The River Ver and Abstraction by Andy Webb, August 2024
Chapter 2: Upper Reaches

"We never know the worth of water 'til the well runs dry"

Thomas Fuller, 16th century English historian

The "Industrial Revolution" of the 18th century brought two related advances in mechanical technology to aid the mining industry in particular. Firstly, at the beginning of the century, Thomas Newcomen invented the atmospheric engine. Secondly, James Watt improved this with his true steam engine in the middle of the century. Both could lift groundwater from deeper mines so that they did not flood. The new technology evolved and improved exponentially into the 19th century, so that steam power could be harnessed to drive wheels, pulleys, shafts and chains, as well as lifting and shifting large amounts of water.

The Old Pumphouse, Stonecross

The Chelsea and Westminster Water Co was founded in 1724 to supply what was then the burgeoning area of West London (Mayfair, Westminster, St James etc.). It established a major waterworks at Chelsea, which drew its water from both the Thames and the Westbourne. Its water was the first to be filtered through a series of sand-beds, and was stored in several small reservoirs nearby.

Initially the Chelsea Waterworks utilised Newcomen's atmospheric engine, but certainly installed Boulton and Watt's more powerful steam engines to lift and pump its water later in the 1700s. The new technology of mechanical devices became one of the sights of London. An account of 1755 gives the following description:

> "A short distance from hence is Chelsea Water Works, a noble cut, being a large, though not long, river itself, from the Thames to near Buckingham Wall, where is a curious water-engine that works by means of steam arising from water boiling in a great copper, a continual fire being kept for that purpose. The steam, being compressed and condensed, moves by its evaporation and strikes a great counterpoise, which, striking another, at last moves a great beam, which mounts through iron pipes and discharges itself into a deep cistern over the machine, and thence falling down through other iron pipes, is conveyed by large wooden pipes to the bason or reservoir in Hyde Park, from which it supplies the upper part of new buildings."

This passage reveals that a substantial pressure of water had been achieved by the point of supply.

However, by the early 19th century these new sources of fresh water were unable to keep up with the growth in demand, and were decreasing in quality. A series of Parliamentary and Government Reports and Inquiries led to civil engineer Thomas Telford being commissioned to conduct a survey into future supply of the capital's water. His report was finally delivered in 1834. In it he states the following:

> "The river which passes Uxbridge is called the Colne and has acquired the water of the Chesham after passing Rickmansworth. Proceeding upwards between Rickmansworth and Watford, the westerly branch occupies the Berkhamstead Valley, and the easterly branch the St Albans Valley; and half-way between St Albans and Watford the Colne joins the Verulam; but, unless after heavy rains, the Colne is an insignificant stream, and at such times very muddy, wherefore it is intended to exclude the Colne from furnishing any part of the supply to the Metropolis."

> "At Watford Mill in the autumn of 1833, being the driest season, as regards the supply of rivers, experienced during the last half-century, the Verulam River produced upwards of 30 cubic feet of water per second, being more than double the quantity supplied by the 3 [water] companies in the year 1828." [i.e. from the Thames itself].

Water from the Gade Valley was dismissed for supplying the capital, firstly because its water was needed for the Grand Junction Canal, and secondly:

> “the more decided cause for rejecting it altogether, from its being infected by the deleterious substances used at the paper-mills [at Apsley]: so that there being an abundance of clear water produced by the Verulam alone, at a sufficiently high elevation, I propose to avoid these annoyances altogether."

> "Immediately above the commencement of the London Aqueduct, about 2 miles above Watford, the valley of the Verulam affords a commodious situation for extensive reservoirs of water, and allowing it to settle if such should hereafter be deemed requisite."

> "From this place a covered aqueduct may be made to descend with a uniform inclination of 18 inches per mile to Primrose Hill."
> "Verulam would be adequate for the 3 [water] companies, even in summer; a third more might be obtained by building reservoirs to retain flood waters in that valley. The Ver in the driest season known for the last 30 years had a flow upward of 30 cubic feet per second, which is more than double what the three companies have now."

And, in conclusion:

> "The Verulam is the only stream with water sufficiently good and pure for the supply of London."

Bearing in mind the siphoning off of water from the River Lea at Ware for the New River (and thence the City of London), which had by then been in existence for over 200 years, Telford's Ver "New River" approaching the capital from the west would have taken a vast amount of river water away from Hertfordshire. Indeed, exporting of river and groundwater from the county, and later its treatment and return to another river system, was to become a recurrent theme for the next 150 years, as we shall see. Ultimately, Telford's report and its recommendations were not pursued.

The issue, of course, did not go away. Railway and civil engineer Robert Stephenson gained experience of shifting great volumes of sub-surface water whilst overseeing the design and construction of, in particular, the Kilsby tunnel in Northamptonshire between 1835-38 for the London and Birmingham Railway.

The search for fresh water for London switched from surface water abstraction to groundwater abstraction in 1839, when Stephenson was commissioned to report on the issue. (London's population grew from 865,000 in 1801 to 2,362,000 in 1841.)

The source for the water was to be the same as Telford's, i.e. the upper Colne above Watford, but Stephenson began by making test wells into the unconfined chalk at Bushey Heath. His report of December 1840 states: "Nature has supplied us with the means of substituting a pure and unceasing flow of spring water for the outpourings of filthy drains, and that this can be done without encountering difficulties of any but an ordinary nature."

Stephenson used data from the new sciences of geology and hydrogeology, as well as his own observations from the test wells: " . . . there was abundant ocular demonstration [the water] was so beautifully transparent as to admit of the bottom of the well being seen when the water was upwards of 30 feet [9.1m] deep". In his first report to Parliament Stephenson erroneously concluded that new groundwater sources would increase "the supply to London with facility and economy" . . . "in making use of the enormous reservoir which nature has supplied us with in the chalk, and effecting this at a spot where no existing interests can be injured".

This time there were protests from local landowners and worthies, and from mill owners on the Colne who feared the loss of water in this way. Echoes of this were to be heard in the 20th century,

as we shall see soon. Landowner and Hertfordshire historian the Rev. J.C. Clutterbuck wrote a pamphlet opposing the report's conclusions, entitled "A Letter to Sir John Sebright on the Injurious Consequences Likely to Accrue to a Portion of the County of Hertford if the London and Westminster Water Company should Carry Into Effect their Project of Supplying the Metropolis with Water from the Valley of the River Colne".

Again, these ideas were not pursued and it took the "Great Stink" of London in 1858, and cholera outbreaks in the 1860s, to provide the impetus for more clean water, but this time from new reservoirs constructed by the Lea and Thames in the later Victorian period.

There is one other, rather baffling, item from the *Corporation Records of St Albans* that is worth noting here:

> 1833: Court held April 23rd - Permission was granted to Mr Joseph Fowler, who was about to establish waterworks in the town, to lay the necessary pipes in the public roads, which were to be left in good condition by him.

This needs more research and elucidation.

The theory and practice of groundwater abstraction on an industrial scale had been demonstrated to be a real possibiilty for the future decades, then. St Albans Abbey Station was opened in 1858 by the London & North Western Railway, and this brought the possibility of bringing in sufficient stocks of coal to power steam engines, which would then pump water for public supply. It is worth noting here the official dates that new pumping stations were opened to supply the Ver valley and other areas:

Wells/Pumping Stations	**Opened**	**Amount (millions of litres per day)**
Stonecross	1865	8
Holywell	1885	7
Redbourn	1938	1
Kensworth	1945	6
Mud Lane	1948	2
Friars Wash	1956	15
Bow Bridge	1967	6
	Total	45 Ml/d

Additionally, wells and pumping stations sunk immediately to the south, in the valley of the Colne, between the confluence with the Ver and north Watford:

Wells/Pumping Stations	**Applied for**	**Opened**
Bricket Wood (Drop Lane)	1945	1950
Wall Hall	1945	1950
Netherwylde (+Hillfield Reservoir)	1945	1950

On a detailed OS map of 1897 Holywell Waterworks are described as "private". Does this have any relation to the 1833 council permission for such?

There is clarity, however, in the *St Albans Almanack* of 1902, which states under Public Companies: "St Albans Water Co. The works are situate at St Peter's at the top of the city, with a 2nd pumping station on Holywell Hill. Engineer: Mr A.F. Phillips. Office: the Gasworks." (I believe both gas and water services were supplied jointly at this time.)

Thus, by the end of the Victorian period and the beginning of the 20th century, the basis of the modern water-supply system had been established, certainly in St Albans; it would be several decades before villages like Redbourn, Flamstead, Markyate or Harpenden would receive piped water, and they continued to draw water from communal wells, and have their sewerage taken away by the "Lavender" or "Honey" wagon.

Steam-driven lifting and pumping engines would be superceded by ever-more-powerful electric ones as the 20th century progressed, which were also able to operate from deeper wells.

For References, Source Material and Acknowledgements: see Section 6 on the website.

Former offices/HQ of St Albans Waterworks Co, Holywell Hill (built 1908), now a Nursery School

The Old Pumphouse, Stonecross

Dried-up river, Shafford Mill, late 1980s

Top/Settling Lake, Verulamium Park, drained and desilted, dry Summer/Autumn (2nd October 2005)

New water pipes at The Cricketers, junction of Stonecross, Harpenden Road, Avenue Road, St Peter's Street, Summer 2022

Sinking of a modern borehole/well in the 21st century, near St Albans

Friars Wash Pumping Station, River Ver, August 1994