Public Health and Water Supply in Bridgwater, Somerset

by Tony Woolrich

7) The Bridgwater Waterworks 1879 to 1900

Organisation

THE Bridgwater waterworks company was wholly owned by the Corporation and so there were no outside shareholders. In consequence no dividend was ever declared and for all its life the Corporation seem to have been content to cover costs. For some periods the service was run at a loss.

Although nominally the Water Committee comprised the mayor and all the Council, the concern was run by a sub-committee which was appointed annually and it was under the day-to-day control of the Borough Surveyor and Engineer. The first surveyor was Mr John Parker, who later went on to be Borough Engineer of Hereford. He was succeeded in 1882 by Mr George B. Laffan and after 1892 by Mr Francis Parr.

The minute books of the Water Committee are complete. There are, as well, printed annual financial records surviving from 1906 and for some periods manuscript records of water rents paid, and ledgers of expense costs; together these give a partial picture of the operation of the concern, for apart from one bundle of letters and other papers none of the Surveyor's technical records have survived and there are very few details indeed about topics such as the amount of rainfall and water consumption. The minutes record little about staffing of the waterworks and for this period it has not been possible to list exactly the labour establishment. The Committee usually met weekly and on most occasions dealt with requests for service from consumers as well the administrative work of the supply. There are a number of instances where the Committee is recorded as having met and the members' names noted, but no business was done. In the main the minutes are sketchy, and for many meetings simply record the fact that letters were read, or requests for supply granted, but with no details of what was involved. These minutes record in some detail the growth of the town, for builders requested temporary services for use in housebuilding, and the streets where builders were working are recorded in the minutes. The Committee waged a continual battle against water waste, but few prosecutions were recorded.

It is clearly impossible to describe in detail the chronological history of the company in the early days with any certainty due to the lack of fully comprehensive records, but it is possible to discuss the predominant themes which appear in the records.

Finances

Very little indeed is recorded in the minutes about the finances of the water company. The total cost of the original scheme was £41,353, raised by Terminable Mortgages at 4% to 3% interest, and also by a sinking fund. By 1895 £4065 had been repaid, leaving a balance of £37,288. Little has so far been discovered about the annual profit and loss for this period; January 1887 estimates show probable deficiency of £613 13 9. Dec 1890 estimates 2,290.000 gallons per week at a total cost of £2450 per week, cost therefore 5d per 1000 gallons.

Staffing

A curious feature of the water company is that the planning of the staffing needs was done very much on an ad-hoc basis, and that no firm staffing structure was established until some while after the concern opened for business in December 1879.

The first two employees identified in the minutes were the clerk of works, F. J. Jones, appointed December 1877, and G. L. Lambert, a Birmingham man appointed in August 1878 to inspect on behalf of the Corporation the erection of the steam engines and pumps at Ashford.

On the opening of the service in December 1879, the clerk of works was authorised to spend up to three months making connections for consumers. In January 1880 there was much discussion about the best means of keeping the waterworks records, the precise duties of the staff and what system of book keeping was required. It was decided that the Borough Surveyor should act as waterworks manager, as well as his regular duties, for an additional salary of £50 per year. The Surveyor was sent to Norwich in April 1880 to learn all he could on how to run a waterworks and the Corporation later paid the Norwich waterworks for their trouble.

The rents were to be collected by Mr Hydon, the Assistant Overseer of the Board of Guardians, who was responsible for collecting the Poor Rate; he was to be paid 5% for the first £1000 and 2% for any sum beyond that.

It was agreed that a turncock should be appointed at a wage of 17/- per week with a rent free cottage at Wembdon reservoir. His duties were to 1) tap the mains to supply new customers, 2) lay new mains

on corporation property, 3) turn the supply on and off as required, 4) gauge the height of the water in the reservoir, and 5) act under the direction of the manager. Joseph Temblett, from thirty applicants, was appointed in March 1880, with the obligation to give the Council two weeks notice, should he wish to resign. In November 1881 the turncock's wages were increased to £1 per week.

The first entry in the minutes for the Ashford engine driver did not appear until October 1882 when it was resolved that [H.] Rose should be dismissed and a replacement found. The Surveyor interviewed a replacement who lived at Highbridge, but evidently he was not suitable for Rose was asked to appear before the Committee early in December, and appears to have been reinstated. However the Committee also resolved that in future printed sheets should be used to record the pumping and the amount going over the weir at Ashford, and that the sheets should be sent weekly to the Surveyor. From these events it looks as though there was a breakdown in management communication somewhere and poor Rose got the blame.

A second engineer was not appointed at Ashford until September 1889. Later minutes record the names of other engineers, G Tucker, August 1890; and - Queller, who was succeeded by Thomas Giles in August 1891. Giles's wages were to be 17/- per week plus a cottage. He could be given a week's notice by the Corporation, but was to give them four weeks should he want to resign. In 1900 the wages of Napper, second engineer were to be raised from 17/- to 19/- per week. The engineers lived in cottages at the Ashford Mill and paid rent for land attached to them.

In April 1891 the post of foreman at the waterworks was created; the first holder of the post was Robert Pepperell. In June 1892 Pepperell asked permission of the Water Committee to keep at Ashford a pony and trap at his own expense, because of the amount of walking his duties invoved. The Committee turned this down, but did say that if the Borough Surveyor was ever given permission to keep a pony and trap for undertaking his duties then they would reconsider the matter. In May 1895 the Committee recommended that Pepperell be appointed water inspector at a wage of 24/- with a house at the reservoir. His duties were 1) to keep in good order the Corporation's stock of fittings, 2) make all connections to the mains, 3) make slight repairs to leaking taps, 4) inspect and report on all new fittings consumers were proposing to use, and 5) undertake frequent house to house visitations. Robert Pepperell died on 3 January 1900, and the water Committee recommended that a full time water inspector be appointed. Before that the work was done as part of the duties of the assistant sanitary inspector. 16 hopefuls applied for the job and Francis John Cann was appointed in April 1900. In January 1901 Cann's wages were increased from 24/- to 26/- per week, to take effect after he had completed a year's service.

In addition to the staff named in the minutes there were others employed. There would have been labourers responsible for keeping the filter beds at Ashford in good order. This would have involved skimming off the top layer of sand and washing it to remove the sedimental impurities brought down from upstream. Others were involved in general maintenance at the Wembdon Reservoir and in laying new mains in the town. There is some evidence that on some jobs the regular staff of the Borough Surveyor, who were nominally employed by the Highways Committee, were used. At various times the Surveyor engaged men to walk the banks of the streams which supplied Ashford, to check that water was not being illegally taken for irrigation by farmers whose land adjoined the stream. When the new turbine-driven pumps were being tested in 1896 it was found that only about 7½ hours out of twelve hours worth of flow was usable at Ashford on the night of Saturday 3 May, for upland farmers had turned the water out into their meadows.

Technical - Pumping at Ashford

Very little is to be gleaned from the minutes about the operation of the Ashford plant, and what there is relates exclusively to the pumping machinery. In March 1884 modifications were made to the condenser air-pumps to ensure they were supplied with filtered water. The filter beds were not fenced and in October 1887 a man named Staples was found drowned in the settling tank and the inquest jury asked that fencing should be put up. In September 1892 the engineer was cautioned about keeping cattle on the grass around the filter beds and engine house. At the same time the edges of the filter

beds had to be lime-whitened.

According to Charles Hawksley's speech at the opening in December 1879 it was originally planned to make use of the waterwheel at Ashford Mill for pumping water to the reservoir; in January 1880 the Water Committee asked Thomas Hawksley to report 1) on what needed to be done to make the waterwheel fit to use, 2) the probable cost and 3) the probable saving in steam costs if the water wheel was used. His response is not recorded and it would appear that the idea was not pursued.

At various times after this the Committee discussed the future of the old waterwheel in the Ashford Mill, but it was not until January 1895 that active steps began to be taken to create auxiliary pumping facilities there. The problem arose from the cost of carrying coal from Combwich to Ashford -- 2/8 per ton, (an addition of about 25% on the coal costs of that time) and the bad state into which the engines had been allowed to fall. It was proposed to replace the waterwheel with a small water turbine which drove reciprocating horizontal pumps, and once this was in operation radically overhaul the steam pumps. It was proposed to use part of £1500 borrowed from the Local Government Board to pay for the work. The rest was to be used for installing a system of district water meters to cut waste and other improvements. The Committee had received an offer £5 for the old wheel and machinery of from Mr James Kidner of Blackmore Farm.

Twelve engineers were contacted and in July 1895 the Committee accepted the tender submitted by Messrs Hodge Bros., City Basin Iron Works, Exeter, for a 12" horizontal Hercules turbine with duplicate double acting horizontal pumps 7" diameter and 12" stroke. The contract price was £306. By August the work of taking out the old waterwheel had been completed, and revised estimate for the work of £633 11 8 agreed. The previous figure was £450. The contract for the masonry was awarded to Mr Thomas Stockham at a price of £285. By the beginning of May 1896 the plant was being tested, and this showed that in 24 hours the turbines could pump around 280,000 gallons. This was approximately 30,000 gallons more than the minimum contract volume.

On 28 May the Committee heard that the crank shaft of the horizontal pump had fractured and was being replaced by the contractor. By January 1897 the turbine pinion had excessively worn and the plant had to be stopped so that it could be replaced. In October 1897 the turbine failed through the loosening of the set screws holding the impulse cups within the turbine case. The turbine seems to have settled down for in May 1898 major repairs to the No 1 steam engine at Ashford were carried out, and then work started on No 2 engine. However, problems continued with the turbine, and in May 1899 the Committee discussed a report which recommended more repairs and new work totaling £630. In July the Committee recommended that the gearing between the turbine and pumps be modified to substitute mortice gearing to a bigger size, together with modifications to the pump valves and an increase in size of the crankshaft. The cost of repairs by the Bridgwater engineers W & J Wills to the existing turbines and pumps amounted to £77 1 5, and the cost of the modifications planned they estimated to be £9070.

Technical - Coal Prices

Coal was purchased from pits in South Wales and was delivered by boat to Combwich. 'Through and Through', a grade of steam coal, was the type normally obtained from the Ocean Coal Company. Payment was due in 30 days with a discount of 2½% for prompt payment. From Combwich the coal was transported by horse and cart to Ashford. The unloading arrangements at Combwich involved the coal being shovelled into baskets in the vessel's hold, lifted out by tackle attached to the masts, and then barrowed across to the cart on the river bank by a gangplank.

The amount of coal used each year was not given in any of the minutes, but later sources indicate that the consumption was about 1 ton per day. The cost of transport was quoted in 1895 as being 2/8 per ton, and in 1893 as 2/3. The price of per ton coal increased over the years, but no explanation has yet been found for the extreme increase in 1900:

Apr 1880	6/6
Nov 1882	7/6
Mar 1883	10/6
May 1884	10/-
Oct 1885	12/-

No prices were recorded in the minutes until:

Jul 1893	9/6

May 1894	11/-
Nov 1894	10/1
Mar 1895	9/10
Oct 1895	9/9
Feb 1896	9/3
Jan 1897	9/2
Oct 1897	10/-
Jun 1898	16/6
Sep 1898	12/9
Mar 1899	12/6
Oct 1899	13/-
Jan 1900	22/3
Jun 1900	21/6
Oct 1900	23/6
Apr 1901	14/-

The extreme increase in price in 1900 caused the Water Committee to examine the use of coal very closely, and it found that no proper accounts of the price of coal or the tonnage bought were kept, nor was a proper stocktaking ever carried out.

Distribution - Mains

As laid out in 1878-9, the water mains ran through the chief streets of the town but did not extend as far as the borough boundary, except at the eastern part in the areas of Bristol Road/Union Street/Bath Road and St John Street by the railway station. This reflected the patterns of housing development then. When the Surveyor returned from his trip to Norwich in April 1880, the decisions to use galvanised pipes was changed and lead ones were to be used instead; the stocks of galvanised pipes laid in by the Water Committee were later sold to the Bridgwater Gas Company.

It is clear that in the final quarter of the C19 Bridgwater entered a phase of unprecendented prosperity, if the amount of good-quality domestic buildings is a measure. As the town grew, and small blocks of housing were built in new roads, the water mains were extended piecemeal to supply them. Water was also supplied to manufacturers.

The minutes record this growth of the town, which can be summarised:

1882 mains extended to Bowerings Mill at the Docks and Major's Brickworks in Colley Lane.
1882-3 Main for Chilton Street and Russell Place.
1883 Main for Hamp.
1884 Main extended along East Quay to new railway wharf.
1884 Chilton Street main extended.
1885 Main in Washington Terrace extended.
1885 Main extended beyond the railway bridge in Bath Road.
1885 Hamp main extended.
1887 Main for GWR carriage works at Colley Lane.
1891 Main in Washington Terrace extended for new development (74 plots) at Wembdon.
1892-3 Main extended for development at Haygrove.
1895-6 Borough boundary extended. Some discussion about extending the mains to take in the new land.

In 1896 there was clearly a boom in new building for in that year the extensions amounted to the value of £147 2 5, paid from from the revenue:

Chilton Street 186 ft 3" pipe with two hydrants	£11 2 4
Cranleigh Gardens 360 feet 4" pipe with stop cock	£27 1 0
Camden Road 156 feet 3" pipe	£6 12 0
Lyndale Avenue 252 feet 2" pipe	£14 4 3
Old Taunton Road 466 feet 4" pipe with stopcock and hydrants	£36 14 0
Washington Terrace 117ft 3" pipe with stopcock and hydrant	£13 3 11
Washington Gardens 282ft 3" pipe with stop cock and hydrant	£27 2 11

1900 Main extended down Kimberley Terrace

Distribution to Consumers

At the first meeting of the Water Committee after the service opened for business in December 1879 various decisions were made about how the service to the consumers was to be provided from the mains; the clerk of works was engaged to make connections, which were to be made with galvanised iron pipes; a printed copy of the waterworks regulations was sent to every property in the town; the installation of the pipework and fittings was only to be done by plumbers authorised by the Water Committee. The discipline of the regulations and the use of authorised plumbers was required by the need to prevent waste. In the constant pressure system, which Bridgwater's was, the mains were pressured at all times, and any leaks were wasteful. By specifying the kinds of fittings to be used and ensuring the plumbers were technically competent the water company was able to do much to ensure that leaks were kept to

a minimum.

In April 1880 the Committee examined four different patterns of water meter for business users and selected the Kennedy pattern which was the only one they found to record consistently under low pressures. It was decided that the rental of each meter should be 10% of the purchase price.

Like the organisation of the waterworks staff, the setting of the various charges was also done on an ad-hoc basis. During 1880 various discussions took place about the miscellaneous charges to be made. Water was to be supplied to properties on the east side of the railway for the same charge as was to be made to properties in Wembdon. The fish market was to be charged £2 10 0 per annum. A graduated charge was to be made for stables depending on the number of horses. Hosepipes for gardens were charged at 3/- per rood and greenhouses and conservatories at ld per square yard. The Board of Guardians were offered the option of paying £25 per year or having a meter for the supply to the Union Workhouse. Churches and schools were charged at a flat rate of 10/- per year. Special supplies were provided for the shows of the Somerset Agricultural Society, and in one year the Water Committee wrote the charge off since the local organising Committee lacked the funds to pay it. A special supply plus the use of workmen was granted to Lord George Sanger's Circus when it came to Blacklands.

The charges were published in leaflet form, and were occasionally updated. Since the system operated with a constant supply there was the continual danger of water running to waste through leaking pipes and faulty taps. The Water Committee spent much effort in trying to prevent waste.

In August 1880, the Council was offered free use of a meter by Messrs Tylor for district testing purposes. Tylor's meter involved a clockwork mechanism fitted above the meter which moved a strip of paper on which a pencil traced each 500 or 1000 gallons registered by the water meter. The interval between the traces indicated the time taken for each quantity of water to be used. The scheme of district testing was developed by Deacon of Liverpool and was designed to show up loss in the mains, or from properties whose supplies were rated and not metered. The town to be examined was divided into districts in such a way that groups of properties were supplied from one main. A registering meter was fitted to the main and the consumption recorded night and day. If the amount of night-time flow was excessive the valves controlling each street were successively turned off at ten or fifteen minute intervals, and the diagram of the meter would show the flow in each street and also from the trunk main itself. Stopcocks were required to discover if a leak occurred in the main or outside each property. The stopcocks all being turned off in a particular street the diagram would show whether any waste occurred. Waste occurring in individual properties could be discovered by listening for the flow of water at night time. Where stop taps were not provided a house-to-house visitation was needed to look for defective fittings.

The minutes have nothing to say about this meter, but it is clear the Water Committee approved its installation, for in January 1882 J.J.Tylor read to the Institution of Mechanical Engineers a paper about small-flow water meters and described the results of the Bridgwater test in some detail. Unfortunately Tylor did not say which part of Bridgwater was examined. The diagram and Tylor's explanation started at 8 a.m.. Until 11a.m. the flow was irregular but continued at about 500 gallons per hour, then between 11a.m. and 12noon a considerable increase in speed took place since people were coming home from work; the next 500 gallons were consumed in three quarters of an hour. After noon the consumption reduced and during the afternoon there was a very low flow. Little water was consumed in the early evening and after 8.00 p.m hardly any water consumption was recorded, indicating the soundness of the mains as no water was running to waste. At 5 a.m. the flow restarted, increasing in volume, until by 8 a.m. was back to where it had been the previous day. The Borough Surveyor, Mr J Parker, had checked the consumption over a whole week, by supplying the town entirely from the Wembdon reservoir with no pumping, and he found the consumption to be about 7 gallons per head per day, corresponding nearly with the diagram shown from the district being metered.

The Committee did not proceed to install district meters throughout the town, and there is no record in the minutes about the reasons for this.

However a possible explanation may lie in some remarks made by Thomas Hawksley to the Institution of Mechanical Engineers in the discussion of Tylor's paper. He said that the introduction of water meters for domestic purposes would be detrimental to the public health of the population '*It would be found that the working class, and he was afraid the poorer classes generally, would be exceedingly stingy in the use of water and that the change [to meters] would by no means tend to the promotion of cleanliness*'. Hawksley was also of the view that the capital cost of metering every household, coupled with the reduction in consumption which would in many cases result, could cause water companies to get into financial difficulties. He stated that the average cost of water all over England was about 9d per 1000 gallons, including interest on capital, but the cost of pumping, even where coal was expensive did not amount to a fraction of this, the bulk of the price charged being for overheads and the interest charged on the capital. He said that the return on capital did not amount to 6 or 7% on average. If meters were introduced there would be no saving to the consumer, since they could only result in an increase in water charges as the consumption would be sure to drop.

Another speaker, Mr E. B. Marten, said that the problem seems to have arisen from the way Parliament had drawn up the Waterworks Clauses Act, 1847. They appear to have made a rough calculation that a water company ought to supply about 20 gallons per head per day and ought to receive on average 6d per 1000 gallons; for domestic customers companies were not allowed to charge on what people consumed but according to people's ability to pay. The charge was treated as a tax, like the poor rate, calculated according to rent paid, the rich having to pay for the poor. If the better class of houses were to have meters, they would pay much less in proportion, and the amount Parliament intended a water company to earn would not be reached. Unless there was a change in the law companies would find their revenues reduced.

Charles Hawksley, partner of father Thomas, pointed out that in many provincial towns no savings would be made by eliminating waste by the use of meters, since the distribution was so efficient. He said that if the charge for water in smaller houses compared with the rent to be charged to cover the overheads of interest on capital, meter maintenance and testing, was added to that of the water used, the consumer would have higher bills than he did now. As far as the water companies were concerned, they would gain from the introduction of meters since they would be relieved of the obligation to prevent waste.

It is clear that the Corporation did not pursue the District Water Meter plan, but by 1895 the amount of waste was such that the idea was revived. The consumption then was up to about 35-38 gallons per head, but the district meter system reduced this to about 22 gallons a head. It remained at this level so long as a full time water inspector was employed, but since then increased to reach about 27 gallons a head in 1919.

Drinking Fountains and Horse Troughs

The town had several public drinking fountains erected by public- spirited citizens. In 1880 A.G Foster Barham offered to erect a drinking fountain at the cattle market, and May 1881 F.J.Thompson asked permission to erect a drinking fountain at the Quay and another on the docks. Drinking fountains were erected at St John's and Wembdon Cemeteries. A drinking fountain may be seen at the rear of the Library in Binford Place. In 1894 a pair of handsome horse troughs for the town were presented anonymously. One was sited at the junction of the Bath and Bristol roads, and the other at Penel Orlieu. In addition to these, which were recorded in the minutes, another fountain was erected on the railway station, where it may still be seen, and the ordnance survey map of 1886 shows one on the wall of the Market House.

Supplies to the Rural District

The Bridgwater (Corporation) Water Act of 1877 set out the area the service was to supply; as well as Bridgwater Borough, water was supplied to the villages of Cannington and Wembdon through which the mains passed on their way to the town, and the Corporation had powers (which it did not in fact exercise) to supply other villages within the area of the Rural Sanitary Authority over which the Act gave it powers. The Rural Sanitary Authority was based on the area of the Bridgwater Poor Law Union, but its powers did not extend to the area of Bridgwater Borough. This meant that settlements adjacent to Bridgwater such as the one at Somerset Bridge in the civil parish of Bridgwater Without could not

be supplied with water from the Borough unless the Rural Sanitary Authority, and its successor the Rural District Council could reach an agreement with the Corporation to purchase water, or could have a supply of its own. The problem of inadequate water (and also sewerage) was repeatedly pointed out by the Somerset Medical officer of Health in his annual reports but the County lacked the powers to insist that anything be done by the Borough and Rural Councils until legislation in the 1920's allowed the County Council to make grants for improvements to water and sewerage schemes.

In 1883 the wells at Burnham became badly polluted by seawater, and also in 1883 Dr Blaxall reported adversely on the sanitary condition of the town. The Burnham Board of Health entered into negotiations with Archdeacon Denison to procure a supply from East Brent, and in 1884 and 1885 with Bridgwater, but the Corporation held there was not enough water to spare and the negotiations eventually collapsed. Burnham Board of Health purchased land at Winscombe and built a pumping station at Brent Knoll with a loan from the Public Works Board, and by 1888 began connecting the consumers to the supply.

Until 1894 the only formal contacts between the Bridgwater Corporation and Bridgwater Rural Sanitary Authority were over the provision of water for flushing sewers. There must have been informal contacts, however, since both authorities shared a medical officer and sanitary inspector. In February 1894 the Sanitary Authority formally asked for a supply for Downend, Dunball, Dunwear and Somerset Bridge. The Water Sub-Committee turned down Downend and Dunball but considered a supply for 6 farmhouses, 1 licensed house and 34 cottages at Dunwear. This involved the provision of a 5000-yard main from the borough boundary at the railway station gates at the bottom of St John Street. This scheme was later turned down by the full Water Committee. For the next five years the two councils continued in unsuccessful discussion over the question. Two areas proved to be of difficulty: the first was the price to be charged and the second was the feeling on the Corporation's behalf that the supply should be reserved for the Bridgwater ratepayers and the future growth of the town. Eventually, in October 1899, the Water Committee recommended that in future no water should be supplied to houses outside the Borough boundary without the written consent of Rural District Council and their Medical Officer of Health; a bill was to be sent to the district council for water already supplied. Meanwhile the Rural District Council was taking steps to ensure adequate supplies for some communities, with the discussions in 1899 about the loan required to provide a supply from Nether Stowey. This involved a gravity supply to the village from springs feeding a small 15,000 gallon reservoir.

From this point onwards much effort was expended in providing a supply to consumers in the Bridgwater Rural District Council's area: first by the RDC utilising small sources of supply in a piecemeal way, and then in the mid 1930's through a joint scheme with the Borough supply, which involved three major civil engineering works, undertaken between 1933 and 1962, for the provision of more water storage to meet the ever increasing demand.