

## 16 River Severn Navigation

*Category: Commercial 69km*

*Map: Plate 14 Profile: Figure 9*

1. The River Severn Navigation extends northwards from Gloucester through Tewkesbury, Upton-on-Severn, Worcester, and Stourport on Severn to the confluence of the Gladder Brook just upstream of the latter town, a total distance of about 69km. In the vicinity of Gloucester the River Severn has two channels; the west channel connects the upper reaches of the river more directly to its estuary, but passes about 1.6km to the west of Gloucester; the other channel forms a big loop to the east passing close to the entrance of Gloucester Docks. The eastern channel is navigable north of Gloucester but not to its lower junction with the west Channel. The west channel is not navigable either, so that there is no navigable channel from the upper reaches of the river to the Severn Estuary. Such navigation can however be effected via Gloucester Docks and the Gloucester and Sharpness Canal (15).
2. The navigation is joined at Tewkesbury by the River Avon (not BWB) which is also navigable (to Evesham and Stratford-upon-Avon); at Worcester by the Worcester and Birmingham Canal (17); and at Stourport by the Staffordshire and Worcestershire Canal (18). Formerly connections were possible near Leigh to the Coombe Hill Canal and near Grimley to the Droitwich Canal (not BWB); both these canals are now disused and derelict, although there is a project to restore the latter to navigation.
3. The River Severn has been a principal navigation since medieval times, reaching, with its tributary the River Avon, into the heart of the Midlands. As the size of ships and the water demand for milling increased, navigation became more difficult due to the presence of currents and shifting shoals. The construction of the connecting canals referred to in paragraph 1 above brought this problem to a head and the Severn Commission was formed in 1842; it proceeded to make the river navigable over the reaches in question by the construction of river weirs, and by-pass channels with locks.
4. Between Gloucester and Worcester the ruling dimensions for vessels are 42.7m by 6.71m by 2.74m with superstructure restriction of 7.16m at summer level under Westgate Bridge. Between Worcester and Stourport the ruling dimensions for vessels are 27.4m by 6.79m by 1.83m with superstructure restriction to 6.10m at summer level under Worcester Bridge.
5. The Board has no responsibility for the various road and rail bridges crossing the navigation; the warning lights on these indicate either the navigable arch (for a low level bridge) or the navigable channel. Their only responsibility is for footbridges at the locks.
6. There are five locks on the River Severn Navigation, two between Gloucester and Worcester and three between Worcester and Stourport. At Worcester, Diglis Lock has parallel chambers, a large one conforming with the ruling dimensions for vessels using the lower reaches of the navigation and a smaller one for those proceeding further upstream. The lock gates are of timber with balance arms of steel in the case of the larger locks and timber otherwise. They are all hydraulically operated with dual controls, manual near the gate and electrical from a central control box. Sluices also have dual control, manual in-situ and electrical from the cabin; they connect with large bore longitudinal culverts with multiple lateral connections to the chamber. Chambers are of masonry, and heavy gauge steel sheet piling has been used at some approaches for protecting banks or forming cut-waters. The locks are well maintained and operate efficiently. Each has a lock-keeper living in a BWB cottage at the lock. Each lock has associated with it an artificial channel generally in cutting and a weir across the river. All these BWB consider to be their responsibility, and also the maintenance of a navigable channel along the main river in between locks; maintenance of the main river banks they do not consider to be their responsibility. The weirs are generally of masonry construction with a concrete crest and a stone pitched apron. All are in good order.
7. The River Severn has a large catchment extending into mountainous central Wales; it amounts to nearly 5,000 square kilometres at Stourport and to nearly 10,500 square kilometres when Gloucester is reached. It also has an entitlement of 90 Ml/day from Liverpool Corporation Reservoir at Vyrwy. It is therefore rarely short of water. Water is extracted by Worcester and Coventry Corporations, by Stourport Power Station (and returned), by several water authorities, and by a number of riparian owners for irrigation purposes. The income received by BWB from these extractions is small. Flooding is not uncommon and has frequently submerged completely several of the locks.
8. The whole length of the Navigation is in the Gloucester Area and under the immediate supervision of a Section Inspector and his staff based at Diglis Yard in Worcester. Dredging is a major task and the dredging fleet is of some size. It includes one 200 tonnes per hour bucket dredger, a grab dredger plus a discharger, two tugs and seven hoppers of various sizes. Tonneages of silt removed depends to a large extent on the rainfall with the Severn's catchment area. In times of flood, the river carries vast amounts of silt, which quickly form shoals and require removal as quickly as possible. Except at these periods, the tidal length between Tewkesbury and Gloucester is normally self-scouring.
9. Commercial traffic has declined somewhat over the past few years. What traffic remains is concentrated in the length below Tewkesbury and consists mainly of patent fuels.
10. Heavy use is made of the canal by amenity users, both for cruising traffic and for sea-going craft. These latter make use of the Navigation's large locks to reach off-river moorings at Tewkesbury, Worcester and Stourport. Commercial operators of passenger craft also offer trips on the river at Tewkesbury and Worcester. Angling is extremely popular, over 2,000 anglers having been noted on the Board's length in each of the last five annual counts. Fish include salmon, barbel, pike and eels.

## 17 Worcester and Birmingham Canal

*Category: Cruising 48km*

*Map: Plate 15 Profile: Figure 10*

1. From the River Severn (16) at Worcester the canal rises through no less than fifty eight locks to a junction with the Main Line of the Birmingham Canal Navigations (20a) at Worcester Bar, Birmingham. There is an intermediate connection with the Stratford-on-Avon Canal (70) at King's Norton. Former connections with the Droitwich Junction Canal and the Dudley No 2 Canal no longer exist.

2. The promoters intended that this canal should provide a shorter route to Bristol than that provided by the Staffordshire and Worcestershire Canal (18), at the same time avoiding the then treacherous reaches of the River Severn below Stourport. Opposition to the authorising Act of 1791 was fierce and there was originally a physical barrier ('Worcester Bar') between the canal and the Birmingham Canal Main Line. The canal was opened progressively from 1795 onwards, but was not completed until 1815, the year in which Worcester Bar was finally removed. By the 1870's the canal was in severe financial straits and in 1874 it was absorbed by the Sharpness New Docks Company, the owners of the Gloucester and Sharpness Canal.

3. All but two of the locks are standard narrow locks to dimensions of 22.9m by 2.21m with 1.62m over the sill. The exceptions are the two locks leading from the River Severn to the basins at Diglis, Worcester, which are slightly longer and deeper and 5.79m wide. Thirty of the locks occur in the great flight at Tardebigge, which raises the canal some 66m to its summit level. The rise of the top lock (4.27m) is the largest of any narrow lock in the country.

4. About one hundred and twenty bridges cross the canal and its feeder channels. The Board's responsibility extends to thirty two bridges carrying public highways and thirty three accommodation bridges, the majority being of brick arch construction.

5. Four of the five tunnels are on the 23km summit level. These four are Tardebigge (512m), Shortwood (561m), King's Norton (2.49km) and Edgbaston (151m). The first of these is cut through solid rock and is mostly unlined, the latter is the only one with a towpath. The others, and Dunhamstead Tunnel (216m), are lined in brick. Although the tunnels are rather wet in places, the lining is in generally fair condition.

6. There are eight aqueducts on the canal, none of which is a major structure.

7. The water requirements of this canal are derived from five reservoirs and other diverse sources. Three reservoirs, Cofton, Upper Bittell and Lower Bittell, were created at the time the canal was built by damming the River Arrow. The last was constructed to meet the needs of the downstream mill owners and does not feed the canal; the other two feed the summit level. Supplies from Tardebigge Reservoir were formerly pumped to the summit, but now it is only used to provide supplementary supplies to the canal seventeen locks down from the summit. Wychall Reservoir failed its 1965 inspection under the Reservoirs (Safety Provisions) Act 1930 and is now disused, the feeder passing through to the canal. Other supplies are obtained from the B.C.N. and the

Stratford-on-Avon Canal, whilst the canal receives a number of storm water discharges in the King's Norton area. At Worcester, water is pumped from the River Severn to provide extra water for the two large locks which are heavily used.

8. The whole of the canal falls within the Worcester Section of the Birmingham Area. The Section Inspector is based at a small yard by the top lock at Tardebigge.

9. Bank protection is of many different sorts. In the urban lengths, brickwalling predominates and some of this, in Worcester for example, is in need of extensive repairs or replacement. Elsewhere, some timber piling exists and again this will need replacement in the not too distant future. Generally, the condition of the towpath and banks is rather better than on the majority of narrow canals.

10. Despite the large number of locks and the urban areas at either end, the canal is popular with pleasure boaters. As well as the usual boatyards, there is a marina at Hanbury. Diglis Basin is well used by larger craft seeking sheltered moorings off the River Severn. The basin houses two boatyards, a chandlery and BWB facilities, including a drydock. Upper Bittell reservoir is used by sailing dinghies. The canal and Tardebigge Reservoir are also heavily fished.

## 18 Staffordshire and Worcestershire Canal

*Category: Cruising 75.7km & Remainder 2.5km*  
*Map: Plate 17 Profile: Figure 10*

1. From Great Haywood Junction, and its connection with the Trent and Mersey Canal (23), the canal rises by twelve locks to its summit level, 104m A.O.D. After passing through the outskirts of Wolverhampton, it then falls through twenty nine locks to a complex of four basins at Stourport, where the connection to the River Severn Navigation (16) can be made through two barge locks, or through two separate two-rise staircase locks which are narrow. Connections are made with the Shropshire Union Main Line (21a) at Atherley Junction and the Birmingham Canal Main Line (20a) at Aldersley Junction. Alternatively the B.C.N. can be reached via the Stourbridge Canal (19) from Stourton Junction. The Hatherton Branch, originally 5.5km long, also provided a link to the B.C.N., via the Cannock Extension, but this link is now closed and just over 2.3km, remain in the Board's ownership. A former link to the River Stour near Stourport is also closed and derelict, as is the former branch to Stafford via the River Sow.
2. This is an early canal, authorised in 1766 and constructed by Brindley as a link in a scheme to connect the Rivers Severn, Trent and Mersey. The canal construction, unusually, proceeded without a major hitch and was opened throughout in 1772. The Hatherton Branch was opened in 1841, but the connection to the Cannock extension was not brought into use until 1863. It suffered extensively from coal mining subsidence and was eventually closed to navigation in 1955. Despite various tribulations, the Staffordshire and Worcestershire Canal Company remained as an independent viable concern until nationalization in 1948.
3. All but two of the locks on the canal are narrow locks, the exceptions being the barge locks at Stourport, which are 4.57m wide. It was on this canal that the standard narrow lock originated and the lock at Compton is thought to be the first narrow lock constructed on the British Canals. They are built to standard dimensions of 22.9m by 2.19m with 1.37m over the sill. Special features include three very closely spaced locks at Bratch, equipped with intermediate side ponds and the two-rise staircase at Botterham, one of the earliest in the country.
4. Over one hundred and eighty bridges cross the canal and the Hatherton Branch and one hundred and eighteen are maintained by the Board, thirty three of these being public road bridges. Most are brick arch construction in reasonable condition, though some on the Hatherton Branch have been subject to subsidence. At Great Haywood Junction, Bridge 109, which carries the Trent and Mersey towpath over the canal, is scheduled as an Ancient Monument. Clay House Bridge, Causall, is a 'listed' structure.
5. There are three structures classified as tunnels at Dunsley, Cookley and Kidderminster, being 21m, 59m and 22m long respectively. That at Kidderminster is little more than a wide bridge, carrying the main street, and the buildings that line it, over the canal. The short Dunsley Tunnel is cut through solid rock, as is Cookley Tunnel, but the latter is partially lined with brick.
6. Two of the twelve aqueducts on the canal are four-arch structures carrying the canal across the Rivers Trent and Sow. They are of brick and masonry composite construction and the Sow Aqueduct is a 'listed' structure. All the other aqueducts are of brick or composite construction.
7. Like the Main Line of the Shropshire Union, this canal depends to a large extent for its water supply on an agreement made with the former Wolverhampton B.C. to convey purified effluent from its Barnhurst Sewage Works at Atherley Junction. Additional supplies are also derived from Coven Heath Sewage Works a few kilometres to the north. These supplies are more than adequate, with the result that the original reservoirs Upper and Lower Gailey and Calf Heath are rarely used. Their natural catchment area is very small and they are fed from the Snaredon Brook via the remaining length of the Hatherton Branch. Alternatively the brook can feed direct to the main line via the branch. The summit level takes lockage water from the B.C.N. and the Stourbridge Canal feeds in on the Stourport side. Further up on this side, the Pools at Dimmingsdale are maintained at the same level as the canal, and can be used to supplement supplies below Dimmingsdale Lock.
8. The major water sale is to a tar distillery near the junction of the Hatherton Branch and the main line. Other sales are small. Pollution occurs from the deposition of solids from the sewage outfalls and intermittently from a slaughterhouse near Bridge 73, south of Hatherton Junction.
9. The canal falls within two Areas, Northwich and Birmingham, the boundary occurring at Oxmoor Lane Bridge between Aldersley Junction and Atherley Junction. North of this point, the length as far as Gailey Lock, and including the Hatherton Branch, is in the Norbury Section, based at Norbury Junction on the Shropshire Union Main Line. Beyond Gailey it is the immediate responsibility of the Stafford Section Inspector and his staff based at Fradley Junction. The whole of the length south of Oxmoor Lane Bridge is in the Stourport Section.
10. Bank protection is a problem, particularly on the southern length where the canal is a classic 'contour' canal meandering along the sides of the valleys of the River Stour and the Smestow Brook. The original drystone walling has deteriorated generally and although long lengths of steel sheeting have been driven much requires to be done as the towpath is badly eroded in places. The problem is exacerbated by the channel being of restricted width in a number of places.
11. Agricultural work required on the canal is extensive. Hedges are generally somewhat overgrown and where the canal is cut out of the hillside, the steep slopes of friable sandstone are heavily overgrown with trees and vegetation of all descriptions. Although some of the woods are not owned by the Board, they still need lopping and clearing for safety reasons.
12. The only part of the canal affected by subsidence is the Hatherton Branch. Most of the troublesome lengths have been disposed of, but action has been necessary on the remaining length to ensure the continuation of the water supply to the reservoirs.
13. There is very little commercial traffic, but pleasure traffic is extensive. Facilities for these craft abound with several marinas and boatyards including a marina on the sold-off length of the Hatherton Branch. Stourport Basins provide

popular moorings, not only for craft from the canal, but also for larger vessels using the River Severn. Sailing dinghies also make use of all the reservoirs except Gailey Upper.

14. The usual amenity pursuits are all well represented on this canal, more particularly on the attractive southern reaches. Anglers use the reservoirs, too, but the fishing rights in Gailey Upper Reservoir are not vested in the Board. This reservoir and Gailey Lower Reservoir are both Nature Reserves, attracting large numbers of wintering wildfowl and boasting a heronry and cormorant roost on one of the islands.

15. This canal is of considerable interest, both visually and historically. For the most part, particularly in the south, it passes through rural surroundings. Further north it is adjacent to Cannock Chase which is deemed to be a 'Site of Special Scientific Interest'. Besides the structures mentioned, a large number of the buildings surrounding the basin in Stourport are 'listed' structures.

## 19 Stourbridge Canal

*Category: Cruising 8.5km & Remainder 3.5km*

*Map: Plate 16 Profile: Figure 13*

to the Staffordshire and Worcestershire Canal the main line is not heavily used by traffic and the Stourbridge Branch is little used. The urban nature of the upper length of the canal does not make it attractive to other casual users.

1. From a junction with the Staffordshire and Worcestershire Canal (18) the canal rises through two flights of four and sixteen locks respectively to the bottom of Delph Locks. Here it makes an end on junction with Dudley No. 1. Canal of the Birmingham Canal Navigations (20a). There are two short branches: the Fens Branch (1.1km) and the other to the centre of Stourbridge (2.5km). The main line is classified as 'Cruising' and the branches 'Remainder'.

2. The canal was authorised by an Act of 1776; the Act for the adjacent Dudley Canal being passed on the same day. It was intended to link Stourbridge to the River Severn (16) via the Staffordshire and Worcestershire Canal. As built, the main line ran from Stourbridge to Stourton Junction with a branch to the Fens Pools on Pensnett Chase and a further branch from the latter to the Dudley Canal. In 1837, a further independent canal, the Stourbridge Extension Canal, was authorised to run for 3.5km from the Fens Branch. It was abandoned in 1935 and has been largely eliminated. The Stourbridge Canal remained independent until nationalisation, by which time traffic had virtually ceased. By the late 1950's, the locks were in a state of disrepair, but the canal was restored from 1963 onwards and reopened in 1967. This was the first major case of joint restoration of a canal by the Board and voluntary bodies. The Fens Branch remains unnavigable; one of the bridges having been culverted.

3. The locks are all narrow, built to dimensions of 21.6m by 2.16m with 1.52m over the sill. Although some of the chambers require pointing, many of the gates were installed during the restoration and are consequently in very good condition.

4. There are forty two bridges across the canal of which only four public road bridges and nine accommodation bridges are the Board's responsibility; many of these require attention.

5. The only aqueduct is a double arch brick structure across the River Stour. The brickwork requires extensive pointing and the removal of vegetation growth.

6. Water can be passed down from the Dudley Canal or alternatively derived from the Pools on Pensnett Chase. The three pools, Fens Pool, Middle Pool and Grove Pool have limited storage capacity and a very limited catchment, most of their previous supplies having been diverted to the local drainage system. General silting of the Fens Branch also limits the volume of water passed. A small amount of water is abstracted by five industrial users.

7. The canal is maintained by the Stourport Section of the Birmingham Area, which is based on the Staffordshire and Worcestershire Canal at Stourport.

8. When built the majority of the canal was provided with brick walling along the banks, and although much of this still remains its condition is unsatisfactory. Replacement or repair of the existing protection is the main requirement before serious erosion develops.

9. Although it serves as a through route from the B.C.N.

## 20 Birmingham Canals

### *Introduction*

The network of canals in the Birmingham area is complex, having been constructed, extended and extensively modified from time to time since 1768; in more recent years numerous sections have been closed and in some cases filled in or otherwise disposed of. The greater part of the network represents the former Birmingham Canal Navigations system, which included the Birmingham and Fazeley Canal, but not the Stourbridge Canal. The development of the main sections of the existing network will first be reviewed briefly, after which they will be described individually in more detail.

### *The Main Lines*

In 1768 the Birmingham Canal Company commenced building a canal to link Birmingham with the Staffordshire and Worcestershire Canal (18) at Aldersley, to the north-west of Wolverhampton. The canal was engineered by the pioneer Brindley, and its main characteristic was that of a winding contour canal at one level from Wolverhampton to Smethwick, east of which flights of three locks led up to, and six down from, a short summit cutting to a final level pound into Birmingham. Because of the three extra locks down the Birmingham pound was, and still is 6m lower than the Wolverhampton pound. At Wolverhampton a flight of twenty one locks leads down to Aldersley Junction, and the canal was opened to traffic when these locks were completed in 1772. The total length of canal was 35km. In 1790 Smethwick summit level was lowered from 149m above sea level to 144m, the level of the Wolverhampton pound by removing three locks at each end and cutting a new channel at the lower level.

In 1826, Telford engineered a new, straighter main line, all at the 138m level, from Smethwick to Tipton. This involved a new channel in a deep cutting at Smethwick, passing under the old Main Line at Stewart Aqueduct and then, after running parallel with it for about four miles, rising to meet the old line by three locks at Tipton Factory Junction. Other straightening works were carried out at the Birmingham end, and also between Deepfield and Bloomfield on the Wolverhampton Level where the Coseley Tunnel was opened in 1837. The new Main Line was opened throughout in 1838 and resulted in a shortening to 24km, a reduction of one third of the original.

The old Main Line from Smethwick to Tipton and some of the loops of the old line cut off by the straightenings were left in service on both levels. Those now remaining include the Oozells, Icknield Port and Soho Loops in Birmingham and the Wednesbury Oak Loop (northern half, to Bradley, only) on the Wolverhampton Level. In 1835 a connection was made between the old and new Main Lines via three locks at Bradeshall – the Gower branch – which still remains in use. In 1837, the Titford Canal was constructed, locking up from the 144m level by means of six locks at Oldbury, to reach Titford Pools where water supplies are obtained. Water not required for use at or through the Oldbury locks is taken by gravity through a long culvert to the Rotten Park Reservoir (1826), adjoining the Icknield Port Loop on the 138m Birmingham Level.

### *The Stourbridge and Dudley Canals:*

In 1776 two canals were authorised to link the Dudley area with the Staffordshire and Worcestershire Canal at Stourton. The western, known as the Stourbridge Canal, ascended by sixteen locks from Stourton to Delph, with a branch to Stourbridge, and remained entirely independent until nationalisation in 1948. The eastern ran from Delph up a total of nine locks to Blowers Green below Park Head and was called the Dudley Canal. In 1785-92 the Dudley Tunnel was driven from above the three Park Head locks running for 3km under the hills to join the Main Line (Wolverhampton Level) of the Birmingham Canal at Tipton Junction. Immediately afterwards another canal, the Dudley No. 2 Canal, was built to run from below the Park Head locks to Halesowen and then on, via the long Lappal Tunnel, to join the Worcester and Birmingham Canal at Selly Oak, the whole being opened for traffic in 1798. (The section from Halesowen to Selly Oak was closed in 1917, and except for the Lappal Tunnel, has been disposed of). Finally a new and larger tunnel was driven between 1855-8 from Netherton, on the Dudley No. 2 Canal, parallel with and about 2½km distant from the Dudley Tunnel, to join the new Main Line of the BCN at Dudley Port Junction, all on the 138m Birmingham Level; the new line passed under a new aqueduct carrying the old Main Line shortly before reaching the junction at Dudley Port. Both the Dudley canals were absorbed into the BCN system in 1846, the year in which the company came under the control of the London and North Western Railway.

### *The Walsall Canals:*

(i) The Wyrley and Essington Canal was commenced in 1792 from a junction with the Birmingham Canal at Horsley Fields, near Wolverhampton, eastwards to Sneyd. The Wyrley Bank branch beyond Sneyd has since been closed but the Birchills Branch continued, still at the 144m Wolverhampton Level, to Birchills Junction. It was further continued at the same level in 1794 by a circuitous route to Pelsall, Aldridge and Daw End. From Catshill Junction, between Pelsall and Aldridge, the canal was taken on in 1797 eastwards to meet the Coventry Canal (8) at Huddlesford Junction, but this is now closed east of Ogle Junction. The Anglesey Branch was first built as a canal feeder in 1800, but later, about 1864, was made navigable to connect the Chasewater Reservoir with the canal at Ogle. In 1847 the Rushall Canal was constructed from the Daw End terminus by way of a flight of nine locks descending to meet the Tame Valley Canal at Rushall Junction. Finally, in 1854, the Cannock Extension Canal was built, running northwards from Pelsall Junction, but this has now been closed except for a 2½km length from that junction to Norton Canes Dock.

(ii) When the old Main Line of the Birmingham Canal was commenced in 1768, another canal – the Wednesbury Old Canal – was made as a branch from it to connect Birmingham with the Wednesbury collieries. It left the old Main Line at Pudding Green, immediately at the western end of the Smethwick cutting, and ran in a northerly and then easterly direction for a total of 16km from Birmingham, being opened to traffic in 1769.

Much of the original line has long since been abandoned and it is now represented only by the Ridgacre Branch, opened in 1826, and the section near Pudding Green was altered when

Telford's new Main Line was constructed about the same time. In 1783-6 the canal was extended from Ryders Green, down a flight of eight locks, and then northwards along a level pound at 124m above sea level (now called the Walsall Level) to Broadwaters near Moxley, with various short branches now closed. Between 1794-9, the canal was continued on the same level in an easterly direction to Walsall, again with branches of which only the Anson Branch – much truncated – now survives. In 1841, the Walsall Extension Canal was built to connect the canal near Walsall with the Wyrley and Essington Canal at Birchalls Junction by a rising flight of eight locks.

(iii) In view of increasing congestion from growing traffic, a new canal, the Tame Valley, was built between 1839-44 to follow the valley of the River Tame from Doe Bank on the Walsall Canal (usually called Tame Valley Junction) to Salford Bridge on the Birmingham and Fazeley Canal. It runs at the 124m Walsall Level as far as Perry Bar, and then falls through thirteen locks to Salford Junction at the 92m level.

(iv) In 1840 the Bentley Canal was opened from Wednesfield Junction on the Wyrley and Essington Canal down through ten locks to a junction with the Anson Branch of the Walsall Canal – all except the extreme ends has now been closed. Not all the lengths officially closed to traffic have been filled in.

#### *General Notes:*

(i) The Birmingham Canal Navigations also included the Birmingham and Fazeley Canal, constructed between 1783-9, which the Birmingham Canal absorbed in 1784. The new name was applied to the complete system in 1794. The Birmingham and Fazeley Canal is described in section (20b).

(ii) The *Cruising* sections of the Birmingham Canals comprise, in addition to the Birmingham and Fazeley Canal, the following:—

- New Main Line from Aldersley to Birmingham,
- Dudley No. 1 Canal, Delph to Park Head,
- Dudley No. 2 Canal, Park Head to Netherton,
- Netherton Tunnel to Dudley Port Junction,

These are described in Section (20a).

There are no *Commercial* sections, all others being *Remainder* described in Section (20c).

(iii) Other waterways, described separately in this volume, which form junctions with the Birmingham network include:—

- Stourbridge Canal (19), at Delph,
- Staffordshire and Worcestershire Canal (18), at Aldersley,
- Coventry Canal (8), at Fazeley,
- Grand Union Canal (6) at Salford and Digbeth Junctions,
- Worcester and Birmingham Canal (17) at Worcester Bar, Birmingham.

All these are in the *Cruising* category.

(iv) The whole of the waterways in the Birmingham network are "narrow", i.e. constructed to take vessels not exceeding 2.13m in beam and about 22m in length, with a

ruling depth of about 1.2m and head room about 2.15m.

(v) With the exception of the northern part of the Birmingham and Fazeley Canal, the canals in this network comprise the Oldbury and Walsall Sections of the Birmingham Area. The Oldbury Section comprises the Tame Valley Canal and the canals south of it, the westernmost point on the Birmingham New Main Line being at Factory Junction. The rest of the Main Line and the canals to the north are in the Walsall Section.

(vi) In the past, the whole of the network has been subjected to mining subsidence resulting in settlements of over 6m in some places. This is no longer a serious problem.

## 20a Birmingham Canals – Main Lines

### (i) *Aldersley Junction – Worcester Bar*

*Category: Cruising 25km*

*Map: Plates 16 / 16a Profile: Figures 11 & 12*

1. This length is Telford's new Main Line of 1838. From Aldersley Junction it rises through a flight of twenty one locks to the Wolverhampton Level which is followed to Factory Junction. Here it descends through three Factory locks to the lock-free Birmingham Level, which leads to Worcester Bar.
2. The Board are responsible for eighteen public road bridges and eleven accommodation bridges across this line. Included in the former category is Telford's Galton Bridge, a 'listed' structure. There are two aqueducts, one of which crosses a minor road. Coseley Tunnel, 329m long, the only one on this line, is lined in brick and provided with a towpath on both sides of the waterway.
3. The main supply of water is derived from the Wolverhampton Level, being passed down through the various connecting locks and branches. In turn it is passed down to the adjoining canals which are at a lower level.
4. Most of the banks are protected by the original brick walling which requires continuing attention to prevent further deterioration.
5. Little amenity use is made of the canal except at Worcester Bar (Gas Street) Basin, which is used extensively for moorings, and Cambrian Wharf where a pleasant new development and public house are centred on the remnants of the former Newall Branch Canal. Access to the towpaths is discouraged and the fishing is of poor quality.

### (ii) *Delph – Dudley Port Junction*

*Category: Cruising 12km*

*Map: Plates 16 & 16a Profiles: Figures 11 & 13*

1. From an end-on junction with the Stourbridge Canal (19) at the bottom of Delph Locks, this route follows the Dudley No. 1 canal to Park Head Junction. It then almost doubles back to follow the Dudley No. 2 canal to Windmill End Junction and then through Netherton Tunnel to join the new Main Line at Dudley Port Junction.
2. Eight of the nine locks are grouped in a single flight at Delph, the other is a single lock at Blower's Green. The Board maintain eleven public road bridges and nine accommodation bridges.
3. Netherton Tunnel is the major structure on this length. It was the last canal tunnel built in Britain and is 2.77km long, and was formerly lit, first by gas and then electric lamps. The waterway is wide enough to allow two narrow boats to pass and a towpath is provided on both sides. Although it has been subjected to slight damage from mining subsidence, the brick lining is in a generally fair condition. Some attention could usefully be given to the towpath railings to improve safety.
4. The main supply to the canal is water passed down from the Birmingham Level via Netherton Tunnel. The reservoir at Lodge Park is fed by surplus water from the canal. It is owned by the local authority, but the Board have powers to utilise the top 1.5m of water.
5. For most of the route, the bank protection is provided by the typical B.C.N. brick walls.
6. Although the canal forms part of the through route from the B.C.N. to the Staffordshire and Worcestershire Canal, it is only moderately used by pleasure craft. Some casual walkers use the towpaths, but angling is virtually non-existent.



## 20b Birmingham and Fazeley Canal

*Category: Cruising 24km*

*Map: Plates 16 & 16a Profile: Figure 15*

1. Leaving the Birmingham Canal Navigation Main Line at Farmers Bridge Junction, the canal falls rapidly to make a connection with the 1.5km Digbeth Branch, an extension of the Grand Union Canal at Aston Junction, and then continues falling to Salford Junction with connections with the Tame Valley Canal (20c) and the former Birmingham and Warwick Junction Canal of the Grand Union (6). It then follows a north-easterly direction falling to Fazeley Junction and the Coventry Canal (8), where it turns west through 90° and leads to a junction with the detached length of the Coventry Canal at Whittington Brook. For the purposes of this report, the length from Fazeley to Whittington is regarded as part of the Coventry Canal.
2. There are forty four locks all of which are standard B.C.N. pattern narrow locks. On the Main Line there are twenty four locks in two flights between Farmers Bridge and Salford Junctions and a further fourteen spread over the length to Fazeley Junction. Another six locks occur in a single flight down on the Digbeth Branch.
3. Over one hundred bridges cross the canal; fifty occur in the length between Farmers Bridge and Salford Junctions. Some of these are spaced so close together as to form tunnels, but there is only one actual tunnel, at Curdsworth. It is 50m long and provided with a towpath. Of the bridges, the Board are only responsible for thirty five, fourteen of these carrying public roads.
4. The nine aqueducts include two which are maintained by other authorities. Some are quite substantial structures, the major one being a seven arch crossing of the River Tame near Salford Junction.
5. For water supplies, the canal depends entirely on water passed down from the connecting canals. Water sales are concentrated at the Birmingham end of the canal.
6. From Minworth Bottom Lock northwards, the canal is maintained by the Hartshill Section, based on the Coventry Canal. The southern part of the canal comes within the Oldbury and Walsall Sections of the Birmingham Area.
7. Although some modern bank protection has been installed, most of the banks are lined with brick walling.
8. The canal is moderately well used by pleasure craft, particularly on the less urban lengths east of Salford Junction. Access to the towpath is restricted in central Birmingham and there is no angling on the heavily locked length leading down to Salford. Elsewhere angling and towpath walking are quite popular except around Salford Junction, which is situated under the Gravelly Hill motorway interchange.

## 20c Other Lines and Branches

Category: Remainder, totalling 123km  
Map: Plates 16 / 16a Profile: Figure 14

### Introduction

These canals form the major part of the Birmingham waterway network. They will be described in the following sequence:

- 1) the branches of the New Main Line;
- 2) canals south of this line;
- 3) canals north of this line. Minor branches and basins, which have been closed for many years, will be ignored.

Many bridges cross the canals but only eighty public road bridges and seventy one accommodation bridges are maintained by the Board. The Board are responsible for the maintenance of all but one of the fourteen aqueducts.

### 1. Branches of the New Main Line

The *Oozells Street Loop* (0.7km), *Icknield Port Loop* (1.1km) and the *Soho Loop* (2.3km) are the remaining lengths of Brindley's canal at the south-eastern end of the Main Line. The second of these provides access to the Oldbury Section Yard and acts as a feeder from Rotten Park Reservoir. This reservoir is now owned by the local authority, but the Board have reserved the right to use the water. The other two loops are both navigable, but are not used for any particular purpose at present. Alternatively, the water from Rotten Park Reservoir can be passed by a culvert to the *Engine Arm* (0.7km). This arm crosses the Birmingham Level on Telford's cast-iron trough aqueduct, which is scheduled as an Ancient Monument, and joins the Wolverhampton Level on the *Old Main Line* (10.7km). At Smethwick Junction, this line rises through three locks and crosses the Birmingham Level by an aqueduct near Spon Lane Junction, where the three *Spon Lane Locks* provide a 0.7km link to the New Main Line. It leads to Factory Junction, crossing the Netherton Tunnel Branch on an aqueduct. En route, the short *Gower Branch* (0.8km) falls through three locks to the Birmingham Level at Albion Junction. Summit Bridge, which crosses this canal is scheduled as an Ancient Monument. The only other loop remaining on the Wolverhampton Level is the *Wednesbury Oak Loop* (3.4km). The southern half of this loop has been closed, but the northern half provides access to the Area Repair Yard at Bradley. It is also an essential feeder as mine water is pumped into the canal at Bradley. Part of the *Dixon Branch* (0.6km) has been piped. With the exception of the lengths noted, all these branches are in a navigable state, though somewhat shallow in places. Little amenity use is made of these lengths, but they do provide a useful alternative route to the Birmingham Level when the latter is closed for engineering work.

### 2. Canals South of the New Main Line

The *Titford Canal* (4.3km) rises by six locks from the Wolverhampton Level and splits into two branches to *Causeway Green* (which now terminates at the M5 motorway) and the *Spon Lane Branch*. Water is collected from several minor sources and either passed to the Wolverhampton Level or through a feeder to Rotten Park Reservoir. Excess water from the Wolverhampton Level can be back-pumped up the Oldbury Locks to remedy any deficit or to replenish the

reservoir. After falling into disuse the canal has been restored with substantial financial aid from the former Warley Corporation. With this in mind, the present rather light use made of the canal can be expected to increase.

The 'Remainder' length of the *Dudley Canal No. 1* (4.2km) leaves the Old Main Line at Tipton Junction and passes through Dudley Tunnel, before falling through three locks to Park Head Junction. Dudley Tunnel was originally 2.9km, but the underground basin was later opened up giving two lengths of tunnel, 2.69km and 179m long respectively. In addition, there are several branch tunnels totalling almost 2km which are now unnavigable. Part of the tunnel is in natural caverns which contain interesting geological formations. Elsewhere the headroom of the tunnel has been drastically reduced by mining subsidence. Park Head locks fell derelict in the 1950's, but were restored to use with voluntary aid in 1972. The tunnel is not available for general navigation, but conducted trips use the canal regularly.

From Windmill End Junction, the 'Remainder' length of the *Dudley Canal No. 2* (5.3km) leads south to its present terminus at Halesowen. The continuation through the 3.5km Lappal Tunnel to the Worcester and Birmingham Canal at Selly Oak is now disposed of, except for the tunnel itself. There is one tunnel (528m) at Gosty Hill on the length remaining open. The short *Bumble Hole Arm* (0.5km), near Windmill End Junction, provides access to a boat yard. Some improvement work has been undertaken by local authorities, but little use is made of this length.

### 3. Canals North of the New Main Line

The *Wyrley and Essington Canal* (26.1km) follows a meandering lockfree course from the head of Wolverhampton Locks to Brownhills, where the *Anglesey Branch* (2.5km) diverges to the north and the *Daw End Branch* (8.5km) to the south. Beyond Brownhills, the link to the Coventry Canal at Huddlesford Junction has been disposed of. The Anglesey Branch provides an essential feed to the system from Cannock Chase Reservoir, which is owned by the local authority but from which the Board have the right to extract water. The Perry Hall feeder provides a substantial supply.

The *Cannock Extension* (2.5km) is now truncated at Watling Street, and the former Lord Hay's and Churchbridge Branches have been eliminated. Only a short length of the *Hay Head Branch* (0.4km) remains near the junction with the Rushal Canal, and the *Sneyd Branch* (0.2km) now only serves the Walsall Section Yard. The main line of this canal provides a somewhat circuitous route avoiding the centre of Birmingham and some parts are semi-rural in character. There is a minor concentration of boatyards on the Cannock Extension, but other amenity uses are relatively minor.

Near the Wolverhampton end of the Wyrley & Essington, the *Bentley Canal* (2.6km) falls away. This canal was originally 5.4km long (excluding the short Neachells Branch) and had ten locks. Now only the upper six locks remain and they are unusable at present. There are, however, a number of industrial users of water on this length. Walsall Metropolitan Council, who have purchased part of the canal, have installed back-pumping equipment to return surplus water to the top of the locks. At its other end, the Bentley Canal connected with the *Anson Branch* (2.2km), which in turn links to the *Walsall Canal* (14.1km including the Walsall Extension Canal).

The Anson Branch is navigable, though shallow in places, as far as the M6 Motorway under which it is culverted to provide an essential feed to Birchills Power Station. The water is then pumped by the C.E.G.B. to the Wyrley and Essington Canal and provides a supplementary supply to those previously listed. The Walsall Canal falls from Birchills Junction, through eight locks and follows a winding level course before rising through another eight locks to a terminus at Ryder's Green Junction. It is navigable throughout, though little used by pleasure craft and other users, and originally had many branches and basins. The *Walsall Wharf Arm* (0.5km) leaves the Main Line at the foot of Walsall Locks. It is surrounded by industrial sites, but there are proposals to develop it for moorings and to improve the surroundings. The former Whillenhall, Bilston, Haines and Monway Branches are either derelict or disposed of, as are Toll End Locks, which provided a link to the Birmingham Level through seven locks. Of the other connections to the Birmingham Level, that via *Bradley Locks* (0.8km) has been largely disposed of, as has that via the *Ocker Hill Branch* (0.7km), a short stub of which remains providing water feed to the adjacent power station. Most of the *Gospel Oak Branch* (0.2km) has been sold off, but it is proposed to develop a short length near the Main Line for moorings.

At Ryder's Green Junction, the Walsall Canal meets the vestiges of the Wednesbury Old Canal, which survives as the length from Pudding Green Junction on the Birmingham Level and the *Ridgeacre Branch* (2.3km) total. The former stretch serves as part of the through navigation, the latter is largely a repository for local rubbish, although there are proposals to develop the branch for amenity use. The short Halford Branch, near the present terminus, has been leased to other bodies.

The last of the main B.C.N. canals to be built was the *Tame Valley Canal* (14.1km) and is a typical mid-19th century canal, with a straight course, major earthworks and seven aqueducts. The aqueducts include one across the M6 Motorway (maintained by the Highway Authority) and another across a railway, unusually maintained by the Board (the railway having preceded the canal). Generally, the aqueducts are in an acceptable condition, but some work is required in the cuttings. There are thirteen locks, grouped together at or near Perry Bar. From Rushall Junction, the *Rushall Canal* (4.6km) rises through nine locks to a connection with the Daw End Branch of the Wyrley and Essington Canal. The main amenity use of these canals is by anglers, being the most heavily fished of the B.C.N. network.

## 21 Shropshire Union Canal

### *Introduction*

The Shropshire Union Railways and Canal Company came into being in 1846 as a culmination of a series of amalgamations started in 1813. No less than five canals with a total length of 325km, were vested in the combined company. One year later the company was leased in perpetuity to the London and North Western Railway, although it continued to function as a separate entity until 1922, when the L.N.W.R. totally absorbed the Canal Company. In turn, the L.N.W.R. became part of the L.M.S.R. at the 1923 railway grouping. An Act of 1944 led to the official closing to navigation of about 280km of the system.

The parts of the canal remaining in BWB ownership are described under the sub-headings 21(a) to (f) of this series. First by way of an introduction, the histories of the constituent companies of the Shropshire Union are briefly described.

#### a) *The Chester Canal*

Construction of this canal commenced in 1772, the same year as an Act was passed authorising a link from the River Dee in Chester to the Trent and Mersey Canal (23) at Middlewich. Financial and engineering difficulties led to modifications of the proposals, and the length opened in 1779 ran from Chester to Nantwich only.

The line to Middlewich was eventually completed as a branch to Wardle Lock, Middlewich where it connected with a short branch of the Trent and Mersey Canal. This did not take place, however, until after the merger with the Ellesmere Canal in 1813, the branch being opened in 1833.

#### b) *The Ellesmere Canal*

Originally intended as a link from the Mersey to the Severn at Shrewsbury via Chester and Wrexham, this canal was authorised in 1791. In the event, the proposed main line was never extended further north than Ruabon nor further south than Weston in Shropshire.

Further north, the section from Chester to Ellesmere Port (previously known as Netherpool) was completed in 1796 and provided a link to the Chester Canal. Over the next ten years, the system was progressively extended with branches to Carreghofa near Llanymynech, Whitchurch, Prees and Ellesmere, plus a navigable feeder to Llantysilio. With the joining of the two canals, trade improved rapidly and a merger of the two took place in 1813.

#### c) *The Montgomery Canal*

Inspired by the plans for the Ellesmere Canal, a separate company obtained authorisation by an Act of 1793 to build a canal linking Newtown in Powys with the Llanymynech Branch of the former at Carreghofa. Although the eastern length, i.e. between Garthmyl and Carreghofa including a short branch to Guilsfield, was completed in 1797, the construction of the western section was discontinued for

financial reasons. This extension was revived in an Act of 1815 and finished, under a separate company, in 1821. These lengths were respectively transferred to the new Shropshire Union Canal in 1847 and 1850.

#### d) *The Shrewsbury Canal*

Opened in 1796, just three years after it had been authorised, the canal was intended to facilitate the transport to Shrewsbury of coal from the mines in the area around what is now Telford New Town. From Shrewsbury, where there was no connection to the River Severn, the canal ran to Trench, where an inclined plane connected it to the Wombridge Canal. About 1½km of this latter canal was bought by the company, providing a link to the Duke of Sutherland's Tub Boat Canal. This in turn provided a connection to a complete network of canals serving the mines in the area. The canal was absorbed into the Shropshire Union at the inception of that company.

#### e) *The Birmingham and Liverpool Junction Canal*

The purpose of this scheme was to provide a more direct outlet from the Birmingham Canal Navigations to the River Mersey than that offered by the Trent and Mersey Canal and its connections. Parliament passed an Act in 1826 for the construction of a canal from Autherley on the Staffordshire and Worcestershire Canal (18) to a junction with the Ellesmere and Chester Canal at Nantwich. One year later a further Act authorised the construction of a branch from the Main Line at Norbury Junction to join the Shrewsbury Canal at Wappenshall. Construction of the Main Line entailed the building of a number of deep cuttings and high embankments, and trouble with the embankment at Shelmore caused the completion of the canal to be delayed until 1835. One year after the amalgamation with the Ellesmere and Chester Canal, in 1845, the company became the Shropshire Union Railways and Canal Company.

**21a & b Shropshire Union Canal – Main Line***a) Atherley Junction – Nantwich**Category: Cruising 62.5km**Map: Plates 18 & 19 Profile: Figure 16**b) Nantwich – Ellesmere Port**Category: Cruising 45.5km**Map: Plate 19 Profile: Figure 16*

1. These two lengths of the Main Line exhibit quite different characteristics. From Atherley Junction to Nantwich, the former Birmingham and Liverpool Junction Canal falls through twenty nine narrow locks to Nantwich. This length is a characteristic Telford canal with long straights, high embankments and deep cuttings. Beyond Nantwich, the older Chester Canal continues the fall northwards through thirteen broad locks to Chester. From there, the Wirral Line of the Ellesmere Canal forms a lock-free pound leading to Ellesmere Port. Here two pairs of locks lead down to a dock complex and a further one to the Manchester Ship Canal. From Atherley Junction, the Staffordshire and Worcestershire Canal (18) provides a link to Aldersley Junction 800m to the south, and thus to the whole of the Birmingham Canal Navigations. At Norbury Junction, 25km north of Atherley, the Newport and Shrewsbury Branch (21f) formerly joined the Main Line. North of Nantwich, the Llangollen Branch (21d) connects from the west, and the Middlewich Branch (21c) from the east, at Hurleston Junction and Barbridge Junction respectively. In Chester, the three locks of the short Dee Branch provide a link to the navigable length of that river.

2. The narrow locks south of Nantwich are built to minimum dimensions 22.9m by 2.19m with 1.22m over the sill. At Atherley Junction, the stop lock has a fall of less than 150mm, and unusually has both single top and bottom gates. Elsewhere the locks are of the more usual type, with a pair of mitred bottom gates. Many of the chambers and approaches to these locks require pointing and patching. New lock gates are of steel construction, well fitted and in good condition, but many of the old gates are in need of replacement in the near future. On the northern length, the broad locks will take craft of 21.6m by 4.2m with 1.47m available over the sill. Included in these are two staircases at Bunbury and Northgate, Chester. The latter flight of three, cut partly from solid rock, and its adjacent disused lock-keeper's cottage are both 'listed' structures. During Telford's renovation of the Chester Canal, he reconstructed one of the locks at Beeston with a cast-iron chamber, to overcome problems with running sand beneath the lock. This chamber still remains in fairly good condition, like most of the lock on this length. At Ellesmere Port, there are parallel flights of broad and narrow locks down to the Middle Basin.

3. The majority of the bridges across the canal are of brick or masonry arch construction. Of a total of almost one hundred and sixty, the Board are responsible for one hundred and twenty eight bridges of which fifty are public road bridges. Although the general condition of these is fair several still need extensive repairs; one has recently been reconstructed under 'Operation Bridgeguard'. The roving bridge at Northgate Yard, Chester is a 'listed' structure.

4. Aqueducts occur mainly on the Birmingham and Liverpool Junction stretch of the canal, only four being

situated north of Nantwich. By contrast, there are twenty one south of this point, including two cast-iron trough aqueducts. Both of these, one at Nantwich and the other over the A5 road at Streeton, are in reasonably good condition. The others are of brick or stone arch construction and ten carry the canal over roads. One, at Cristleton near Chester, passes a railway under the canal in a tunnel and is maintained by the British Railways Board. Generally the condition of these is satisfactory.

5. The only tunnel on the canal is at Cowley. Cut through red sandstone and provided with a towpath, it is unlined for most of its length and in generally good condition.

6. Deep cuttings and high embankments are a feature of the southern part of the Main Line. On the former Ellesmere and Chester Canal, the only feature of note is the deep cutting through solid rock at Chester. South of Nantwich, there are a number of deep cuttings of which some are cut through friable sandstone, e.g. Tyrley (Woodseaves) and Cowley. Tyrley in particular, has given persistent trouble over the years and a number of buttresses and retaining walls have been installed in the past to stabilise the slopes. Problems with soil slips and erosion still continue and maintenance is hampered by the fact that, in common with the others, it is heavily overgrown. Embankments, too, have been a problem from the start, some of them having been built with steep slopes. Shelmore embankment took five and a half years to build and still gives trouble with intermittent slips.

7. Water supply to the canal is from a variety of sources. At Atherley Junction, the Board have an agreement to take up to 55 MI/day of the purified sewage from Barnhurst Sewage Works and to carry it clear of the upper catchment of the River Penk. The purity of the effluent may be open to doubt as a considerable amount of flock can be seen floating on the canal in the vicinity of the discharge. Belvide Reservoir near Streeton provides an additional supply as required, but is not much used since the supply from the sewage works commenced in the late 1950's. The feeder channel here requires clearing regularly. Knighton Reservoir, was abandoned in 1955 after ground movement had affected the dam. Lockage water from the Llangollen Branch feeds into the Main Line at Hurleston Junction, but most of the water passes to Hurleston Reservoir for sale to the North West Water Authority. Water sales are of negligible value on this length.

8. The whole length of the canal is in the Northwich area, with the Section Inspectors being based at Chester and Norbury Junction. Dredging equipment utilises the central pool of equipment at Northwich. The Chester Section presently has a tug, a grab crane dredger and three hoppers; the Norbury Section a tug, a hydraulic dredger, a grab crane and four hoppers. Although there are no immediate dredging problems it is doubtful whether the present allocation of plant is sufficient to meet the demands on it.

9. The state of the banks must give rise to some concern. Long lengths of embankment were protected about ten to twenty years ago with in-situ concrete walling. In some places the base of this walling, which is only 300mm below normal water level, has been undermined by scour from the heavy traffic on the canal rendering the wall unstable. Whilst long stretches are apparently in good condition the many suspect lengths will require early attention. Steel sheet piling and concrete piles have been used elsewhere, but there are long unprotected lengths where there is severe erosion. On the Birmingham and Liverpool Junction length, protection is required on the offside to stabilise the toe in some of the cuttings.

10. Where protection has been installed the towpath is in fairly good condition, particularly on embankments. Elsewhere the situation is far below an acceptable standard. Erosion is such that the towpath is virtually impassable in places, and in Rye Hill Cutting it has disappeared completely. A former practice of dumping dredging arisings on the towpath has blocked the drainage in, for instance, the Tyrley Cutting, where the towpath is a quagmire after rain. Some of the worst towpath conditions on the system are found on this canal, particularly on the southern half.

11. Agricultural work, too, is a particular problem on this canal, some of the hedges not having been trimmed for ten years. South of Nantwich the BWB own woods stretching for some distance from the canal which have not been properly maintained, with the result that the cuttings are heavily wooded and overgrown. Dangerous and dead trees need removing and many others need lopping. On embankments, the situation is better, and most of the trees which present a possible danger to the canal have been removed.

12. While commercial activity is virtually non-existent, this is one of the most popular of the cruising waterways both in its own right and as a through route to other waterways. There are a number of marinas and boatyards with particular concentrations of craft around Chester, Nantwich, Market Drayton and Autherley. A number of boat firms are based on the canal offering both hire boats and short canal trips. The Board, also, have their hire cruiser base at Nantwich.

13. Angling, walking and other amenity pursuits are popular throughout the length of the canal. Some of the fishing rights are hired to angling associations, and re-stocking of the canal with coarse fish was carried out in 1974. South of Norbury Junction, where water quality is affected by the sewage discharge at Autherley Junction, the decrease in fishing is quite marked. Walkers are not as much in evidence as the attractive surroundings might warrant, largely due to the relative isolation of long lengths of the canal. Negotiations have been taking place with Chester District Council, with a view to their taking over the maintenance of the towpath through Chester. At Ellesmere Port it is intended to set up a Museum of Inland Navigation using some of the remaining warehouses. Belvide Reservoir, a large nature reserve which is being developed by the Royal Society for the Protection of Birds, is open to only naturalists and club fishermen.

14. Except at Ellesmere Port, where a motorway is also being built next to the canal, it has little contact with modern industry and, as such, is only likely to continue as an important cruising waterway. The short Dee Branch is used by very few boats (less than one per week on average) for which the bottom lock has to be cleared of river silt annually. With over twenty 'listed' structures ranging from mile posts to warehouses the canal is of considerable historic interest. It is, however, likely to present a number of ongoing maintenance problems.

**21c Shropshire Union Canal — Middlewich Branch**

*Category: Cruising 16km*

*Map: Plate 22 Profile: Figure 16*

1. Originally the branch fell from Barbridge Junction to the head of Wardle Lock, Middlewich, where it met a short branch from the Main Line of the Trent and Mersey Canal (23). This latter branch is now considered as an integral part of the Middlewich Branch.

2. The four locks are built to minimum dimensions of 23.5m by 2.16m with 1.37m over the sill. Of the thirty three bridges over the canal all but three are maintained by the Board. These are all of brick arch construction and include eight public road bridges. There are three masonry aqueducts; one crosses a road and the others cross the Rivers Wheelock and Weaver. Water supply is derived entirely from the Main Line; no water is extracted from the canal, and excess water passes direct to the Trent and Mersey Main Line.

3. Maintenance is carried out using men and equipment from the Chester Section, there being no workshops or yards on the canal.

4. The bank protection and dredging situations are generally satisfactory. Some of the embankments, like those on the Main Line, have potential weak spots particularly at Middlewich and Church Minshull. The latter breached twice in the 1950's.

5. Amenity usage of the canal is heavy, with boatyards or marinas at several locations and more being built or planned. Angling is again particularly popular on this length.

## 21d Shropshire Union Canal — Llangollen Branch

*Category: Cruising 75km & Remainder 5.5km.  
Map: Plate 20 Profile: Figure 17*

1. This branch, the major portion of the Ellesmere Canal, runs from Llantisilio, Clwyd, to Hurlleston Junction where it joins the Main Line of the Shropshire Union (21b). For the first 9.5km from the Horseshoe Falls at Llantisilio, the channel is little more than a navigable feeder and boats are not encouraged to pass above Llangollen. At the north end of Pontcysyllte Aqueduct, this channel meets the truncated remains of the Ruabon Arm and the main canal begins. After falling through two locks at New Marton, there is a 35km lock free pound to Grindley Brook, from where it falls steadily through nineteen locks to Hurlleston Junction. Besides the Ruabon Arm, there is a derelict arm to Whitchurch, the 300m Ellesmere Arm and the remaining length of the Prees Branch. Originally 6km long, a substantial length of this latter branch has been dewatered or disposed of, but the first 2.5km is to be retained to provide access to a marina established on the disused clay pits at Whixall. The derelict Montgomery Branch (21e) joins the canal at Frankton Junction some 47km from Hurlleston Junction.
2. The twenty one locks are all standard narrow locks with a minimum depth over the sill of 1.16m. All but two are in the length east of Grindley Brook, where there is a three chamber staircase.
3. The Board are responsible for seventy of the total of over one hundred and twenty bridges, but only five of these are public road bridges. Eight of the bridges, including one public road bridge, are a distinctive type of timber lift bridge, which require particular care in maintenance and operation; they are an attraction to youngsters. Three bridges at Wrenbury are 'listed structures', including a lift bridge, which is in particular need of maintenance at the present.
4. Among the seven aqueducts are two very famous ones, Chirk and Pontcysyllte. The latter, scheduled as an Ancient Monument, is considered to be Telford's most famous work. Its eighteen hollow masonry piers carry a cast-iron trough some 37m above the Dee Valley. Whilst it remains in generally excellent condition, there has been a history of movement in the south abutment and the aqueduct was closed in mid-1975 after damage to the southern-most span had been discovered. Chirk Aqueduct, a 'listed' structure, also has a cast-iron trough, but this time set within more usual masonry arches. There are ten of these arches, carrying the waterway 21m above the River Ceiriog. The joints between the trough and the fill on either side of it are subject to recurring leakage, but the aqueduct is otherwise in reasonable condition. The other aqueducts are single span structures, three of brick and two of masonry construction, all being in reasonable condition.
5. The three tunnels on the canal are all provided with a towpath; Ellesmere Tunnel is a mere 80m, the other two, Whitehouses and Chirk are 174m and 420m long respectively. Although some attention is needed to the brick linings, all are in a satisfactory state.
6. This canal fulfils a major role as a water conduit, conveying water from Horseshoe Falls (a semi-circular weir built by Telford) to Hurlleston Reservoir, whence it is distributed to domestic and industrial users by the North West Water Authority. Additional supplies can be pumped into the canal near Vron (south of Pontcysyllte) and about 27 MI/day are passed down the canal, but larger quantities can be conveyed if required.
7. The whole of the canal is in the Ellesmere Section of the Northwich Area. The Section Inspector utilises the old Shropshire Union workshops which include an indoor dry dock. There are also many fine examples of 19th Century industrial equipment, most of which is in good condition and of considerable historic interest.
8. Bank protection, or rather lack of it, is the major maintenance problem on this canal. Although long lengths of steel sheeting have been driven in recent years, for example 3.85km in 1974, a lot of work remains to be done. The heavy cruising traffic has resulted in the destruction of most of the original light stone walling provided on the towpath side, with subsequent serious erosion of the towpath in places. In many parts, the offside freeboard is extremely low and unprotected, and the prevailing slope of the land is downhill from the canal bank. Urgent priority should be given to the protection of these lengths to prevent further damage, either by livestock or by the wash from boats overtopping the bank. A major part of the banks on the Prees Branch were protected as part of work leading to the establishment of a marina. Leakages have been an ongoing problem throughout this canal, there being over thirty locations which require constant attention. Remedies, both successful and attempted have included lining the bed with concrete or asphalt. In particular, the length of navigable feeder has been prone to this trouble for a number of years.
9. Dredging too, is a problem as the large volume of water passing through the channel carries a greater amount of silt than would otherwise be the case. Despite the limited depth of craft using the canal (those with a draught greater than 610mm are not encouraged), the length to be dredged requires the full time usage of a dredger.
10. Where the canal crosses Whixall Moss, a raised peat bog, continuing shrinkage of the bog is causing subsidence of the embankment for a distance of about 2.5km. Concrete capping has been placed on top of the original steel sheeting and this capping is being continually raised, together with the bank.
11. This is one of the best known and most popular of cruising waterways. At peak periods, several hundred craft per week head for Llangollen and Pontcysyllte. Many of the craft are based around Nantwich, Chester and Middlewich and come on week-long trips to the canal. The result is that considerable congestion can occur towards the upper end of the canal when the craft arrive in the space of a couple of days. Several boat hire firms have bases on the canal, but the number of craft actually based on the canal is not large having regard to the numbers which cruise the canal. A marina has recently been established in the disused clay pits on the Prees Branch, and the semi-derelict Ruabon Arm would seem to offer scope for further development as a mooring site. Horse-drawn narrow boat trips are a popular attraction in the Llangollen/Pontcysyllte area and British Rail run excursions to Ruabon in connection with such trips.
12. Other amenity uses, although considerable, play a secondary role to the cruising traffic. Angling is of good quality, most being leased to angling societies. The scenic



attractions of the feeder mean that this is the most popular length with walkers. Whixall Moss is under the control of the Nature Conservancy Council and its flora and fauna are of considerable interest.

13. This length of canal was one of the parts of the Shropshire Union System closed to navigation under the L.M.S. Act of 1944. It was, however, retained as a water channel and in 1955 an Agreement was made with the Mid and South-East Cheshire Water Board for the conveyance of water to Hurlleston.

14. Plans to lower various bridges, and thus prevent through navigation, were dropped as a result of objections and cruising traffic was resumed. This traffic has grown rapidly and now presents serious problems in terms of maintenance and traffic management.

## 21e Shropshire Union Canal – Montgomery Branch

*Category: Remainder 58km*

*Map: Plate 21 Profile: Figure 17*

1. The Montgomery Branch consists of the eastern and western sections of the original main line of the Ellesmere Canal from Frankton Junction to its junction with the Llanymynech Branch. From Frankton Junction, the canal falls through eleven locks to Burgedin just beyond the junction with the 3.5km Guilsfield Branch. Beyond Burgedin, it rises through fifteen locks to Newtown, where the final 3km, including three of the locks, have been disposed of. The Ellesmere Canal main line was never completed beyond Weston, some 9.5km from the junction with the Llanymynech Branch. Nowadays more commonly known as the Weston Branch, only the 1.3km adjacent to the present main line remain in the Board's ownership. On the main line, lengths of the canal are dry at Newtown, near Crickheath and near Frankton Junction, whilst the canal has been piped at a variety of locations.

2. The locks are standard narrow locks. All are in poor condition except at Welshpool Lock, restored with new gates in 1973, and if navigation was to be restored they would require new gates and extensive repairing or replacement of lock chambers. The original cast-iron upper gates of Welshpool Lock together with the ancillary equipment, were removed some years ago and transferred to the Waterways Museum at Stoke Bruerne.

3. Of over ninety bridges across the canal, branches and feeders, forty are maintained by the Board, only one being a public road bridge. Since closure, seventeen of the bridges have been culverted, generally with 610mm diameter culverts protected against blockage by grids at the upstream ends. The cost of clearing these grids is born by the local authority concerned.

4. Included in the total of thirteen aqueducts are a number of major structures. The largest of these is the five-arch masonry structure across the River Vyrnwy, near Carreghofa. As early as 1823, it was reported that all the arches were cracked and it was repaired using cast-iron straps and ties. It is still standing, but leaking, and attention is needed to stop these leaks. There are two other aqueducts, of three arches and four arches respectively in the approach embankments to the Vyrnwy Aqueduct; these function as flood relief openings. Berriew Aqueduct, across the River Rhiw is a four arch brick structure. A 0.9m diameter concrete pipe was laid across the aqueduct over 20 years ago following movement of the structure which gave rise to severe leakage. Some of the other aqueducts are substantial structures, three of them being cast-iron trough structures, one of which is maintained by the British Railways Board. Most would need attention if the canal were to be restored to navigable standards.

5. The canal has a number of dry or piped lengths and receives its water supplies from several sources. Two of these, the Penarth and Garthmyl feeders, derive their supplies from the River Severn. The former did so by pumping and is currently disused. Near Carreghofa, a 2.5km channel feeds the canal from the River Tanat. Additionally, the length near Maesbury can be supplied from the Rednal Moss Stream. From Frankton Junction to the valley pound beyond Burgedin, water could be supplied from the Llangollen Branch (21e), but stop planks are inserted above the top lock at

Frankton. All lengths receive land drainage and in this respect the Board do have certain obligations to surrounding landowners, including the maintenance of long lengths of ditches.

6. At present, maintenance staff are based at the Ellesmere Section Yard on the Llangollen Branch, but were a substantial length of this canal to be restored, then it might be necessary to establish a local office on the canal.

7. Hedges and the towpath are very overgrown in places and require a lot of work to put them in order. Similarly, the dry lengths of canal are often heavily overgrown with shrubs and even full grown trees in places.

8. Throughout its length the canal runs through pleasant rural countryside and, if navigable, would probably be a popular cruising waterway. A short length through Welshpool, including the lock there, was restored to navigation with the help of the Shropshire Union Canal Society and the Waterways Recovery Group in 1973 and is in regular use by passenger carrying craft. Similar restoration work started in 1974 on an 11km length from Welshpool, to Arddleen. Work including bank protection, dredging, vegetation clearance and repair of the Tanat Feeder is scheduled for completion in 1979 and is being partially funded by a substantial grant from the Prince of Wales' Committee. Eventual restoration of the whole canal is the stated aim, but there are many physical and financial hurdles to be surmounted before this becomes a possibility.

## 21f Shropshire Union Canal – Newport, Trench and Shrewsbury Branches

*Category: Remainder totalling 4.0km*

*Map: Plate 21 Profile: Not applicable*

1. From Norbury Junction, the Newport Branch of the Birmingham and Liverpool Junction Canal fell through twenty three locks to Wappenshall Junction, where it joined the Shrewsbury Canal. This latter canal ran from the top of the Trench Incline and fell through two locks to Shrewsbury. Only a few short lengths of the original total of 46km remain in the ownership of the Board.
2. Locks were of two types. Those on the Shrewsbury Canal were of unusual design, having guillotine type bottom gates and were built to take four Tub Boats, 6.10m by 1.93m. Although 25.6m long, their restricted width meant that they could not be used by standard narrow boats. Nor could the locks on the Newport Branch, which were 22.6m long, but would only take craft up to 2.08m beam.
3. Few structures remain, but two of those in the Board's ownership are listed, namely Quarry Canal Bridge and the masonry arch Mees Aqueduct at Forton. Although not now owned by the Board, Telford's cast-iron aqueduct at Longdon-on-Tern, which acted as a prototype for Pontcysyllte Aqueduct, serves the purpose of a farm accommodation bridge across the River Tern. Berwick Tunnel, 892m long, originally had a towpath of timber planks; it was the first tunnel to be provided with a towpath. This was removed in the early nineteenth century and boats were thereafter 'legged' through. It is still in water, but the brickwork is in need of considerable repair. At Trench the inclined plane, 207m long and overcoming a height difference of 22.25m, remained in operation until 1921. It was the last operational plane in Britain and its remains can still be seen.
4. At Norbury Junction a 61m length leads to a dry dock in what was the No. 1 lock. This dry dock discharges into a similar length of canal below the lock from where it passes to a stream, which was formerly culverted under the canal. The water supply for this length is derived from the Shropshire Union Main Line (21a). At Trench, the remaining short length can be fed from Trench Pool and Middle Pool. This latter reservoir is not owned or maintained by the Board, but can feed into Trench Pool, which has a capacity of 100MI. Sankey's Steelworks have an agreement to abstract up to 750 MI/annum from the length. The length by Berwick Tunnel is supplied totally from land drainage.
5. Maintenance of the remaining lengths of the canal is carried out by staff of the Norbury Section of the Northwich Area. Trench Pool in particular, receives regular treatment. No regular programme of dredging or bank protection has been carried out for many years.
6. These branches were progressively closed from 1921 onwards and the whole was closed under the L.M.S.R. (Canal) Act of 1944. As a result of problems with flooding and the subsequent claims from farmers, much of the canal has been disposed of and eliminated. It is the intention of the Board to dispose of the whole of these branches, except for the short length at Norbury Junction, which will be treated as part of the Main Line, and the length at Trench Pool, which will be retained for industrial usage.

## 22 Weaver Navigation

*Category: Commercial 32km and Remainder 1km*  
*Map: Plate 22 Profile: Figure 18*

1. The River Weaver rises in the Peckforton Hills and originally flowed into the Mersey Estuary. Following the construction of the Manchester Ship Canal along the southern bank of the Mersey Estuary, the River Weaver now flows into that canal. The Navigation extends from Winsford Bridge to the Board's Weston Point Docks, most of the distance being canalised river, but the last four miles from Sutton to Weston Point Docks is in artificial cut, viz. the Weston Canal. There is also a 2.5km artificial cut between Winnington and Saltersford Locks. There are two locks connecting the Weston Canal with the Manchester Ship Canal, one at Weston Point Docks and the other at Weston Marsh where the lower reach of the River Weavers enters the Ship Canal. From Northwich to Dutton, the Trent and Mersey Canal (23) follows close by the course of the River Weaver though at a higher level, and there is a connection between the two by means of the Anderton Lift. There are no other branches, but there was formerly a connection to the now abandoned Runcorn and Weston Branch of the Bridge-water Canal, and from the Weston Canal to the lower reach of the river at Frodsham.
2. The River Weaver was made navigable under Acts of 1721 and 1759, and the Weston Canal and Docks constructed under Acts of 1807 and 1829. Considerable improvements were made to the Navigation in the 1860's and 1870's. The Weaver Navigation Trustees remained in control of the undertaking until the Transport Act of 1947 brought it into the control of the British Transport Commission and subsequently the British Waterways Board. The lower reach of the river between Frodsham Lock and Frodsham, though not now connected to the navigation, remains under the jurisdiction of the British Waterways Board. An Act of 1733 provided for making the River Weaver navigable upstream of Winsford as far as Nantwich. These powers were taken over by the Chester Canal Company in 1773 and subsequently passed through other canal and railway companies to the British Transport Commission in 1948, but these powers have never been exercised; nor have supplementary powers enacted in 1945.
3. The statutory depth to be maintained in the canalised river is 1.37m and in the Weston Canal 2.13m, but the normal depth throughout is about 3.65m and the lock sills allow 4.57m. There are five locks, four of which are paired, the exception being Weston Marsh Lock, which links the Weston Canal to the Manchester Ship Canal. The main locks are 67m by 12.8m and are equipped with intermediate gates to enable smaller vessels to use only half a lock; the secondary locks lie alongside. Below Northwich, this secondary chamber is of similar length and depth to the main chamber, but only 7.3m wide. Above this point the secondary chamber is only half the length of the main chamber with just 2.9m over the sill. With the exception of Weston Marsh, the main locks are hydraulically operated, using the head difference between the pounds; the small locks are manually operated. The hydraulic equipment is generally in need of major overhaul or replacement, and the gates have to be opened by supplementary winches. At Weston Marsh, progressive raising of the level of the Manchester Ship Canal means that hydraulic operation is now not possible and this lock is electrically operated.
4. Five of the bridges across the canal are fixed high bridges, none of which is the responsibility of the Board. Minimum headroom is 18.3m below Northwich and 9.1m above that point. All the seven electrically driven swing bridges are manned and maintained by the Board and six are public road bridges. The Cheshire County Council make a substantial contribution towards the maintenance of most of these bridges as they carry important main roads.
5. A special feature on this navigation is the Anderton Boat Lift with its two counter balanced caissons each 22.9m x 1.37m, enabling boats to pass between the River Weaver and the Trent and Mersey Canal some 15.25m above. The original structure was built in 1875 and substantially altered in 1908; a description is contained in Chapter 6. The atmospheric pollution prevailing in the district has necessitated major repairs from time to time, but it still serves a useful purpose and many people make a visit to see this large and now unique structure.
6. Water supply from the River Weaver and its tributaries is more than adequate for all present requirements. There is also an artificial supply into the Weston Canal from an I.C.I. works power station at Weston Point, amounting to about 33 MI/day, the water originating from the Manchester Ship Canal. A number of industrial users abstract from and discharge into the navigation, but the revenue is low as some of them claim the privileges of riparian owners.
7. The whole of the Navigation is under the immediate control of the Weaver Section Inspector, based at the Area Offices at Northwich. The Northwich Area Repair Yard is also on the same site.
8. Dredging is a major and continuing maintenance problem. Two ladder-bucket dredgers are in constant use on the navigation, together with their associated dischargers and hoppers. The principal areas for dredging are: at the confluence of the Rivers Dane and Weaver, where the former brings in over 50,000 tonnes of silt per annum; below Saltersford Locks, where chemical deposits from I.C.I.'s Winnington Works require regular removal; and on the Weston Canal, where deposits from their Rocksavage Works require annual dredging. The amount dredged annually by the Board's fleet is usually around 250,000 tonnes, with a similar or larger amount being dredged from the Weston Canal by private operators on behalf of I.C.I. As well as paying for the private dredging, I.C.I. make a substantial contribution to the Board's dredging costs. Nevertheless, to maintain the full depth of water over a minimum width of 24m, there will have to be a further increase in the dredging output.
9. Most of the banks have been protected, the protection being of various types, not all in good condition. Recently heavy steel piling has been used, but older protection includes stone pitching, timber piling and concrete piles. The concrete piles were only 1.83m long, and deep dredging has resulted in a lack of toe support and consequent movement of the piles. Much of the timber piling is decaying and will need replacement within a few years.
10. Commercial traffic is heavy from Weston to Northwich, but there is little traffic above this point. This traffic is mainly from the I.C.I. works and is conveyed in barges or coasters. Carriage of dredging arisings is a major traffic in itself, either to tips by the canal, or, in the case of the deposits from I.C.I. works, to dumping grounds at sea. There are several wharves along the canal in the ownership of the Board

or other enterprises. Weston Point Docks and the associated container depot are also owned by the Board, but fall outside the scope of this report.

11. Outside the built up areas, the canal passes through pleasant rural countryside and has considerable amenity value. The stretch above Northwich is used by both cruising craft and rowers. Winsford Bottom Flash, which is under the control of Vale Royal D.C., is used extensively by sailing craft, and by cruising craft which can gain access to it from the Navigation. Pollution from the chemical works' discharges mean that anglers are virtually non-existent below Northwich, whilst above that point the angling is of particularly high quality being regularly used for fishing contests. Lack of a towpath throughout the navigation means that access is sometimes difficult and the number of walkers is somewhat lower than might be expected.

12. The navigation is extensively used and offers scope for further development. Coasters of up to 700 tonnes can navigate to Northwich and craft of half this weight to Winsford Lock; dimensions would permit craft of over 1000 tonnes, but further extensive work on the channel would be required to bring it up to this standard. Under the 1945 Weaver Navigation Act it would appear possible to incorporate Winsford Flashes into the navigation. This would bring the Board additional revenue from licences, but little in the way of maintenance charges.

## 23 Trent and Mersey Canal

*Category: Cruising 148.5km*

*Map: Plates 22-24 Profile: Figure 18*

1. The Grand Trunk Canal, as this canal was originally known, connects the Bridgewater Canal at Preston Brook with the Trent Navigation (28) at Derwent Mouth, 19km upstream of Nottingham. From Preston Brook, the canal rises through thirty six locks to a 9.5km summit pound, whence it falls by forty locks to Derwent Mouth. The Bridgewater Canal leads to Manchester, some 39km from Preston Brook, and also to the Leigh Branch of the Leeds and Liverpool Canal (45). The Caldon Branch is treated as a separate canal (42) for the purpose of these descriptions. Former short branches at Middlewich and to Hall Green are now regarded as part of the Shropshire Union Canal, Middlewich Branch (21c), and the Macclesfield Canal (41) respectively. Little remains of the Newcastle Branch, except for a length of 120m adjacent to the Main Line, nor of the independent Derby Canal, which was abandoned in 1962. Further connections are made with the Weaver Navigation (22) via the Anderton Lift, the Staffordshire and Worcestershire Canal (18) at Great Haywood Junction, and the Coventry Canal (8) at Fradley Junction. Apart from a length of 200m at Alrewas, where the River Trent is crossed on the level, the whole length is an artificial cut.
2. Designed by James Brindley, the canal was constructed under an Act of 1766 and opened in 1777. It was prosperous from the start, carrying both a heavy local traffic and considerable through traffic. Dividends reached a peak of 75% in 1822 and improvements to the canal followed, including the new Harecastle Tunnel and doubling most of the locks north of the Potteries. In 1845, the canal was absorbed by the North Staffordshire Railway Company, but did not suffer the loss of traffic of other railway-owned canals, carrying over a million tonnes per year until the twentieth century.
3. Below Burton upon Trent, the canal is of broad gauge, the six locks having minimum dimensions of 23.8m by 4.3m with 1.04m over the sill. Otherwise, with one exception, the locks are narrow, to a minimum size of 22.3m by 2.3m with 1.07m over the sill. The exception is the bottom lock at Middlewich, which is 4.5m wide, but Croxton Aqueduct was reconstructed some years ago to a width of only 2.5m and thus limits the size of craft using this length. The length from Croxton to Dutton Stop Lock just south of Preston Brook Tunnel, is navigable by wide craft, but through traffic to the Bridgewater Canal is restricted to the 2.74m width of the lock. Twenty four of the locks north of Hardings Wood Junction were duplicated in the nineteenth century but some are now disused and have been weired. The remaining duplicated locks are fitted with a paddle between the chambers, so that one can act as a side pond to the other. The condition of the locks is variable and some in the Fradley Junction area are in need of extensive repairs to the brickwork. One distinctive feature of the narrow locks is that the upper ground paddle gearings are inclined and set in a heavy timber staging. Although several of these stagings have been replaced by concrete, some of those remaining are in poor condition and should be treated similarly. The present timber gates are gradually being replaced by steel ones. In the mid-1950's, the locks at Thurlwood were subjected to severe damage from brine subsidence. One of the locks was rebuilt as an adjustable steel chamber with guillotine gates, to overcome this problem. The adjacent conventional lock was repaired and still remains in use.
4. Of over two hundred and fifty bridges across the canal, the Board are responsible for fifty six public road bridges and one hundred and nineteen other bridges. The most common type of construction is brick arch, those on the narrow canal being of a style peculiar to this canal. Where the canal crosses the Trent at Alrewas, there are no less than ten bridges carrying the towpath over the Trent and its flood channels. These are of iron girder construction carried on brick piers and abutments and include one across the Trent and a mill race which is over 130 metres long. Coal mining and brine subsidence have caused damage to bridges in the past and led to reduced headrooms in various places. Two bridges are 'listed': Trent Lane Bridge at Great Haywood and Salt Bridge a few kilometres to the north.
5. The nineteen aqueducts include two major structures, both designed by Brindley. At Rugeley, the River Trent is crossed by six brick arches, whilst near Burton upon Trent the River Dove and its flood channels are crossed by twenty three masonry arches. Earlier this century, the masonry aqueduct at Croxton was damaged by brine subsidence and replaced by a steel trough. This structure is now in need of repair, the south abutment having settled due to further subsidence and flood damage from the River Dane.
6. As originally constructed, the canal had five tunnels: Preston Brook (1.13km), Saltersford (388m), Barnton (523m), Harecastle (2.64km) and Armitage (119m). None was provided with a towpath. By the 1820's, Brindley's Harecastle Tunnel was suffering the effects of subsidence and had become a serious bottleneck for traffic. Telford's new tunnel is slightly longer (2.68km), of larger cross-section and was provided with a towpath. Both tunnels remained in use until early this century, when the old one was closed. It is now totally derelict and impassable. The new tunnel has also suffered extensively from subsidence necessitating the re-lining of some lengths of the tunnel and, more recently, the removal of the towpath to enable boats to proceed under the crown of the arch. Even this has proved insufficient, and the tunnel is currently closed for major lining repairs. Armitage tunnel also suffered extensively from subsidence damage and was eventually opened out in 1972. Although needing some repairs to the brickwork lining, the other three tunnels are all in reasonable condition.
7. Water supplies are derived mainly from the reservoirs feeding the Caldon Canal. The eastern length below Alrewas receives almost unlimited supplies from the River Trent. Additionally, the canal is supplied by several canals joining it and receives extensive drainage run-off. Sales of water are heavy, particularly in the Potteries and around Burton-upon-Trent.
8. The canal passes through the Northwich and Nottingham areas of the Board, the boundary occurring at Dallow Lane Lock, Burton. The Nottingham length is the responsibility of the Soar, Trent and Mersey Section based at Loughborough on the Soar Navigation (27b). In the Northwich Area, the canal falls within the Weaver, Potteries and Stafford Sections, the Section Inspectors being based at Northwich on the Weaver Navigation, Red Bull Yard near Hardings Wood Junction and Fradley Junction respectively. Dredging is carried out using the central resources of the two areas.
9. Bank protection of various types has been provided over the years, but there still remain long stretches which require attention. In the lengths affected by brine subsidence,

the concrete walls are continually being raised to combat subsidence and this expensive work is likely to continue for some time.

10. It is evident from the preceding paragraphs that this canal is one of the worst affected by subsidence in the Board's system. Coal mining subsidence is concentrated in the length from Fradley Junction to Hardings Wood Junction, with brine subsidence north of this point. Coal mining subsidence has affected some of the tunnels and bridges, as already mentioned and is likely to continue to do so. So too is the brine subsidence, which apart from the rebuilding of Croxton Aqueduct, led to the reconstruction of the Main Line on a new alignment of nearly one kilometre near Northwich in 1956. There are a number of lagoons, caused by flooding of the subsided ground, immediately adjacent to the canal. A particularly problematical length is the reach through Sandbach, where the canal is on a hillside above the river valley. As well as the raising of walls, it has been necessary to place 'tell-tales' in the embankment to detect any movement.

11. Commercial traffic is now virtually non-existent. Despite passing through the Potteries and industrial areas around Northwich, the major part of the canal is in pleasant rural surroundings. The number of pleasure craft is high with particular concentrations around Middlewich, Fradley Junction and Derwent Mouth. Extensive facilities exist for boat users and another attraction is the number of connections that the canal makes with other waterways. Angling is of fair quality throughout the length of the canal and is very popular below Burton.

12. This canal provides both an important through route and a valuable connection between other canals. It is however likely to be subject to recurring subsidence problems, and the lengths of contour canal are likely to need constant surveillance to guard against slips and breaches.

## 24 Cromford Canal

*Category: Remainder 4.5km*

*Map: Plate 25 Profile: Figure 19*

1. From the canal head at Cromford, a generally south-easterly course was followed to a junction with the Erewash Canal (26) at Langley Mill, a distance of 23km. It was formerly connected to the Peak Forest Canal (40) by the Cromford and High Peak Railway. There was a short 3.5km branch, now dewatered, to Pinxton Wharf. The top 8km has been sold to Derbyshire County Council, and industrial concerns, local authorities and private individuals have taken over most of the remaining lengths.
2. Authorised in 1789 to provide an outlet for the mines and quarries of the area, the canal passed into railway ownership in 1846, and through the Midland Railway it passed to the L.M.S.R. in whose ownership it remained until nationalisation. Part of Butterley Tunnel collapsed in 1900, preventing through traffic, and the canal was legally closed to navigation in 1944. In 1973 the upper length from Ambergate to Cromford was transferred to Derbyshire County Council for amenity development. The Council have now taken over responsibility for the structures on the canal including Lea Wood Aqueduct, which is scheduled as an Ancient Monument. It is proposed to dispose of the rest of the canal in the Board's ownership.
3. All the locks, which were of broad gauge, have been disposed of. Only ten bridges remain over the lengths in the Board's ownership. Of these six are the responsibility of the Board of which two carry public highways.
4. The Board have residual responsibilities for the 2.76km long Butterley Tunnel. It suffered major damage due to subsidence in the 19th century and was abandoned in 1900 after a collapse. Now it is totally blocked and stop planks have been inserted at both ends.
5. There are three reservoirs in the Board's ownership; Butterley, Butterley Park and Codnor Park. Butterley Park has been disused for many years after being affected by subsidence, and feeder water is passed through to the canal. Butterley Reservoir feeds into Butterley Tunnel, but because of the blockage it can only feed into the Cromford end. This short length is already supplied from the Hartshay Brook and thus the reservoir has little use. The third reservoir, Codnor Park, now acts as a compensation reservoir to the River Erewash, the water being passed through a pipeline to the river. There are no sales of water along the length of the canal.
6. The canal is in the Nottingham Area, maintenance being carried out by the Upper Trent, Grantham and Cromford Section.
7. The lengths of canal held by the Board are not heavily patronised by amenity users. Butterley and Codnor Park Reservoirs are used by a few dinghy sailors and the latter is quite heavily fished. The remaining lengths in water may be developed for amenity use by local authorities interested in taking over these lengths.



## 25 Nottingham Canal

*Category: Remainder 8.0km*

*Map: Plate 25 Profile: Not applicable.*

1. Originally the canal ran 24km from Meadow Lane Lock in Nottingham to Langley Mill, where it joined the Cromford Canal (24). The length from Trent Lock to Lenton Chain is now part of the Trent Navigation (28). Much of the canal has been sold or eliminated and it is the intention of the Board to dispose of the remaining lengths, most of which remain in water but are unnavigable.

2. Authorised in 1792, the canal was taken over by a constituent company of the Great Northern Railway in 1846, and remained in railway ownership until nationalisation. It was legally closed to navigation in 1937 except for the length in Nottingham, which was leased to the Trent Navigation Company with an option to purchase, which was exercised in 1946.

3. Few structures remain. All the locks, which were wide gauge, have been eliminated. Only nine bridges remain with the Board of which three are fixed swing bridges. The canal is on a high embankment at one point, where it is crossed by the M1 Motorway.

4. The feeder from Moor Green Reservoir has now been diverted to serve the Erewash Canal (26). The remaining lengths take land drainage, and the Robbinetts Arm feeder serves the main length in water.

5. Maintenance is the responsibility of the Upper Trent, Grantham and Cromford Section of the Nottingham Area, which is based in Nottingham.

6. The weirs on the canal have been lowered by about 550mm, but there is a legal obligation to maintain 600mm of water in the channel. As a result of this little bank protection has been provided, nor is needed. Spot dredging has been carried out by land-based equipment as and when required.

7. Boat traffic ceased many years ago and there is no likelihood of it being resumed. Anglers do, however make considerable use of the canal, and the towpath is in regular use by walkers.

## 26 Grand Union Canal – Erewash Canal

*Category: Cruising 1.5km & Remainder 17km*

*Map: Plate 25 Profile: Figure 19*

1. From Langley Mill and a junction with the Cromford Canal (24), the canal falls through fourteen locks to a junction with the River Trent (28). The Derby Canal and the Nutbrook Canal, which formerly joined the Erewash Canal, are now both abandoned and largely eliminated. North of Tamworth Road Bridge, some 1.4km from the junction with the River Trent, the canal is designated as a Remainder waterway. The short length below this point is 'Cruising' category.
2. Completed in 1779 just two years after the authorising Act had been passed by Parliament, the canal was an immediate success and encouraged the construction of several other canals in the vicinity. The Erewash remained independent until it was absorbed into the Grand Union in 1932. Commercial traffic ceased in the 1950's and the length north of Ilkeston was closed to navigation in 1962. Restoration of the disused length commenced in 1972 and was completed in 1974. Financial aid was provided by Nottinghamshire and Derbyshire County Councils and volunteer labour by the Erewash Canal Preservation and Development Association.
3. All fourteen locks are wide, built to ruling dimensions of 24.7m by 4.34m but with only 1.14m over the sill. Some of the locks were equipped with new gates during the restoration. Flood gates, maintained by the Water Authority, but operated by the Board have been installed where the Trent flood embankment crosses the canal, 1km from Trent Lock.
4. Only one public road bridge is maintained by the Board, who are responsible for nineteen of the thirty four accommodation or footbridges on the canal.
5. There are only two aqueducts: one of three arches, which carries the canal over the River Erewash at Eastwood; the other a single arch structure over the Nutbrook. The former is of masonry, the latter a composite structure of brick and stone.
6. The canal depends for its supplies on water fed in at the head of the canal from two separate sources. One of these is from the River Erewash, the other is from Moor Green Reservoir. This reservoir used to feed the Nottingham Canal (25) which joins the Cromford just 200 metres above the head of the Erewash Canal. Since much of the Nottingham Canal has been disposed of, this supply has now been diverted to the Erewash Canal and helps to meet the heavy industrial demands on the lower part of the canal.
7. This canal is maintained by the Upper Trent, Grantham and Cromford Section of the Nottingham Area. Some bank protection and dredging were carried out as part of the restoration scheme; not much work in either category has been carried out in previous years.
8. Subsidence used to be a serious problem on this canal, leading to a rather low headroom at certain bridges, but there has been little movement in recent years.
9. The number of pleasure craft is quite high particularly near the Trent, where there are two boatyards and a marina. In Long Eaton, the Council have landscaped the surrounding area and the canal acts as a linear park for a distance of over a kilometre.

**27a Grand Union Canal – Leicester Section (North)**  
(Market Harborough to Leicester)

*Category: Cruising 37km*

*Map: Plates 5 & 26 Profile: Figure 4*

1. This length of canal was originally the Leicestershire and Northamptonshire Union Canal. Although authorised in 1793 with the intention of linking Leicester with Northampton, the canal was never carried southwards beyond Market Harborough, which was reached in 1809. The original Grant Union Canal with narrow locks, opened in 1814, provided by means of its junction with the L.N.U. at Foxton an alternative route to the south. The L.N.U. was provided with wide locks from the beginning as it connected at Leicester with the existing wide gauge canalisation of the River Soar (27b).
2. Running in a somewhat tortuous, but generally north-westerly direction from the terminal basin at Market Harborough, Foxton junction is reached in about 9km; this first length is now known as the Market Harborough Arm. From Foxton the route is the main line of the Leicester section of the Grand Union Canal and proceeds on the level through Saddington tunnel (805m) to Kibworth, where the series of locks down to the Soar valley begins. The canal follows the valley of the tributary River Sence to Blaby and then swings northwards closely alongside the Soar, which it eventually joins before Leicester. The greater part is an artificial canal, but the 4 km length from Aylestone to West Bridge at Leicester is canalised river.
3. Saddington tunnel and all the twenty four locks are wide enough to accommodate two narrow boats abreast; the present practical limit to beam for a single craft throughout the waterway is about 3m. There is a total of eighty two bridges, of which seventeen highway bridges (including one swing bridge), twenty five accommodation and thirteen footbridges are the Board's responsibility. There are seven aqueducts, none of any great size, and a number of embankments and cuttings the largest of which are adjacent to the aqueducts and tunnel respectively.
4. Water is supplied from Saddington reservoir in addition to what is brought down the locks at Foxton. As the Foxton locks are narrow and the Kibworth locks are wide there is a need for additional water to preserve a balance in the Saddington pound. Feeders bring in direct supplies at several points but these are insufficient in dry weather, so that the reservoir must be drawn upon. In the lower parts of the canal supplies from the Rivers Sence and Soar could no doubt be obtained, but to pump water back at anything from ten to fifteen locks up to Kibworth top lock would be expensive in relation to present traffic levels.
5. On these lower parts of the canal there is a liability to flooding in wet weather. Where canal and river are near together the towing path may become submerged. There are weirs designed to discharge surplus water from the canal into the river but – particularly near Leicester – the river may flood back into the canal. There are no abstractions of water of any significance.
6. A considerable amount of bank protection has been carried out in past years but many stretches now call for attention. Leakage takes place through the banks at several points and in one cutting the stability of the side slopes is doubtful. There is no towing path through the tunnel but elsewhere it is generally in reasonable condition; the hedging also is adequate.
7. Dredging is regularly undertaken, using a floating hydraulic-arm unit, and on the whole the required depths are maintained.
8. The whole of this length of waterway is controlled by the Area Engineer, Birmingham, and the Section Inspector at Leicester, where there is a maintenance yard.
9. There is no commercial traffic. Cruising activities are on the increase and a marina has been established at Market Harborough, where there is also a very active boat-building industry. Other boating centres are located at Foxton and Glen Parva. Angling is a popular activity throughout the canal.

## 27b Grand Union Canal - River Soar Navigation

*Category: Cruising 41.5km*

*Map: Plate 26 Profile: Figure 4*

1. Now generally known as the River Soar Navigation, this waterway comprises two originally distinct navigations which towards the end of the 18th century connected Leicester with the River Trent. The Loughborough Navigation was the first, being authorised in 1776, and was a canalisation of the River Soar to a point about 2.5km north of Loughborough, from which an artificial canal terminated at a basin in the town. The Leicester Navigation followed some 15 years later, commencing with a junction just north of Loughborough basin and, after a further 4.5km of artificial canal, it rejoined the river which was then canalised to Leicester. These navigations were taken over by the Grand Union Canal in 1932, together with the Erewash Canal (26), in order to obtain control of the continuous through route between the coalfields north of the Trent and the south of England.

2. The greater part of the waterway consists of the river channel, improved and realigned as necessary, but there are numerous cut-off lengths of artificial canal in which the locks are sited. The two longest stretches of artificial canal are from Thurmaston to Cossington, where the diversion picks up the formerly navigable River Wreake, and above and below Loughborough as mentioned above. There is however a length of about 2km north of West Bridge, Leicester, where the original navigation was rebuilt towards the end of the 19th century as part of the city of Leicester's flood prevention scheme. The city are still responsible for the maintenance of this length, including three of the navigation locks.

3. The navigation forms at West Bridge, Leicester, a direct continuation of the Leicester section of the former Grand Junction Canal (27a) and terminates where the River Soar flows into the Trent above Thrumpton weir at Edhill. The only branches, now that the River Wreake is not navigable, are the short ones to basins at Loughborough and at Belgrave Gate Wharf, Leicester. The whole waterway is of wide gauge, the locks having a width of 4.5m, but the rise of the locks varies considerably, according to the siting of the cut-off lengths of artificial canal. Two of the fifteen locks for which the Board are responsible are shallow, or flood locks only.

4. There are some seventy bridges across or alongside the navigation of which forty one are the responsibility of the Board. These comprise thirty nine accommodation and footbridges and two public road bridges.

5. There are no tunnels or aqueducts on this navigation, nor any considerable earth works, but there are numerous weirs and three flood gates. Most parts, but especially the river sections, are liable to flooding in wet weather. Water supplies are, naturally, not a cause of anxiety. There are abstractions of water for industrial use at Leicester and Loughborough.

6. Bank protection is generally adequate and although the original dry stone revetment is collapsing in places, calling for remedial attention, there is no danger of general disintegration and there is no problem with bank leakage.

7. There is a towing path throughout the navigation but it is bounded by a hedge or fencing only in the artificial canal stretches. Dredging is seldom required in the river

sections but shoaling in the artificial cuts has to be dealt with from time to time — adequate plant is available.

8. The whole navigation is under the control of the Area Engineer, Nottingham, and the Section Inspector at Loughborough, where there is a small maintenance depot.

9. There is now no commercial traffic on the navigation but cruising is becoming very active. There are boatyards at Thurmaston, Mountsorrel, Loughborough and Kegworth; the navigation passes through much pastoral country and some of the old mills on the river are among the features that make it attractive to users. There are good facilities for angling, which is also very popular.