



Gloucestershire Society for Industrial Archaeology

Cotswold Canals Restoration

Phase 1b. Saul Junction to The Ocean, Stonehouse

Project S01

Stroudwater Canal Features Influenced by the Ship Canal to Gloucester

by Hugh Conway-Jones April 2007 Issue 1

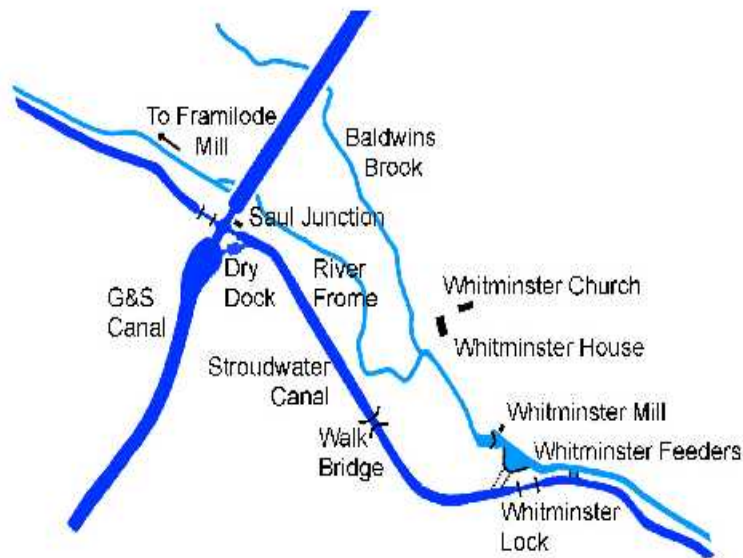
This paper highlights features along the half-mile stretch of the Stroudwater Canal from Saul Junction to Whitminster Lock that have been influenced by the needs of the Gloucester & Sharpness ship canal which was built across the line of the earlier Stroudwater Canal in the 1820s. Information is given about how these features that can be seen today illustrate past concerns about forming the junction, the collection of tolls, water supply, dredging, land drainage and lock design and operation.

Stroudwater Canal Features Influenced by the Ship Canal to Gloucester

by Hugh Conway-Jones April 2007

Introduction

Many features along the half-mile stretch of the Stroudwater Canal from Saul Junction to Whitminster Lock have been influenced by the needs of the ship canal between Gloucester and Sharpness which intersected the Stroudwater at Saul. Forming the Junction required the level of the Stroudwater to be raised locally by about four feet, and this was achieved by the ship canal company building a new lock, forming embankments and raising two bridges. Later, when the ship canal needed to obtain more water from the River Frome via the



Stroudwater, the ship canal company constructed a supply weir at Whitminster and agreed to ensure excess silt did not accumulate in the Stroudwater as a consequence. When the Stroudwater was officially abandoned for navigation in 1954, this length was bought by the fore-runner of British Waterways, and it continues to be maintained as a water supply channel which is also used for boat moorings. This note highlights canal-side features that have resulted from these initiatives, most of which can still be seen today while walking along the towpath.

Saul Junction (*Junction with Boat*)

Saul Junction is the only place in the country where there is an intersection of two independent canals. The Stroudwater Canal, built along the valley of the River Frome, was opened in 1779 to allow barges to carry coal up to the woollen cloth mills in the Stroud valleys, and this part of the Gloucester & Sharpness ship canal was constructed between 1818 and 1827. The initial Junction was about 40 yards north-east of the present position, the water then being at the existing level of the Stroudwater, and the first barges were able to pass between the two canals in February 1820. To allow the water level to be raised about four feet to provide the necessary depth for ships, the present junction and lock were built on a new alignment, and this was commissioned and the old line closed off in two months of intense activity during the summer of 1826 (1).

The Stroudwater company was initially very concerned about loss of water from its canal, and so the ship canal company provided four pairs of stop gates across their canal and agreed to appoint a man "to attend the gates to preserve the water in the Stroudwater Canal". In practice, however, the Stroudwater company soon agreed to allow their canal to be used as a conduit for passing water from the River Frome into the ship canal (2). Thus it seems that the stop gates have had very little use, and only two pairs now survive, although the recesses for the other two pairs can still be seen. One surviving pair of gates was put to the test in 1990 when the section of the ship canal north-east of the Junction had to be drained following failure of a culvert near Parkend Bridge. Only then was it found that the gates did not really

have an adequate margin of safety when holding back the full head of water, and the gates have subsequently been strengthened.

Junction Lock

The lock beside the Junction has three unusual features compared with other locks on the Stroudwater Canal. Firstly, it is built in stone rather than the usual brick - evidently a preference of the ship canal company. Secondly, the upper gates are much deeper than usual because the cill had to be low enough to allow barges to pass while the new alignment was commissioned at the original water level - before the level above the lock was raised four feet. Thirdly, the gate paddles are pivoting boards worked by rack and pinion gears. These pivoting paddles are similar to those seen on the Leeds & Liverpool Canal, and this has led some to believe that the present gates must have come from that canal in recent years. However, local records include drawings dated 1880 showing gates for the Junction Lock with pivoting paddle boards made of planks bolted together, and the specification for the original Junction Lock gates in 1824 required the paddles "to be of good Memel timber three inches thick, built and bolted together as per plan" (3). Although this original plan has not survived, the wording of the specification is consistent with the 1880 drawings, and so it is likely that the present paddles are of the same design as the earliest ones.

The lock originally provided a drop of four feet to the lower pound, but the canal channel to the west was lost in the 1970s when it was merged with the River Frome to reduce the risk of flooding. There was originally a swing bridge across the lock to carry the towpath of the ship canal, but this has been replaced by a fixed bridge. On the grass area to the south of the lock is an old boundary stone that was moved here when discovered at the far end of the Junction House garden. It is inscribed with the initials CGB and was presumably carved by an illiterate mason who knew what shapes were required but did not realise that the order should have been GBC, standing for Gloucester Berkeley Canal, as on other surviving stones.

Entrance to the Stroudwater Arm

The first 100 yards of the Stroudwater Canal to the south-east of the Junction is part of the new alignment of the Whitminster pound built by the ship canal company in the 1820s. At the entrance is a pair of stop gates designed to maintain the level in the ship canal if the level in the Whitminster pound needed to be lowered for maintenance work. As for the upper lock gates opposite, the stop gates are deeper than might be expected because the cill had to be low enough to allow barges to pass while the new alignment was commissioned at the original water level.

On the wall adjacent to the southern stop gate is an iron handle that presumably once worked a sluice shown in that position on the original drawing of the Junction. The drawing also shows an 18 inch diameter cast-iron pipe running from the sluice, under the ship canal and emerging in the middle of the Junction Lock (4). This allowed the water level in the Whitminster pound to be lowered when necessary for maintenance. On the wall adjoining the northern stop gate is a depth gauge for the ship canal which normally indicates 18 feet 6 inches, although the canal has not been dredged to this depth for many years.

Junction House

The house adjoining the Junction was built for the official whose duties included recording traffic passing from one canal to the other and collecting tolls where appropriate, supervising the lock and stop gates when necessary and opening the footbridge which carried the towpath of the Stroudwater Canal over the ship canal. Although he was primarily an employee of the ship canal company, each appointment was subject to the approval of the Stroudwater company and at times he also carried out duties for them (5). The house was probably built around the time the ship canal was opened in 1827, and it is certainly shown on a map dated

1831 (6). The original house comprised the front block of the present building with probably a single storey out-house at the back. It was enlarged to its present size and the office was added in 1870 (7). The office retains many original fittings, and the brass plate on the door came from the bridgeman's office beside the Low Level Bridge at Sharpness when it was demolished in the 1970s.

The garden of the Junction House includes part of the original line of the Stroudwater Canal. It was acquired by the ship canal company in 1861 in exchange for some other land further west, and two years later the old channel was filled with 1000 tons of mud dredged from the new channel (8).

Footbridge

Opposite the door of the Junction House is a footbridge across the Whitminster pound which can be swung open to allow boats to pass. A bridge would have been needed at this location during the construction of the Junction, and one was certainly in place by the opening of the ship canal in 1827. The present bridge is probably the replacement installed by the ship canal company in 1901 (9).

Junction Boatyard and Dry Dock

The footbridge gives access to an area that was for many years shared by private boatbuilders and the ship canal company's maintenance craftsmen. The former built and repaired small sailing vessels, and the latter constructed and maintained bridges, lock gates and maintenance craft. When the dry dock was built by the ship canal company in 1869, it originally had gates at each end to provide a link between the two canals across one corner of the Junction, and these were made wide enough for the ship canal company's steam dredger (which was too wide to use the normal route). This was important because the ship canal company was obliged to keep the Whitminster pound of the Stroudwater free of mud as a condition of receiving River Frome water that way, and it was more efficient to get their steam dredger to do the work than to rely on an old hand-operated spoon dredger (10). The opening at the Stroudwater end of the dock has subsequently been shut off by a wall, but its position can still be seen.

Boat House

Close to the site of the former entrance to the dry dock is a covered arm off the Stroudwater Canal which was built by the ship canal company *circa* 1840 to house their ice boat (11). It was later used for storing pleasure craft and eventually became a facility for the boatyard where work could be carried out on boats under cover. The building was badly damaged by fire a few years ago and has been rebuilt.

Change of Alignment

The bend in the Stroudwater arm 100 yards from the Junction marks where the new alignment built by the ship canal company meets the original line of the Stroudwater Canal. Looking back, the original line had no bend at this point and continued through what is now the garden of the Junction House as noted above. Old Ordnance Survey maps show a drain running from the canal at this point down the bank and into the River Frome. This presumably had a sluice at the top end beside the towpath which superseded the sluice beside the stop gate (noted above) as a means of draining the pound for maintenance.

Embankments

The straight length of canal from the bend to Walk Bridge is constrained by embankments which were raised about four feet by the ship canal company to suit the higher water level needed to match the level of their canal. There was a back drain along the bottom of the off-side bank which linked to the culvert under the ship canal just to the south of the Junction. Map evidence suggests that this drain was filled in or culverted in the 1870s, around the time when mud dredged from the ship canal was being dumped on land attached to the nearby Walk Farm (12). It is possible, therefore, that the land drainage was changed because the level of the neighbouring field was being raised by the mud dumping.

When this length of the Stroudwater was piled to help maintain the banks, a gap in the piling was left on the off side to provide a place where cows could get access to drinking water. As this length is still maintained as a channel for feeding water from the River Frome to the ship canal, it has also become a popular place for mooring boats - using old sections of railway line as mooring posts. It is due to take on an additional role as there is a proposal to form a marina in the field to the south with access from this length.

Walk Bridge

Walk Bridge, one third of a mile south-east of the Junction, was originally a brick-arched bridge with awkward approach gradients for those crossing. For many years, it only carried a private road that belonged to the Whitminster estate, but as time passed it was increasingly being used by the residents of Saul to pass to and from the Bristol road, in preference to going via the turnpike road through Frampton. In 1855, therefore, Mr H H Wilton of Whitminster House paid for it to be replaced by a swing bridge, pivoting on the off-side, which had much more convenient approach gradients. This new bridge was modified in 1869 when, to allow the ship canal company's steam dredger to pass along the pound, the bridge-hole was widened by two feet and the swing section was extended to suit (13).

By the 1950s, the condition of this bridge and of another were causing concern to Gloucestershire County Council, the highways authority. As commercial use of the canal had died out, the Stroudwater company had no money for bridge replacement, and so in 1954 they agreed to an Act to abandon the canal for navigation and to transfer the responsibility for the bridges to the County Council. The swing bridge was replaced by fixed concrete decking, and this became the limit of navigation along the arm. As there was still a need for water to be taken from the Frome to feed the ship canal, ownership of the arm passed to what became

British Waterways, who continue to maintain it. Under the bridge is a probe that monitors the flow of water that is feeding the ship canal.



Walk Bridge

Two Culverts

To the east of Walk Bridge, the canal is again constrained by embankments that were raised about four feet by the ship canal company, while under the canal are two culverts. These carry streams draining the fields that are below the level of the main River Frome, which in ancient times was diverted along the side of the valley to power

Whitminster Mill. The small Walk Bridge culvert is evidently the one Mr Cambridge of Whitminster House pointed out in July 1818 would not be big enough when the banks of the Stroudwater were raised. Presumably excess water from neighbouring fields in times of flood had previously found its way into the canal, but this would no longer be possible once the banks were raised. Instead of enlarging the culvert under the canal, however, the ship canal company formed a culvert under the road connecting with the back drain along the off-side bank of the Stroudwater noted earlier (14). The larger Nethermoor Culvert carries the main stream that drains the low-lying fields in the bottom of the valley.

Whitminster Mill

The site of Whitminster Mill is now occupied by a modern bungalow beside the weir over which the River Frome tumbles on its way down the valley past the site of Framilode Mill and on to the River Severn. When authorisation for the ship canal was being considered by Parliament, both mills were working, and clauses were inserted into the ship canal company's Act to prohibit them taking any water from the river without the consent of the owners and occupiers of the two mills (15). In practice, there was usually more water in the river than was needed by the mills, and so in the early days of operation, permission was given for the surplus to be diverted along the Stroudwater to the Junction. After a few years, however, traffic on the Stroudwater began to be affected by the accumulation of silt carried in from the Frome, and the ensuing dispute involved physical violence between opposing groups of workmen. Eventually, the mill owners agreed to sell their mills and water rights to the ship canal company, and this was authorised by a new Act in 1834 - which also required the ship canal company to keep the relevant part of the Stroudwater free of silt (16).



Whitminster Weir

The agreement to purchase Whitminster Mill required the ship canal company to demolish the buildings and not rebuild anything except a house for the man to take care of the flood gates and sluices that controlled how much water was taken from the river (17). The resulting house was a single storey structure in the classical style with a pediment at the front supported by two Doric columns. This design was probably chosen to please Mr C O Cambridge of nearby Whitminster House who had been very helpful during the earlier dispute. This interesting building was replaced by the present bungalow in the 1960s, but the design can still be seen as it was used again for the early bridge houses along the ship canal.

The original waste weir was 23ft long along one side of the channel approaching the mill, and there were flood-gates in the wall between the weir and the mill. The original flood-gates

were replaced in 1863 by three guillotine gates with vertical rods, each operated manually via a simple gear-box mounted on a beam forming the top of the surrounding frame (18). When this arrangement was replaced in 1984, the beam and the three rods and gear-boxes were preserved, and they are now on display on Level 3 at the National Waterways Museum in Gloucester. Each gear-box carries the name W Harris Gloster and the date 1863. (Harris was an engineer and machinist with premises in Quay St.) The top of the weir was raised in 1876-77 when the ship canal company wanted to raise the level of their canal by six inches to allow larger ships to navigate to Gloucester. Because of concern that this would cause flooding upstream, they also built a large new section of weir at right-angles so that the increased width could pass more water without so much effect upstream (19).

Whitminster Feeders

Behind a wall are the current feeders and sluices that pass water from the River Frome through culverts under the meadow and into the Stroudwater Canal below Whitminster Lock. Before the ship canal company became involved, the original water supply was via a controlled opening in the bank between the Frome and the canal above Whitminster Lock to help maintain that pound at its proper level. After the ship canal company had raised the pound below the lock by four feet, it was only a few inches below the upper pound, and when the ship canal company wanted to draw water from the Frome, the levels were equalised and the lock gates were left open to let the water flow easily. The drawback, however, was that the upper pound could not then be maintained at its proper level. The solution, authorised by the Act of 1834, was for the ship canal company to build a new supply weir, with feeders, sluices and a culvert to pass Frome water into the pound below the lock (20).

This arrangement worked well for many years until the ship canal company wanted to take more water from the Frome to make up for the extra lost through use of the new large lock at Sharpness opened in 1874. To achieve this, they rebuilt the feeders, sluices and culvert on a larger scale in 1876-77 (21), and these basic structures are still in use today, providing the main source of water for the ship canal.



Whitminster Feeders

Whitminster Bridge

The former swing bridge at the tail of Whitminster Lock was the only access to the low-lying fields to the south, and it also carried the tow path across to the south bank of the canal.

Whitminster Lock

When the pound below the lock was raised four feet to match the level of the ship canal, Whitminster Lock only had a difference in level of a few inches, and when the level of the ship canal was raised a further six inches in later years, the lock became completely redundant. Towards the end of the nineteenth century, however, the ship canal company had occasional difficulties in maintaining its nominal level owing to the huge loss of water when the tidal basin at Sharpness was used as a lock for particularly large vessels. By this time, the lock gates at Whitminster had deteriorated too badly to be effective, and so when the water level dropped, loaded boats grounded in the pound above the lock and could be held up for days. After years of complaints and much correspondence about who was responsible, the ship canal company eventually agreed in 1904 to make Whitminster Lock effective again by raising the walls and gates by eight inches and raising the banks of the pound above to suit. This ensured that there would always be enough difference in level at the lock to prevent the gates swinging open, even when the ship canal was at its highest level (22).

After the Stroudwater Canal was abandoned, the lock was filled in, but some restoration work has been done by the Cotswolds Canal Trust. New upper gates carry the date 1996, but the work was interrupted before the intended lower guillotine gate could be installed.

Conclusion

The half-mile stretch of the Stroudwater Canal from Saul Junction to Whitminster Lock has been much influenced by the needs of the Gloucester & Sharpness ship canal, and many interesting historic features can be seen today when walking along the towpath. Much of the length has been maintained in navigable condition and is used for moorings because it still provides an important conduit for water from the River Frome to feed the ship canal.

References

1. For an account of the construction of the Junction, see Conway-Jones, A H, *The Gloucester & Sharpness Canal - an Illustrated History*.
2. Glos Arch JF 14.3 & JF 14.11, G&B Canal Acts 33 Geo III c97 and 4&5 Will IV c54
3. Glos Arch D2460/4/7/8/3 & 6, gate drawings; TNA RAIL 829/17 18 Dec 1824, gate. specification
4. Glos Arch D2460/3/3/4/2
5. Glos Arch JF 14.3, G&B Canal Act 33 Geo III c97; TNA RAIL 829/13 p573
6. Glos Arch Q/RUM 138
7. Glos Arch D2460/4/4/1 Maintenance diary
8. Glos Arch D1180/8/13; D2460/4/4/1 Maintenance diary
9. British Waterways Deed Room, Gloucester, Sutherland's map of Canal Co property. c1826; Glos Arch JV14.2, . Engineers Report Apr 1901
10. TNA RAIL 829/13 p264, 265; Glos Arch D2460/4/4/1 Maintenance diary
11. Glos Arch D2460/3/3/4/9
12. British Waterways deed No 240; 1879 OS map; Glos Arch D2460/4/4/1 Maintenance. diary
13. Glos Arch D2469/3/3/4/11, 17; D1180 1/5
14. Glos Arch D1180/1/3; TNA RAIL 829/17 18 Dec 1824; BW Deed Room, Sutherland's.map c1826
15. Glos Arch JF 14.3, G&B Canal Act 33 Geo III c97

16. Conway-Jones, Hugh, Water Management on the Gloucester & Sharpness Ship Canal. *Jnl R&CHS* Mar 2005
17. British Waterways deed No 235
18. Glos Arch D2460/3/3/5/6; D2460/4/4/1 Maintenance diary Oct 1863
19. Glos Arch D2460/4/7/6/24; D2460/4/4/1 Maintenance diary Jun 1876-Jul 1877
20. Glos Arch Q/Rum 140; D2460/3/3/5/4
21. Glos Arch D2460/4/7/9/3; D2460/4/4/1 Maintenance diary Jun 1876-Jul 1877
22. TNA RAIL 864/6 p354-435