were recognised by the Lord Mayor of Bristol, who threw a civic reception for Bristol Water staff to recognise their efforts.

World War II

As Bristol Waterworks' men were called up for service once again during World War II, the remaining employees played a critical role in ensuring that water kept flowing in to the city. These employees often put themselves in danger and the critical role of water in the war effort was recognised.

In order that pure water should be available, lists of all known conduits and wells throughout the ancient city and its suburbs were prepared, suitable treatment of the water was arranged, and pumps and tanks were installed. Men and women, jug or bucket in hand, gathered at disused conduits, gossiping as their ancestors had done before them, not of Blenheim or Waterloo but of Dunkirk and the Battle of Bristol. As a direct consequence of the Company's survey of medieval sources of supply, a mass of evidence has now become available to the local historian. Dame Pugsley's well at

The first bombs of the Bristol Blitz fell on 24 November 1940. There were six major bombing raids until the last attack in April 1941. Bristol suffered 548 air-raid alerts, resulting in 399 mains being fractured by enemy action and 3,842 services cut off.

Bristol was the fifth most bombed city due to the presence of Bristol Harbour and the Bristol Aeroplane Company, which made the city a target for bombing. The city was easily found as enemy bombers were able to trace a course up the River Avon from Avonmouth, using reflected moonlight on the waters into the heart of the city.

On 24 November 1940, some 95 water mains were damaged. To prevent enemy aircraft landing, hundreds of rafts were made using tree trunks and placed on Blagdon, Cheddar and Barrow reservoirs. Office-based staff were trained on repairs, inspections and fire watching duties, while field-based staff signed up for the

Home Guard for the purpose of protecting works in the event of invasion.

A survey was conducted by Bristol Waterworks to locate the old medieval wells and conduits as an emergency measure – research which subsequently proved of significant historical value after the war.

In total, 73 employees were called up for service, four of whom were killed and five medically discharged. Mercifully, there were no casualties among those remaining with the company during the war, despite their close proximity to danger.



Considerable damage was sustained at the Victoria Pumping Station⁽¹⁾ and at the Central Depot the latter building receiving a direct hit while the A.R.P. staff was on duty, but happily there were no personal injuries. A fleet of water trucks was kept available, and these were used for supplying parts of the Company's district temporarily deprived of water. At one time when risk of invasion seemed imminent, hundreds of rafts of unhewn tree trunks were placed on Blagdon, Cheddar, and Barrow Reservoirs to prevent the alighting of enemy aircraft.⁽²⁾ Fortunately they were not needed.



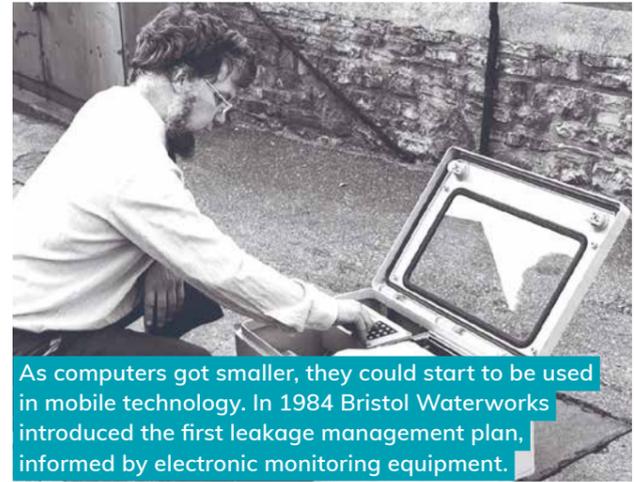
Computers and technology

Bristol Waterworks was an early adopter of new computing technology. By the early 1960s magnetic tape had replaced punch card systems in computers (known as 'The Calculator').

They were initially used to calculate water bills, particularly when rateable values were updated by local councils. Over time computing technology was used to design water supply systems and remotely control their operation.



The early computers were rather large, and part of the head office building had to be removed in order to install it when it opened in 1963.



As computers got smaller, they could start to be used in mobile technology. In 1984 Bristol Waterworks introduced the first leakage management plan, informed by electronic monitoring equipment.



'Any idea where I can get a spot of water, Mr Barker?'

This witty cartoon is reproduced by courtesy of *Electronics Weekly*, who gave a front page feature recently about the Company's new telemetry scheme which is now being manufactured by Cossor Ltd., and which will be installed between November/December 1977 and December 1978.

Computers and technology cont...

As early as the 1950s Bristol Waterworks identified the benefits of remote control technology – not only to monitor works and pumping stations but also to drive efficient use of staff while they were out serving the community.

The operation room has long since become the focal point of our operations.

A call centre for staff and customers was opened on Bristol's Marsh Street and we were the first water company to introduce an emergency freephone number that allowed out-of-hours contact.

Investment in productivity paid off, as was recognised in 1970 as the only one of 228 water undertakings in the country that had efficient systems of management and budgetary controls.

Technology had allowed streamlining of different jobs and roles in the organisation, with 87 different job roles reduced to 12 and 25 rates of pay reduced to six. This efficiency may have played a part of Bristol Water not being amalgamated into the 10 regional water and sewerage companies in 1973.



1964

Information room opened at Bedminster Depot with radio control and telemetry connections to manage equipment.

1977

Operations room opened at Bedminster Head Office.

2013

Upgrade of operations room and centralised control capability.

2020

First use of IPSOS artificial intelligence control of water pumping between treatment works and service reservoirs. Full live smart network monitoring and flow prediction through GISel.

2020

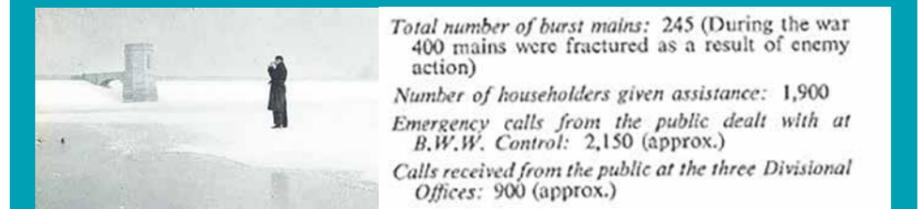
In-line continuous water quality monitoring equipment protects NHS Bristol Nightingale Hospital.



Bristol Water traditions of innovation have continued up to the present day, including the first combined stop tap and meter chamber box, slip lining of water mains and "ice pigging" being examples over the last 40 years.



Even the business of mains laying and repairs has become slightly less muddy over the years, although we frequently still have to get our hands dirty to get water back into supply.



Total number of burst mains: 245 (During the war 400 mains were fractured as a result of enemy action)
 Number of householders given assistance: 1,900
 Emergency calls from the public dealt with at B.W.W. Control: 2,150 (approx.)
 Calls received from the public at the three Divisional Offices: 900 (approx.)

Spells of severe weather are made less severe as a result of the efforts of these water supply heroes. In 1962/63, where Clifton was without water for 6 weeks due to one of the coldest winters on record, the Lord Mayor threw a civic reception for Bristol Water staff to recognise their efforts.

Uniforms

The original 19th century uniform tended to be a silk top hat and morning coat. General Manager Alfred J. Alexander was particularly harsh on any employee who ventured outdoors without a hat, sending them home to “get dressed”!

Meter takers, turncocks and reservoir superintendents wore brown single-breasted coats, brown waistcoats, shiny high leggings, a low felt hat and great coats. The hat bore the initials 'BWW', as did the scarlet collar of the coats.



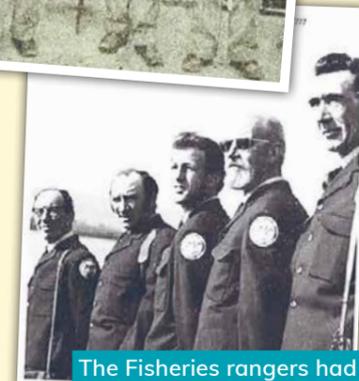
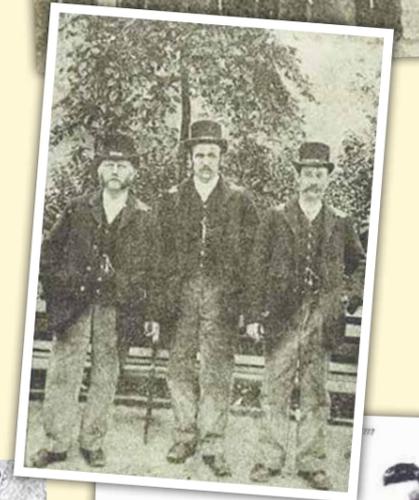
A new outfit was introduced in 1904.



In 1955 peak caps were temporarily replaced by berets at the request of staff, but these proved not to be popular and were soon replaced. Staff continued to choose their uniform styles and by 1956, those working in Head Office could opt for a navy blue or turquoise suit.



This 1960s uniform looks more like Bristol Water was starting an airline! As with all the uniform styles, they were chosen by staff.



The Fisheries rangers had their own smart uniform.



In 1963 we made the move out of town to our new head office on Bedminster Down. The architecture won a civic design award.

Offices

Our original office was located in Small Street but as we grew, new city centre premises were required and we moved into Armada House in Telephone Avenue. The grandly designed Elton Room was used as the Board room. We also had an office in Marsh Street.



One of the main functions of the office was for revenue, with most customers paying their water bill over the counter in person until bank transfers started in 1962.



A prize was won for the decoration of the offices in Marsh Street for the Queen's Coronation in 1954.



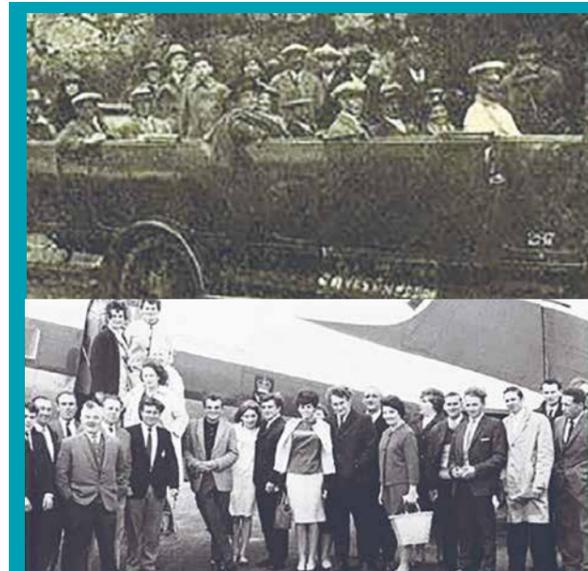
The head office still looks bang up-to-date after a 2015 refurbishment.

Staff welfare

The annual outing was an important company event, and a variety of modes of transport were used over the years.

Legend has it that we introduced annual leave after a fall out between two employees' wives on a works do in 1889! As a result, women were banned from future outings and paid holidays offered so the men could still spend a few days with their families.

The annual walk for Water Aid – the organisation providing clean water, toilets and hygiene to people across the world – began in 1983 around Blagdon and Chew Valley Lake. A similar annual walk and cycle ride for Water Aid still takes place to this day.



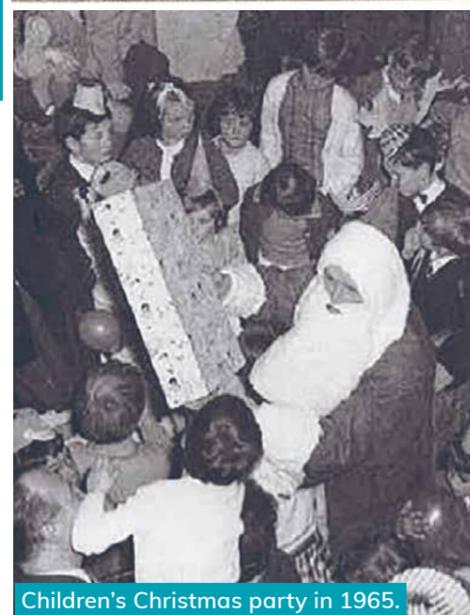
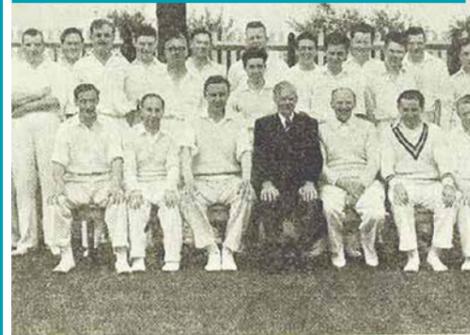
A Bristol Water outing in 1922, compared to 1965.

The influenza epidemic having seemingly abated, our Home Office absentee list shows signs of slackening; but our sick list never appears to have reached the high proportions of many other companies for which we may be thankful. Is it the ingrained water habit or the Halibut Oil capsules that keep our colleagues healthy? We have been pleased to welcome Mrs. Slocombe and Miss Brain back again, and send our good wishes to the mother of Miss Ashton (Revenue) for her speedy recovery.

OUR WELFARE COLUMN.
Looking out on wet roofs and pavements one realises that winter is just round the corner. Piled up on the Welfare Officers' desks are stocks of Halibut Oil Capsules. "One capsule a day keeps the doctor away" has now become a B.W.W. adage.

The welfare column in the late 1940s and 1950s reported on how halibut oil capsules had been purchased for staff to ward off the frequent influenza epidemics.

Sporting events have been a particular highlight of life here – not least the annual cricket match against South Staffs Waterworks. According to the staff newsletter in 1967, South Staffs held a narrow seven to five lead in the contests.



Children's Christmas party in 1965.

Women in the workplace

Over time our records show an increase in the number and proportion of women working for us, together with a shift in the types of roles they had. While huge progress has been made in equality in the workplace, we are still working to ensure that Bristol Water fully reflects the communities we serve.

1960s



1970s



1980s

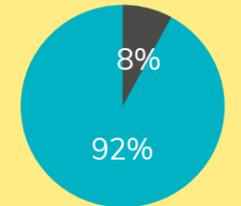
..... Sue Tankard, who joined Bristol Water on Wednesday 21st February as a Process Engineer in the Planning Section at Head Office

Miss Amanda Baker, formerly a Draughtswoman/Mapping Operator has taken up the post of Mains Flushing Technician in the Technical Services Division from 1st February.

2020s

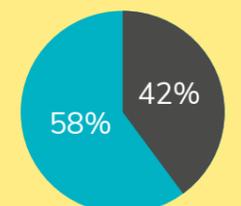


1960s
gender employment split



■ Female ■ Male

2010s
gender employment split



■ Female ■ Male

Women first began working for us during World War I and numbers gradually increased over the decades. The articles in the staff newsletters during the 1950s to 1970s are quite cringeworthy today, including a "vital statistics" section of the newsletter written specifically for women who had noted the lack of equality in the articles. Other articles by women during this time focused on food and fashion.



have decided to adopt one! For a long time now the Ladies, bless their hearts, have been telling us that they don't have their fair share of publicity. They point out that the Ladies in B.W.W. employ play a powerful part in the Company's affairs and ought to be referred to more often. So we have resolved to feature the Ladies. Each month we shall draw the name of a Lady employee out of a hat. her photograph will appear in 'Newsletter' together with a short write-up. Look out for this feature in next month's 'Newsletter' - 'Out of the Blue' (Hat).



Check up on Close ups
Necklines are news this year because designers have realized that their clients wear their smartest dresses to luncheons or bridge parties, where of course, they are sitting down. So the courtiers are concentrating most of the fashion detail where it will be seen - above the waist. This may be revolutionary thinking in Paris but Julie Harris, who designs for Pinewood Studios, says that she must always bear in mind the important close-up shot when considering the merits of any dress. And haven't we all carefully considered the detail of the dress of women announcers on T.V?

So passed the uneventful years until "The Shadow" fell—the Four Years' War of 1914-1918, when men of the Company who had known life on the office stool or in the pumping station went forth to battle. Women stepped into their empty places and carried on their work, and for the first time in the long period of the Company's history the swish and flutter of skirts were heard in the offices. The reader may wonder how the members of the early Board at the time of the Crimean War, stunned by the audacity of Florence Nightingale, would have re-acted to the feminine invasion of 1914. In the company's Museum is a woman collector's badge—one of those poignant "bygones" reminiscent of those days when woman's emancipation was only just beginning. A few months after war broke out Alfred J. Alexander retired from his office of Secretary and General Manager and was succeeded by his son, William Alfred Drew Alexander as Secretary.

Getting to know them...



Janice Hutchinson
Job: Clerk/typist at Kingswood
Joined BWW: July 1970
Married?: Engaged to John Ford
Star: Sagittarius
Special interests: Sewing, dancing and driving
Happiest when dressed in: Minis
Favourite extravagance: Clothes
Pet hate: Back seat driving from boyfriend when she is learning to drive
Male comment: "Freckles have always turned me on."
In the next issue, Newsletter hopes to feature a member of staff from the Accounts Department at Head Office.

Getting to know them...



Patricia White
Job: Punch card operator
Star: Capricorn
Hobbies: Watching football, cooking
Favourite extravagance: Shoes
Pet hate: Moths
Happiest: When meeting people - preferably male

The month's FOOD snippet ... for a delightful, quick, party snack try the quick-frozen dish called "Fish Fingers". Skinless, boneless, headless, tail-less, made of the best quality, solid white fish; they're just the answer to a maiden's prayer for something new on the party supper table - you only have to re-heat them.

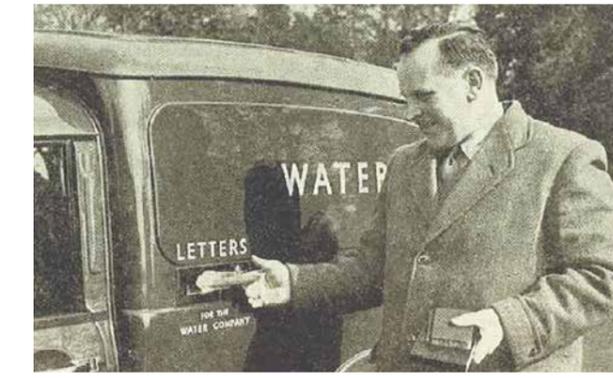
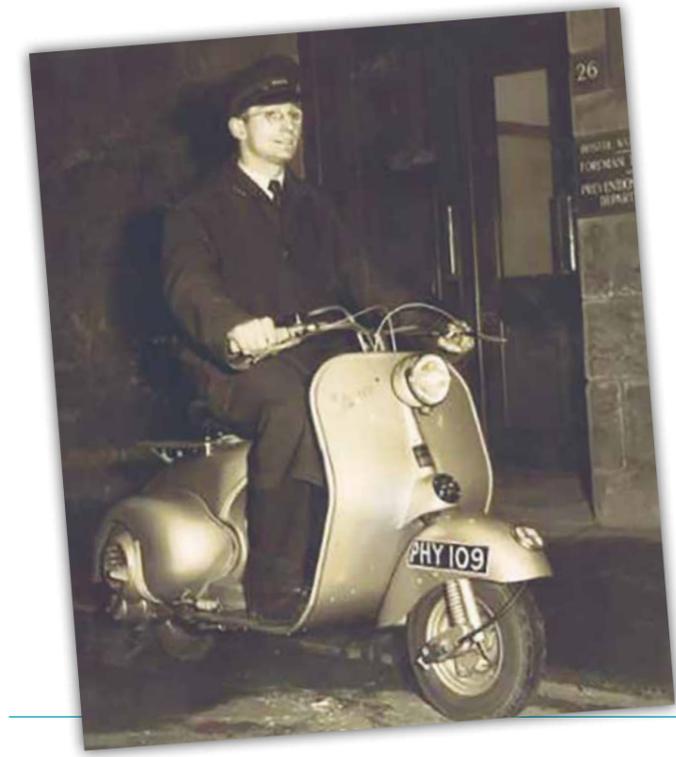
BWW's entry for the prettiest recruit



This is Patricia Dawn Smith, 17-years-old clerk in the Consumer Accounts Department, whose photograph has been forwarded by the NALGO Branch Committee as an entry in the "Prettiest New Recruit of the Month" organised by the NALGO newspaper "Public Service."
If she wins the monthly contest, Pat, who lives in Farleigh Walk, Bedminster Down, Bristol, will go forward for judging in the annual competition.
The Branch had to send up with Pat's photograph something about her interests and she told them—
Likes: ice skating, discos, buying clothes, boating.
Dislikes: spiders and tomato sauce!

Vehicles

The vehicle fleet has ranged from mobile laboratories, vans with post boxes on the side for rural areas, and the latest range of designs from four local artists. The Vespa scooter, while trendy, proved not to be practical!

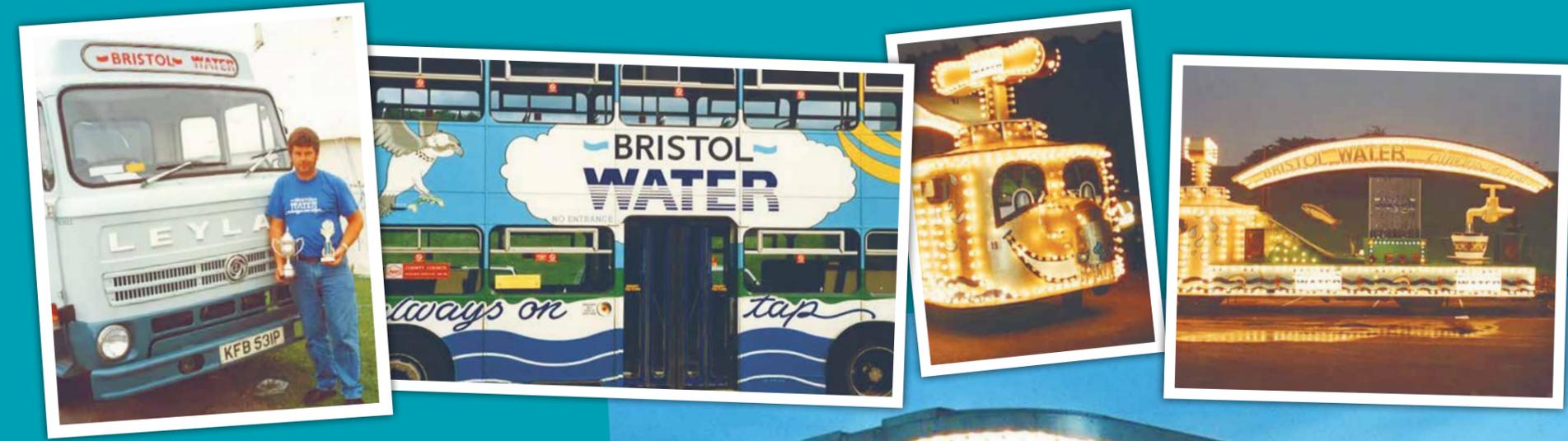


Tiny Drop and other characters



Tiny Drop, the Water Chap, was used from 1947 to express the character of the company – caring passionately about the water service, but also showing a cheeky and subversive streak.

He featured in a series of cartoons in the staff magazine, as well as on customer correspondence. His arch enemy, Water Sprite, was used nationally for a time to promote waterworks, apart from in Bristol! More recent characters include Pitter and Patter (giant water drops who promoted drinking water), the Aardman-designed Peter the Meter and most recently, the Bristol Water Foundation's educational characters Squidge & Snap, Eco Ninja, Hydro Harry and Professor H2O, designed by the Group of Seven.



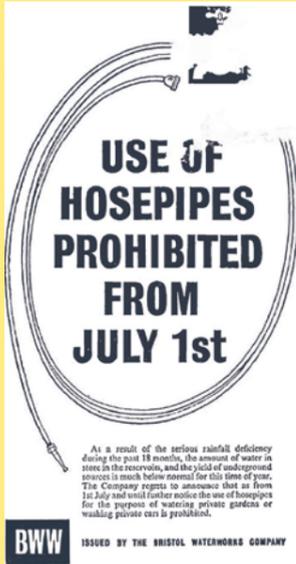
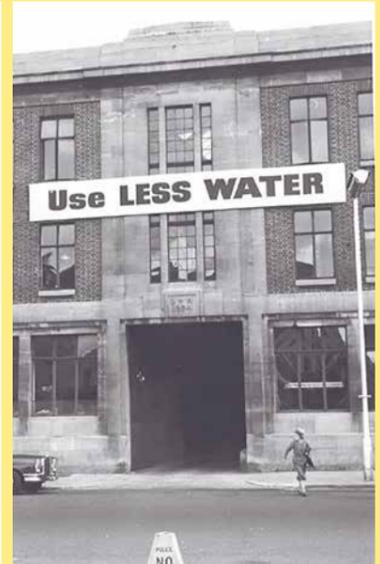
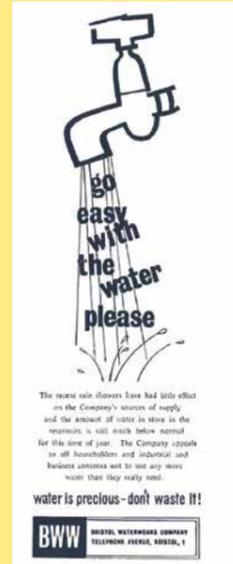
Carnivals

Taking part in the carnival float parades around the West Country is another prize-winning tradition... although quite why Concord featured on one float isn't recorded.

And when a carnival float isn't available, you can always rebrand a bus to get the message across!

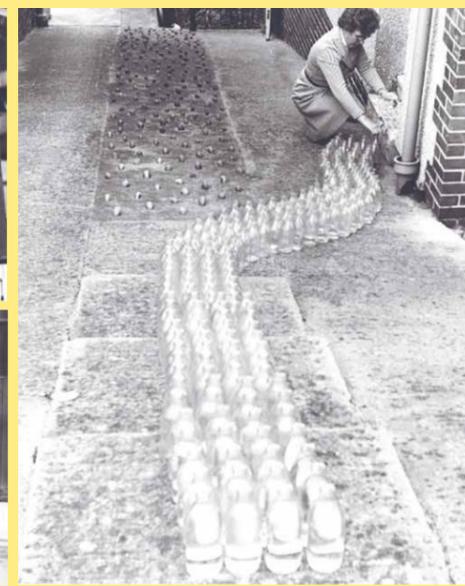
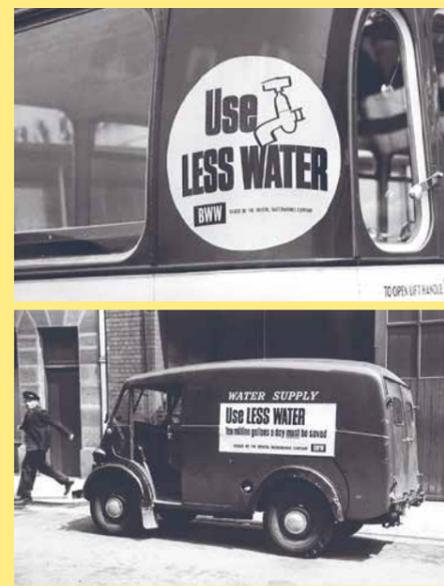


1933 and 1976 drought campaigns.



Water efficiency campaigns

Despite the water supply around the Bristol area expanding post-World War II, water efficiency campaigns were often required in order to protect water resources. In reality, there have been no water restrictions put in place since 1975, other than in 1990 when a section of the Gloucester and Sharpness Canal collapsed.



Partnerships for people and planet

The passion for the water services and science has made stars out of quite a few of our staff over the years.

The Bristol Water scientific team were invited to the Science Museum to demonstrate their educational experiments. (Visit the Bristol Water Foundation website to find the latest water-based science experiments for you to try at home.)

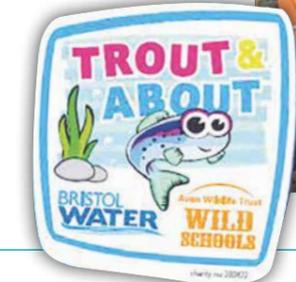
Our Bristol Water Bar tours festivals around the region every summer, providing a welcome refill for festival goers alongside the chance for our staff to talk all things water.

The giant toothbrush created to promote water efficiency in 2018 caused quite a stir when it was stolen, taken on a tour and put back in its rightful place on Millennium Square.

Partnerships for improving the environment and educating the next generation of water consumers have always gone hand in hand. We supported Bristol's push for European

Green Capital in 2015 by installing free drinking water fountains across the city. We were also early supporters of a local campaign group called City to Sea, who wanted to eliminate the use of single-use plastics by promoting refills... this eventually went on to become the nationwide Refill campaign.

In 2019 we went further by becoming the first utility company to develop a social contract. This sets out how we can be held to account for delivering initiatives through local partnerships that focus on the wellbeing of society. The social contract retains a key link to the social purpose that inspired our original founders back in 1846.



Partnerships for people and planet cont...



The first tree planting in partnership with the Avon Wildlife Trust took place in 1983. Partnerships have also developed in core water services, such as sharing billing for water services from Bristol and wastewater services from Wessex Water through Pelican, a unique joint venture when set up in 2001.

INTRODUCING THE FABULOUSLY CLEAR... Water!

IT MAY NOT BE AN IPAD WITH UNLIMITED DATA, BUT IT DOES KEEP YOU ALIVE!

WE WON'T PROMISE YOU NEXT-DAY DELIVERY LIKE AMAZON, BECAUSE IT'S THERE, AT YOUR TAP... RIGHT NOW!

AND WE CAN'T GIVE YOU INTEREST-FREE CREDIT LIKE BARCLAYCARD, BUT AT £0.0001 PER GLASS IT'S PRETTY CHEAP ALREADY.

Whenever you want it, it's there, keeping you, your family and your home clean and hydrated. So let's toast it for the humble glass of water!

#BRISTOLWATER

Pure Brizzle	
500ml West Country's finest tap water, Est. 1846	£0.0001
One serving every day of the year	£0.04
Bottled water	
500ml of bottled water	£0.80
One serving every day of the year	£292
Fizzy drink	
500ml of a leading cola brand	£1.20
One serving every day of the year	£438

A new take on how to market water from 2019.



Hydro Harry at the launch of the Ablaze school poetry water competition in 2019



Charging: facts and figures

The water industry has always run on facts and figures. Presenting these to the public is an important part of explaining what is causing changes in water bills.

The growth in water use over the 1950s and 1960s was explained with a performance graphic. Today, graphics have changed with online interactivity, but the principle of explaining where customers' money goes remains the same.

Until economic regulation of prices came along, the objective was to set charges so shareholders got a fixed return and a small surplus retained. As a result of this surplus, in 1977 charges reduced from 12.5p per £ rateable value to 10.6p per £ RV.

TEN YEARS OF PROGRESS

1950	1960
Population directly supplied (excluding bulk supplies)	452,000 to 780,000
Average daily consumption	19 m.g.d. to 36 m.g.d.
Gallons per head per day	40 to 48
Number of burst mains	220 to 537
Samples of water analysed by the Chemist	2,284 to 6,007
Length of mains laid (miles)	809 to 2,410
Number of Staff employed	410 to 686

A receipt of payment of water rates from 1917. It is not that clear quite how sending the receipt to the office in Marsh Street in case of fire helped – despite that appearing to be the instruction!

How last year's revenue was spent

	1977	1978
	£	£
Income (mainly from water rates and charges)	12,932,000	10,573,000
Operating Expenditure—		
Wages and Salaries	3,066,000	2,819,000
Electric Power	1,070,000	835,000
Local Rates etc.	1,011,000	1,821,000
Materials and Services	2,007,000	
	7,154,000	6,602,000
Capital charges (renewal of works and interest etc. on capital)	4,413,000	4,117,000
	11,567,000	10,719,000
TOTAL COSTS	£1,365,000	(£136,000)
Surplus (Deficit) for the Year		

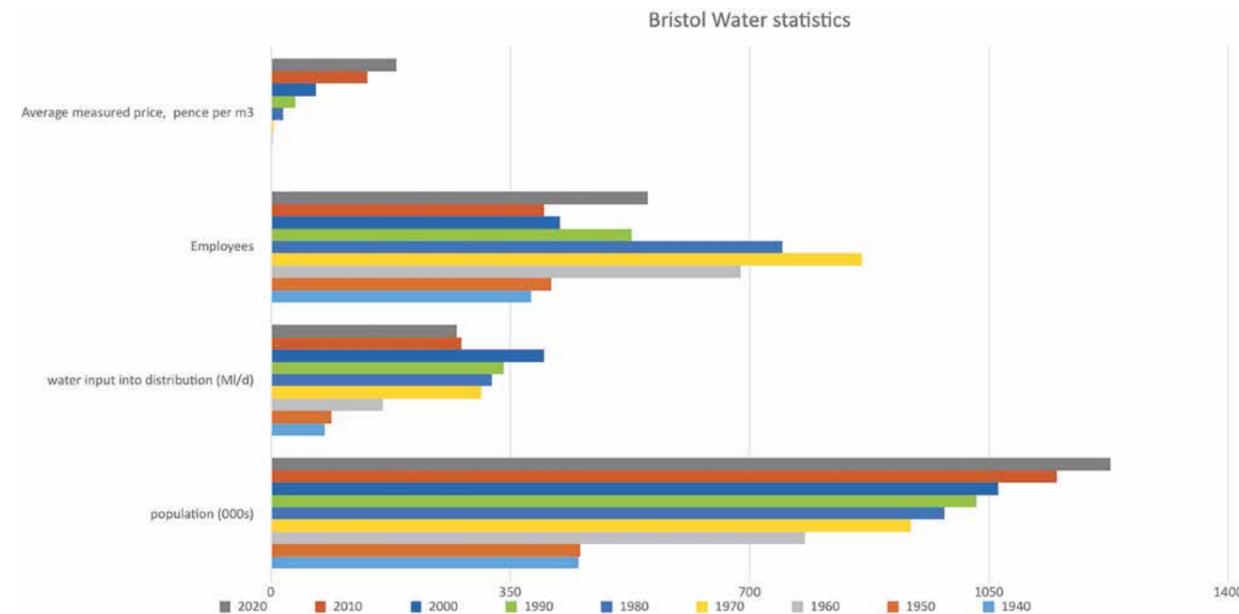
The larger-than-expected surplus for the year enabled the Company to reduce its charges in 1978 and to increase its Carry Forward balance to a more reasonable figure, as explained in the Chairman's Statement to stockholders summarised above.



A statistical history of Bristol Water

Regular statistics have been kept since the 1930s. The number of employees increased up to the 1970s and then reduced with modern technology and some elements of activity being outsourced to contractors from the 1990s.

The work since the mid-1990s to reduce leakage can be seen in the reduction in the water treated and input into distribution to customers, despite the continued growth in population. Prices increased from 1980 with inflation and to pay for increasing service expectations. Efficiencies have seen the rate of increase slow down and reverse since 2015.



Mementos and memorabilia

Bristol Water features on a Corgi miniature version of the classic 1950s minivan. Badges and leaflets produced for previous celebrations, alongside the metal Refill bottles, and soft versions of characters such as Pitter and Patter, have become collectables.



