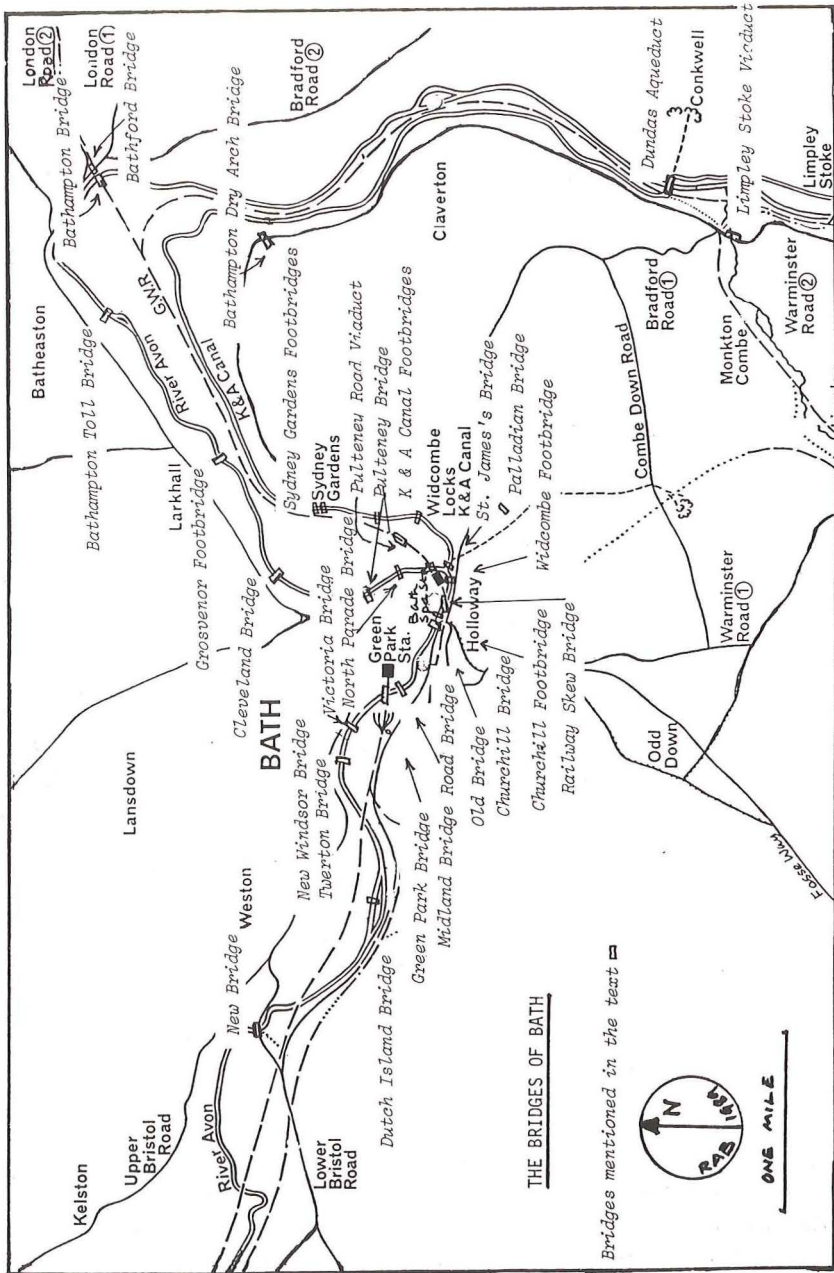


THE BRIDGES OF BATH

R. Angus Buchanan

Beneath the carefully cultivated image of a city devoted to leisure and graceful living, Bath has always depended for its success upon a hard-working urban community in the industries supplying the needs and comforts of its many visitors, and upon an infra-structure of services providing pure water and waste disposal; houses, shops and public buildings; gas and electricity; and a network of road and transport facilities. An important element in the provision of good transport has been the construction of bridges, particularly as Bath grew up on the north bank of the Bristol Avon, with important routes from the south needing to cross the river. For many centuries the history of the bridges of Bath was the story of attempts to establish permanent crossing points over this substantial and somewhat unpredictable river, with its tendency to flood the narrow valley from which the city rises. With the expansion of Bath in the last two hundred years, however, other bridges such as those coping with canals and railways have also figured prominently in the townscape, and in addition to the many elegant bridges which have added to the charms of the city there have been some interesting experimental structures which have made a significant contribution to the history of technology. Bath has thus come to possess a remarkable variety of interesting and important bridges. This brief survey of the bridges of Bath will begin by considering the main river crossings, and go on to look at other road, canal and railway bridges, concluding with an examination of some of the latest bridges.¹

Chronologically, the first problem facing the historian of the bridges of Bath is that of the site of the *Roman Bridge*. The traditional rectilinear pattern of the Roman streets, with a "gate" at each point of the compass, has supported the assumption that

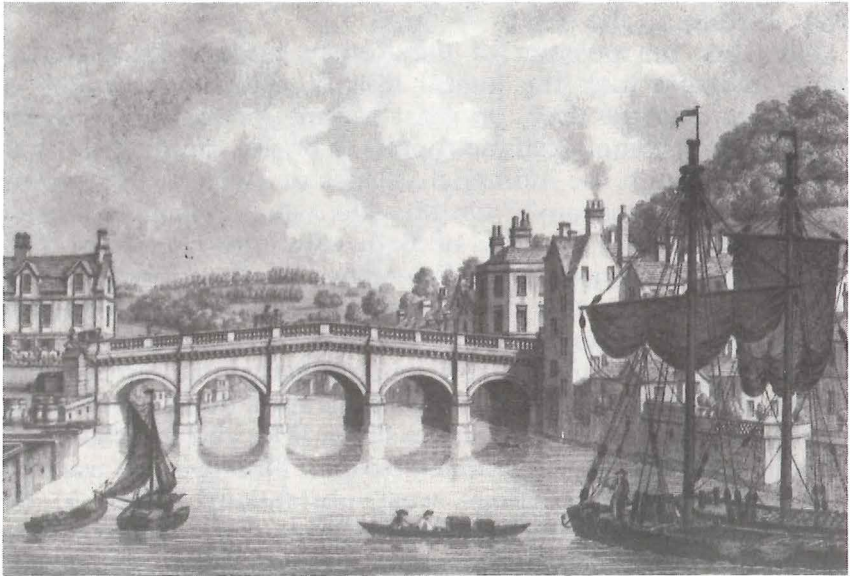


the Roman river crossing must have been in line with present-day Southgate, and the large-scale (1:500) Ordnance Survey sheets surveyed in 1886 confidently mark a pecked line across the river, continuing the line of the Fosse Way down Holloway as: "Ford (site of)". However, no trace of Roman masonry has so far been found on this or any other possible bridge site, so that there is no way of demonstrating the existence of either a bridge or a ford in Roman times, and the position remains an archaeological and historical puzzle. Against the Southgate site is the fact that the river was most treacherous and prone to flooding at this point, but it is possible that the river has moved southwards since Roman times with the gradual erosion at the foot of Beechen Cliff. The favoured archaeological view at present seems to be that the Roman road from the south skirted the south bank of the river eastwards to Bathwick to a bridge more or less on the site of the present Cleveland Bridge. There is evidence of Roman fortifications on the bluffs on either side of the river at this point. In this case, the city of Bath would have been in the angle of the intersection between the east-west route of the Roman road passing north of the city and the north-south route of the Fosse Way, passing to the east.²

Whatever the position of the Roman bridge, the Medieval bridge-builders took the logical step of extending the line of Southgate over the river, on what became the main road to the neighbouring commercial metropolis of Bristol, running south of the river through the industrial villages of Twiverton (Twerton) and "Smoky Canesham".³ On this site, which remained outside the jurisdiction of the city of Bath until the charter of 1590 extended its boundaries, the five-arched masonry bridge which became known as the *Old Bridge* was built in the thirteenth century. Early historians of Bath like Wood, Collinson and Warner give a date around 1340 for its construction, but Emanuel Green, in a scholarly paper published in 1890, demonstrated that there was certainly a bridge on the site in 1273, and that there may well have been an earlier wooden bridge.⁴ Moreover, he was able to establish that the bridge was substantially rebuilt in the fifteenth century, although it retained some of the earlier features including a castellated gateway over the pier closest to the south bank, and a miniscule chapel or oratory built into the eastern side of the parapet above the second pier from the north bank. It was

from the dedication of this chapel that the bridge acquired the name of "St. Lawrence's Bridge". Green pointed out that the chapel would have been too small to contain an altar so that masses could not have been held there. He also observed that figures of a lion and a bear had been erected on pedestals at the south end of the bridge, and suggested that the gateway might originally have housed a drawbridge which was subsequently replaced by the fifth or southern arch.⁵

The chapel, the gateway and the ornamental figures were removed when the bridge was rebuilt in 1754, but no attempt was made to reduce the number of arches and thus improve the flow of the river, so that problems with flooding, which had increased with the spread of new buildings on both banks, persisted. Various schemes of improvement were discussed in the nineteenth century, including recommendations from Thomas Telford and the ingenious suspension design suggested by James Dredge which was eventually built half a mile down-stream from the Old Bridge. Telford had been asked to survey the condition of the bridge, and he reported in 1823 that: "the masonry appears to be



2 The Old Bridge. Engraving by W. Watts, 1794. (Courtesy Bath Reference Library)

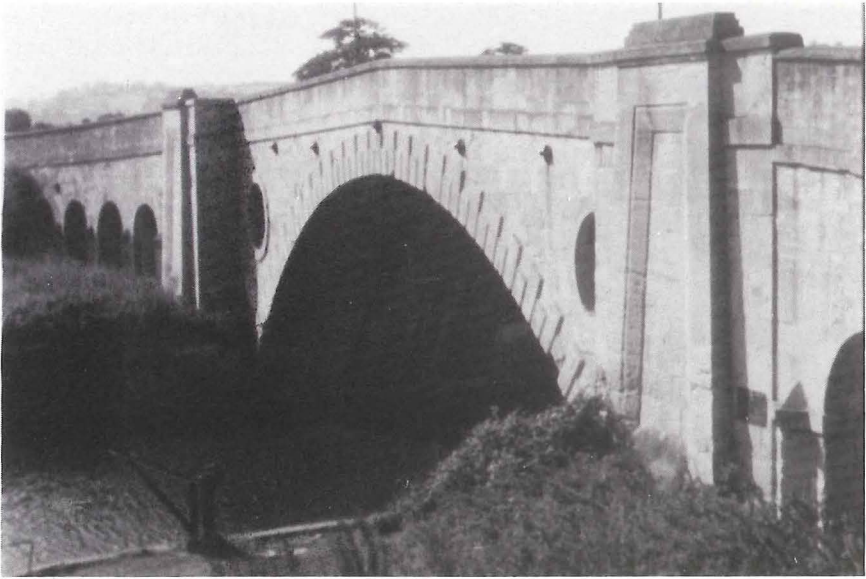
in a state to last another century, so that there is no immediate demand for change on its account". He warned that a rebuilding in masonry would "be a very expensive operation", and he thought that there was insufficient height to permit a cast-iron arch replacement. But he recognized that there were problems with obstructions to the flow of water and the volume of traffic over the bridge, and proposed modifications in detail to deal with these at a cost of about £2,200. But soon afterwards it seems that he was again consulted about severe flooding at the bridge, and this time he recommended, amongst other things: "that a new cast-iron bridge, of one hundred and ten feet width of span, should be thrown across the Avon instead of the present stone bridge".⁶ All his series of proposals were rejected on account of their cost, although modifications were made to the bridge in the 1840s and again in the 1870s in order to widen the carriageway by removing the stone balustrades and throwing out brackets to carry the footpaths. In this form it remained in use until the 1960s, carrying an increasing volume of traffic directly from Southgate Street to the rapidly developing southern suburbs of Bath.⁷

The Old Bridge was already old in the eighteenth century, when Bath achieved its second river crossing, just outside the city boundary, in the shape of the *New Bridge*. This was undertaken by the co-partnership established to improve the Avon Navigation between Bath and Hanham Lock. The company had been set up under the terms of an Act passed in 1712, although it was not until 1725 that a group of 32 proprietors was formed to carry out the improvement. The main works were finished by 1728, but did not include the provision of a bridge at Newton Ford even though the engineer, John Padmore, had been instructed to "open and clear the river" at this point "in order to make that part of the River commodious and passible". Before the deepening of the navigable channel there had been a ford here, and the co-partners were reluctant to incur the expense of a bridge. But in 1734 they received a strongly-worded representation from some local residents who "do expect and require a sufficient Bridge to be built with all convenient speed". The petition was duly considered and accepted, and work began on the bridge in 1735. It was designed by John Strahan, and a Mr Ireton made an engineering report and gave an estimate of the expense for its construction. However, Ralph Allen, who was a Treasurer to the Avon Navigation,

undertook to build it for £800, which was considerably less than Ireston's estimate, and he received the commission and completed the work.

The New Bridge crossed the river with a single graceful masonry arch, but the low approach of the road on either side gave an acute hump to the carriageway which gave rise to sharp criticisms. John Wood, for instance, in his *Description of Bath*, recognizing that "one of Palladio's Designs was imitated in a Bridge executed to make a way over the Avon", went on to describe it as "the shadow of a good Design ignorantly applied", and he deplored the fact that "the passage over it becomes not only terrible to most people, but really dangerous". Nevertheless, the bridge was subsequently used by the Bath Turnpike Trust to provide a link between what became known as the Upper and Lower Bristol Roads beyond the western edge of the city. The Bath Turnpike Trust was one of the earliest in the country, having been established in 1707, which reflected the growing economic importance of the city and particularly its key position on the route between London and the West Country. It had become increasingly desirable to provide the flourishing districts on the northern slopes of Bath with easy access to the main Bristol road, avoiding the necessity of going through town and over the Old Bridge, so that the New Bridge supplied an important link in the developing network of good roads round Bath. The bridge was improved in 1831-4 when William Armstrong was engaged to widen it and to raise the level of the approach roads in order to remove the severe hump in the middle. In this form the bridge continues to carry heavy traffic today.⁸

A third bridge followed soon after in the shape of *Pulteney Bridge*, constructed by Robert Adam in 1769-74 to bring the imposing new development of the Pulteney estate into close communication with the city. In keeping with the dominant style of this Georgian development, Adam adopted a Palladian design for a three-arched bridge with an elaborate superstructure of portico, pavilions and shops, although in the form in which it was actually built this superstructure was reduced to a comparatively modest line of shops on each side. It seems that the western of the two piers in the river was inadequately piled, because signs of settlement were apparent from 1779, and substantial re-building became necessary when part of the bridge collapsed during a



3 The New Bridge. A recent view from the north bank. (R.A. Buchanan)

storm in 1800. A temporary bridge was erected, and repairs were completed in 1804. Further reinforcement of the piers occurred in the 1970s, when the old weir was replaced as part of the river-control works, and Pulteney Bridge survives as one of the most attractive architectural features of Bath.⁹ It is not the only bridge of this style in the city, because the *Palladian Bridge* was built in 1755 as an embellishment to the lake below Ralph Allen's mansion in Prior Park, being a close copy by Robert Morris of an earlier bridge at Wilton.¹⁰

All the bridges discussed so far have been masonry structures, with the possible exception of the Roman bridge, about which no details are known. But by the end of the eighteenth century, cast iron was becoming available as a bridge-building material, the Coalbrookdale Iron Bridge over the River Severn in Shropshire being the first to be completed, in 1779. A flourishing traffic in cast-iron parts for bridges developed down the Severn, and several were constructed in Bath.¹¹ Those over the Kennet & Avon Canal will be discussed later, but two important central city bridges over the Avon were constructed in cast iron in the early



4 Cleveland Bridge. A print from the 1830s showing structural details.

decades of the nineteenth century. *Cleveland Bridge* was built to a design by H.E. Goodridge in 1827, as a single cast-iron span of 100 feet and 37 feet wide. The span consists of seven parallel segmented arches with lattice-work in the spandrels to carry the road platform, and with a substantial iron balustrade. The iron-work came from the Hazeldine foundry in Shropshire. The bridge was decorated with four Doric lodges, two at either end, providing four-columned toll-houses fronting onto the road. The bridge cost £10,000, raised in £100 shares, but in 1838, when it had been open for eleven years, Mainwaring was able to claim that its great utility in linking the parishes of Walcot and Bathwick could be demonstrated by the fact that: "the holders of those shares now receive an annual dividend of seven pounds a share".¹² It remained a toll bridge until it was freed, with great civic ceremony, in June 1929, just after the bridge had been strengthened to carry modern traffic by incorporating concrete reinforcements between the cast iron arches below the road, so that they do not alter the visual impact of this fine bridge from road level. However, it is now difficult to get any view of the bridge structure except from the pleasure boats which sail underneath it.

A second iron bridge followed in 1835, being very similar in size and type to the Cleveland Bridge: this was *North Parade Bridge*. The designer of this structure was William Tierney Clark, FRS (1783–1852), one of the best bridge engineers of the period, who was also responsible for the Hammersmith Bridge in London and the great Chain Bridge in Budapest. The span is 111 feet and it had a slightly less ornate appearance than its sister bridge, but in 1936 it underwent drastic reconstruction in the course of which the ironwork was incorporated in a masonry arch so that it now appears to be a conventional stone bridge. According to the builders' contract, the two outer ribs of the eight cast-iron arches were removed, but the other six were encased in the reinforced concrete superstructure. The two new outer ribs were built entirely of reinforced concrete carrying spandrel walls faced with Bath stone and new masonry balustrades.¹³ A fragment of the original iron balustrade appears to survive adjacent to North Parade. Like the Cleveland Bridge, this bridge had been built as a private enterprise in response to the demand for better communications between the city and the rapidly developing suburbs on the southern side of the river. Again, Mainwaring was in no doubt about the economic and moral value of the bridge: "Indeed, as a local improvement, it cannot but be regarded as in the highest degree beneficial, connecting . . . one particular district (Widcombe) with the city, by a respectable, safe, and ornamental approach, which is at present only obtainable by a circuitous route over the Old Bridge (at all times ineligible for female pedestrians of respectability)".¹⁴

A third iron bridge across the Avon in Bath was *Widcombe Footbridge*, although this was made in wrought iron rather than cast iron, like most of the iron bridges in the second half of the nineteenth century. This had originally been built in 1863 as a double bow-string wooden arch bridge, purporting to be: "an adaptation in timber of the bow-string girder principle employed by Brunel in the Saltash Bridge".¹⁵ If this was the intention, it was misconceived, as the Royal Albert Bridge at Saltash is a combination of a wrought iron truss with suspension chains, and had nothing in common with the 96-foot span wooden arch built at Widcombe by the local firm of Hicks & Isaacs. The design proved to be tragically defective, as it collapsed on 6 June 1877 when the bridge was crowded with passengers who had disembarked at

Bath Spa Station from special excursion trains which had brought them to visit the Centenary of the Bath & West Agricultural Show, then being held across the river on Beechen Cliff. Eleven people were carried to their deaths, to the profound shock of the local population. The result was that the bridge was very solidly re-built as a single span wrought-iron lattice girder design of a type then becoming popular for railway bridges. The engineer was T.E.M. Marsh, a local man who had served under I.K. Brunel in his youth.¹⁶

Another iron footbridge across the Avon which deserves a mention, although just outside the city centre, is *Grosvenor Footbridge*. This was a neat little suspension bridge with wrought-iron chains, designed by Thomas Shew in 1830. It appears to have been promoted as a private enterprise by Shew to improve his own property, but Mainwaring praised it with customary hyperbole for opening up the possibility of perambulations to citizens and visitors: "The delightful walks which this bridge enables the pedestrian to accomplish are, indeed, infinite and unbounded".¹⁷ The bridge was replaced by the present nondescript concrete structure in 1929.



- 5 Grosvenor Footbridge. Postcard of the elegant suspension bridge erected by Thomas Shew, demolished in 1929. (Courtesy Bath Reference Library)

It is not the point of the present exercise to list all the bridges in and around Bath, and as we turn to look at the road bridges of the district only a few need be named. *Bathampton Toll Bridge* provides a useful road crossing over the Avon up-stream from Cleveland Bridge. It was built as a standard masonry arch bridge by Hicks & Isaacs in 1872, and it has the distinction of being the only bridge in the district which still charges tolls. The *Bathampton Dry Arch Bridge* carried the Claverton Down tramway from the stone quarries on top of the hill over the A36 main road to Southampton. The main arch was demolished twenty years ago in the interests of road improvement, and only a fragment of one of the subsidiary arches remains in the undergrowth above the road. The road which continues up the Limpley Stoke valley was one of the last turnpike roads to be built in the district, being constructed by the Black Dog Trust as a new and carefully graded route to Warminster in the early 1830s. It crosses the Midford Brook by the *Limpley Stoke Viaduct*, a fine multi-arch masonry structure which was built in 1834.

While improvements in the roads did much to stimulate the British economy in the eighteenth century, bulk transport of heavy commodities for industrial development required better waterways also, so that the growth of inland navigation was welcomed by many sorts of industrialists and entrepreneurs. In this respect Bath was fortunate to find itself on a major cross-country waterway: the Avon Navigation made the river navigable to barge traffic from Bristol up to Pulteney weir in 1728, and the Kennet & Avon Canal opened a broad canal route through to the River Thames and London in 1810. The Avon Navigation needed few bridges, although we have noted its responsibility for the New Bridge. Also, the construction of the Twerton Cut to avoid the weirs two miles downstream from the Old Bridge involved the construction of the small masonry arch of *Dutch Island Bridge*, linking the artificial island with Weston. The canal, however, required many crossings, and significantly enriched the stock of bridges in Bath.

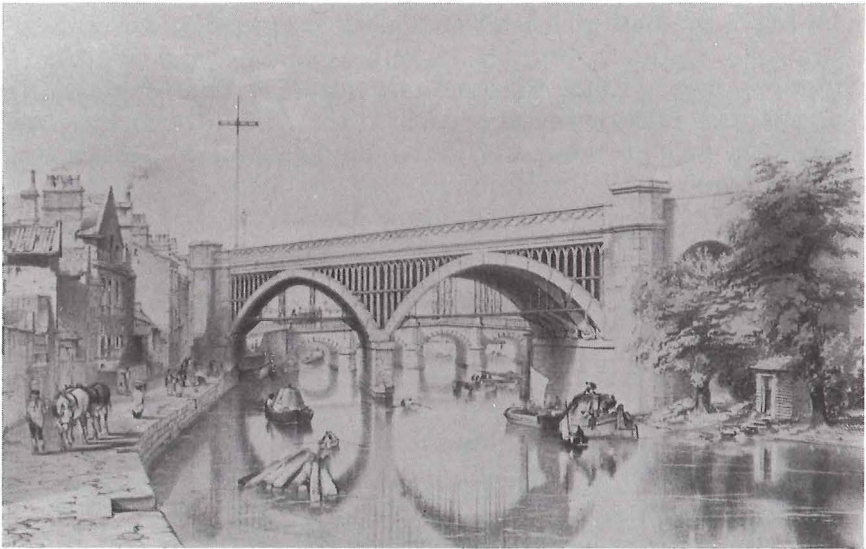
It had been one of the most attractive prospects of the Kennet & Avon Canal that it would open up the London market to Bath stone, and the engineer, John Rennie, had adopted this stone as the natural building material for structures along the line of the canal, including bridges. The result was the construction of many

neat, single-arch, Bath-stone bridges to carry roads and paths over the canal: an excellent example survives at the point in *Widcombe* where the canal joins the river, although that above what used to be the second of the Widcombe Flight of locks has been replaced in the recent past to accommodate the new roads in Widcombe. There are more stone bridges as the canal runs eastwards out of the city, and the series culminates in the beautiful *Dundas Aqueduct*, completed in 1798, by which Rennie carried the canal over the Avon on a single semi-circular masonry arch with two smaller elliptical supporting arches (a further arch was inserted later on the west side to take the railway line from Bath to Warminster). The canal crosses from the west side of the river to the east in order to take the inside of the Limpley Stoke bend and to avoid the confluence with the Midford Brook. By any standards, the aqueduct is a fine piece of engineering adorning the rural landscape of the valley.¹⁸

For all his success in public relations by using Bath stone in these canal bridges, Rennie was not averse to using cast iron where he felt it to be appropriate, and the four cast-iron bridges over the canal in Bath are now amongst the oldest surviving such structures in the world. There are two iron bridges in *Sydney Gardens* and two *Footbridges* on the Widcombe Flight. Hugh Torrens has done some interesting detective work on the provenance of these bridges, and has established that the two larger bridges, in *Sydney Gardens*, were supplied by the Coalbrookdale Company and erected in 1800. The two smaller bridges, over the Wash House Lock and Top Lock in the Widcombe Flight, were made locally at Stothert's foundry and were erected some time after 1815. All of them are constructed with parallel segmented ribs of cast iron and all have a circular motif in the spandrels except the more northerly of the two in *Sydney Gardens*, which has plain plates of cast iron with little decoration.¹⁹

Despite their great contribution to the accelerating industrialization of Britain in the eighteenth and nineteenth centuries, the role of the canals quickly paled in comparison with that of the railways which followed after 1830. As major lines were quickly established fanning out from the metropolis, bringing convenient transport and economic activity to the places which they linked, Bath found itself on the route chosen by I.K. Brunel for one of the main trunk railways of the country, the Great Western Railway,

and the coming of the GWR made an impressive impact on the urban landscape. The old city was actually untouched by the railway, which Brunel kept to the south side of the river as it approached from Bristol, and it only crossed the river briefly in order to establish Bath Spa Station on the foothold so won on the northern bank. The line then immediately returned to the south bank, to swing north-eastwards through Sydney Gardens on the way to the Box Tunnel and London. The two river crossings required substantial bridges, and there were long viaducts as the line cut through Twerton and then as it approached the bridge west of the station. This was the *Skew Bridge*, designed by Brunel with a single pier to form two arches: its unusual feature was that the arches were of wood, of which Brunel made surprisingly extensive use on his railways, especially in his Cornish viaducts. Why he chose to use timber in this Bath bridge is not clear, unless he recognized that the construction of brick arches, skewed at an oblique angle across the river, would have been expensive. He always avoided the use of cast iron for railway bridges, and techniques of using wrought iron had not become available by the



6 Skew Railway Bridge. I.K. Brunel's double timber arch bridge to the west of Bath Spa station, from J.C. Bourne's lithograph of 1846. The Old Bridge is clearly visible through the arches.

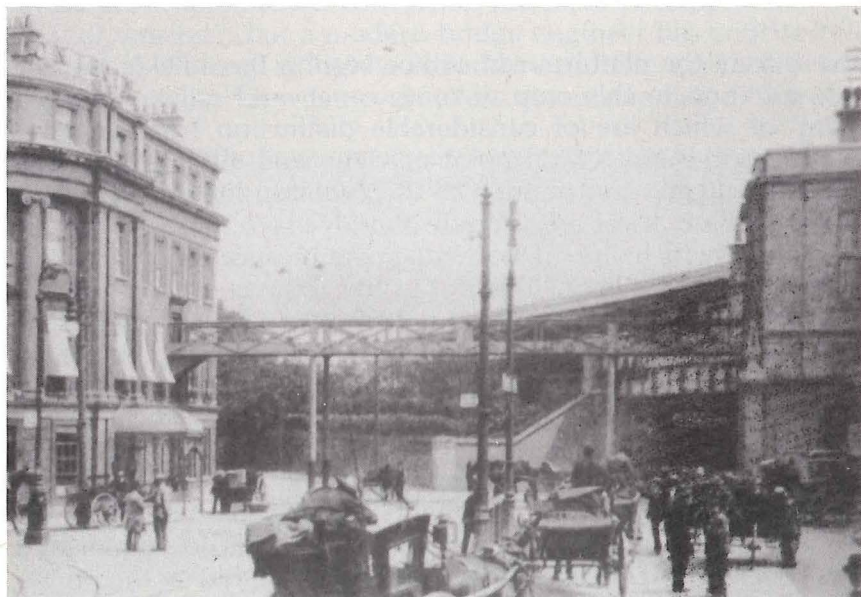
early 1840s. The bridge served its purpose well, but the directors of the GWR became apprehensive about its safety after the collapse of the Widcombe Footbridge, and replaced it with a two-span lattice girder wrought-iron bridge in 1878.²⁰

At the opposite end of Bath Spa Station, the line reverted to the south bank of the Avon across the single masonry arch and supporting arches of *St James's Bridge*, which has undergone little change since its construction, although there are signs of slight settlement in the eastern abutment. A few hundred yards further on the line crossed the main road by *Pulteney Road Viaduct*, an elegant three-arch Bath-stone structure which was somewhat disfigured by subsequent restoration with blue engineering brick and was then demolished in 1975 to be replaced by the utterly featureless slab of the modern steel girder bridge which dispenses with the need for subsidiary arches. Some distinguished masonry bridges by Brunel still survive, however, carrying the line over the Avon by the *Bathampton Bridge* and then over the main Bradford road by the *Bathford Bridge*. Even though Brunel exploited a remarkable variety of architectural styles in his railway buildings, in these two bridges as in Bath Spa Station and other features of the Bath district he usually conformed to the classical idiom. The viaducts through the built-up area of the city are for the most part undistinguished structures of blue engineering brick arches, but for the approach to the station from the west Brunel did provide some decorative embellishment in the shape of castellations and turrets in Bath stone. The viaduct through Twerton was seriously disruptive of life in that busy industrial community, because it cut through terraces of houses where the textile workers lived and made necessary the realignment of the main road.

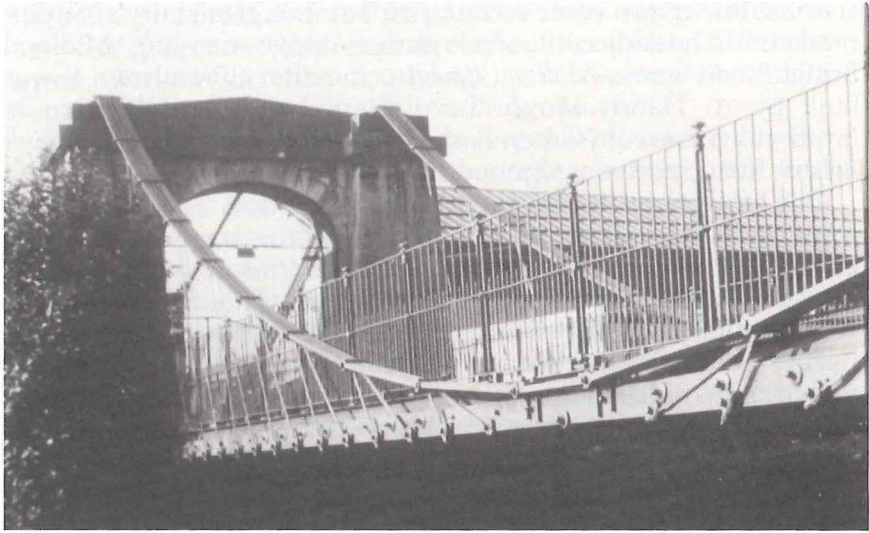
Bath acquired a second railway with a route through the city in the second half of the nineteenth century. The Midland Railway opened a branch from Mangotsfield to a temporary station in Bath in 1869, and in 1874 this joined up with the Somerset & Dorset Junction Railway with a common terminus station at Bath Queen Square, later (in 1951) changed to Bath Green Park. Through trains came in on one line and reversed direction to go out on the other. This line closed in 1966 and much of the track was quickly dismantled, but several bridges remain, mostly of a fairly plain functional appearance, including that at *Green Park* which now

acts as the main vehicle entrance for the Sainsbury's Supermarket.²¹ The adjacent steel girder bridge carrying Midland Bridge Road across *Midland Bridge* came after the railway. It was built by A. Handyside & Co. Ltd. of Derby and London to improve access from Green Park and the City Centre to the Lower Bristol Road, and was opened in 1905.

One small railway bridge with some historical associations was what may be called the *Garibaldi Bridge*, on account of the intention that the Italian patriot should address the enthusiastic masses of Bath from it during his triumphal tour of the country in 1864. In the event, it was not possible to use the bridge for this purpose because the throng of people joining the Mayoral party to welcome Garibaldi was so great that he was not able to dismount from the train which was carrying him from London to Bristol, and on to the south coast where he embarked for Italy.²² The structure was a slender footbridge which linked Bath Spa Station with what is now the Berni Royal Hotel across the station concourse area. The bridge has long been demolished, but the



7 The 'Garibaldi' Bridge, connecting Bath Spa station with the George (now Berni Royal) Hotel. It was proposed that Garibaldi should address the masses from this bridge in 1864. (Courtesy Bath Reference Library)



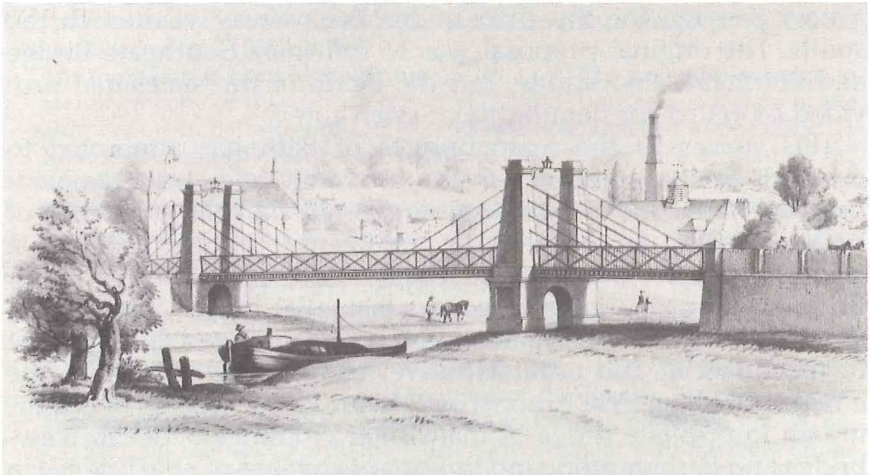
8 Victoria Bridge. Dredge's patent design produced this surviving bridge over the Avon. (R.A. Buchanan)

access from the platform can still be seen in the outside wall.

In addition to this crop of road, canal, and railway bridges, many of which are of considerable distinction from an engineering and architectural point of view, and all of which have made a valuable contribution to the ordinary life and economic vitality of Bath, there are a couple of bridges of a more experimental nature which are of particular significance in the general history of technology. These are the *Victoria Bridge* and the *Twerton Bridge*, built in 1836 and 1837 respectively. The former was given its title when Victoria was the heir-apparent before she became Queen. It was designed by James Dredge on a suspension principle which was intended to spread the load on the bridge platform and thus make a lighter over-all structure possible. The bridge uses composite chains of wrought iron strips, like all the suspension designs of the period, but it differs from most contemporary suspension bridges in using chains of diminishing cross-section by tapering them towards the middle of the bridge, and in having the suspension rods mounted at increasing angles towards the centre of the bridge. The design worked well, being adopted for a site near the end of Norfolk Crescent and close to

the business establishment of Dredge, who was a local brewer. It continues in use there as a footbridge to the present day. The bridge has a span of 139 feet and is just over 18 feet wide. A small toll house built into the north abutment has been partially demolished, and a plaque on the north pier announces "Dredge Patentee". In fact, this was the prototype for more than a dozen such bridges built on this style by Dredge in various parts of the country and overseas, but it is the only one to survive intact.²³

The *Twerton Bridge* was an even more striking innovation. Designed by a Bristol engineer, Thomas Motley, it was built in 1837 with a span of 120 feet. It was remarkable as being an anticipation of the modern "cable-stay" type of bridge, with the road platform supported by rods or cables from single or double towers, which has become very popular in recent years in Europe and elsewhere, although as yet there are few examples in Britain. Motley's bridge had two towers at each end, each with four iron rods, one above the other, reaching down on both sides to support the road platform. Motley described this system as "that of the inverted bracket, converting the force of compression into that of tension", but a modern bridge engineer has criticised the design as "being a highly redundant double cantilever with straight stays".²⁴ It was nevertheless an outstanding anticipation



9 Twerton Bridge. This print from the 1830s shows Thomas Motley's ingenious anticipation of the modern 'cable-stay' bridge.

of a later development in bridge building. Its construction aroused controversy in the local and national press, and it is clear that there was considerable personal animosity between Motley and Dredge, and a third local figure, a Mr J.H. Clive of Bathwick Hill, who proposed refinements to Motley's design, although he found no backers for his scheme. Unlike the Dredge bridge, that of Motley has not survived, being replaced by a more conventional footbridge in 1894, and by the *New Windsor Bridge* which was opened in November 1980 to give an additional road crossing of the river in this part of Bath. It has, however, been recorded for posterity in a contemporary print which includes the main specifications of the bridge, including the contract price of £2,500. There does not appear to have been any replication of this design in the nineteenth century.²⁵

The most important modern development in the landscape of Bath bridges occurred in 1966, when the Old Bridge was at last replaced by the modern *Churchill Bridge*, with its accompanying *Churchill Footbridge* to carry the service conduits, in 1966. These were built as single concrete spans to facilitate the free-flow of the river as part of the improvement schemes which have brought the river, for the first time, fully under control. The two new bridges were built on either side of the Old Bridge, so that neither of them keeps the alignment with Southgate and it was necessary to make a new passage for the road under the railway viaduct to the south. The original proposal was to call them Southgate Bridge and Southgate Footbridge, but the death of the statesman provided a pretext for naming them after him.²⁶

This survey of the main bridges of Bath has attempted to establish their significance in the economic and social development of Bath, and it has been suggested that the incidence of bridge-building since the early eighteenth century provides a useful index to the general vitality and prosperity of Bath. Bridges, after all, represented a substantial capital investment, and the ability to raise the necessary funds indicated the existence of the financial and administrative resources as well as of the engineering expertise to construct them. In the process of acquiring an impressive series of main river crossings between New-bridge and Bathampton, and important clutches of new bridges in connection with its navigable waterways and railways, Bath has come to possess some bridges of eminent architectural and

engineering distinction which vividly illustrate essential aspects of the life of the city. They are worthy of careful attention, both on their own account as adornments to the city heritage, and for what they can reveal about the history of Bath.

Notes

- 1 For a general background to the subject, see my pamphlet: R.A. Buchanan, *The Industrial Archaeology of Bath* (Bath, 1969).
- 2 For a summary of current archaeological views of Roman Bath, see the *Bath Guide* produced by Bath Archaeological Trust. The Ordnance Survey sheet of the 1:500 Survey of 1886 is O.S.XIV.5.19.
- 3 Emanuel Bowen's map of Somerset circa 1760, republished by the *Bristol Evening Post*, 1972, describes Keynsham as "proverbially called Smoky Canesham from its being a Foggy Smoky place".
- 4 E. Green, 'Bath Old Bridge and the Oratory thereon', *Proceedings of Bath Natural History and Antiquarian Field Club*, vol. 7 (1893), pp. 25–34. See also R. Warner, *The History of Bath* (London, 1801); R. Mainwaring, *Annals of Bath from the year 1800 . . .* (Bath, 1838); and J. Wood, *A Description of Bath*, 2nd ed. (Bath, 1765 repr. 1969). For a recent account of representations of the bridge on maps of Bath see Stephen Bird, 'The Earliest Map of Bath', *Bath History* Vol. 1 (1986), pp. 128–149.
- 5 Green, *op. cit.*, pp. 30–34. According to Dr Turnstall, the lion and bear survived the 1754 reconstruction, being replaced over the central piers until "mischievously destroyed in 1799, and thrown into the river" – *Rambles about Bath* (Bath, 1889), p. 102.
- 6 The quotation is from Mainwaring, *op. cit.*, p. 225: I have not managed to identify a copy of this second report of Telford, but there is a copy of the 1823 Report in Bath Record Office, and in a note attached to this dated 11 June 1825, Telford washes his hands of the business on account of the unwillingness of the Corporation to accept his proposals *in toto*: "I must therefore beg leave to decline proceeding further in this matter". It appears that his estimated cost on this occasion was around £47,900, according to the *Bath Journal* 26 July 1824.
- 7 S.D. Major, *Notabilia of Bath – Handbook to the City* (Bath, 1879), p. 17.
- 8 On the New Bridge, originally known as "Newton Bridge", the Minute Books of the Avon Navigation in the Public Record Office, RAIL 805/1, 2, & 3, are very useful. See also John Wood, *op. cit.*, p. 372. For Bath Turnpike Trust see B.J. Buchanan, 'The Evolution of the English Turnpike Trusts: Lessons from a Case Study', *Economic History Review*, 2nd series, Vol. 39, no. 2 (1986), pp. 223–243. For Ralph Allen's involvement with the New Bridge see also B. Boyce, *The Benevolent Man* (Cambridge, Mass., 1967), pp. 71, 161–2.
- 9 Pulteney Bridge is fully treated by W. Ison, *The Georgian Buildings of Bath*

- (London, 1948, repr. Bath, 1969), pp. 65–69. There is an account of the collapse of the north pier and of plans for a temporary bridge in *Bath Chronicle* 20 Nov 1800: I am grateful for this and related references to Mr Trevor Fawcett.
- 10 Ison, *op. cit.*, p. 143 and Plate 61.
 - 11 The trade from Coalbrookdale is well demonstrated in K.H. Rogers, *The Newcomen Engine in the West of England* (Bradford, 1976). It included orders for two large cast-iron bridges over the New Cut in Bristol as part of the harbour improvements in 1803–1809.
 - 12 Mainwaring, *op. cit.*, p. 287.
 - 13 Bath Record Office, Contracts Box 1936.
 - 14 Mainwaring, *op. cit.*, pp. 444–5.
 - 15 G.N. Wright, *The Historic Guide to Bath* (Bath, 1864), p. 368.
 - 16 Four metal plates, one of which has been removed, are fixed to the ends of the bridge: "Westwood Baillie & Co., Contractors, Poplar London, T.E.M. Marsh Esqr., Engineer, 1877". Little is known about Marsh, but see R.A. Buchanan, 'I.K. Brunel, Engineer', in A. Pugsley (ed.), *The Works of Isambard Kingdom Brunel* (London and Bristol, 1976), p. 15.
 - 17 Mainwaring *op. cit.*, pp. 341–2.
 - 18 K.R. Clew, *The Kennet & Avon Canal* (Newton Abbot, 1986) provides a good general history of the canal.
 - 19 H. Torrens, *The Evolution of a Family Firm – Stothert and Pitt of Bath* (Bath, 1978), especially pp. 11–15.
 - 20 All the main railway bridges of the Bath area are vividly illustrated in J.C. Bourne, *The History and Description of the Great Western Railway* (1846, repr. Newton Abbot 1981). Of the Skew Bridge, Dr Turnstall, *op. cit.*, p. 103, remarks: 'Its original construction was one of the feats of engineering skill, more curious than useful, in which Brunel delighted'.
 - 21 A new footbridge with a plastic balustrade has been erected alongside the remaining span of the original bridge, which now takes vehicular traffic into the car park.
 - 22 The citizens of Britain gave Garibaldi a rapturous welcome. He was in the country for three weeks in April 1864. His popularity greatly embarrassed the government, which persuaded him to depart without undertaking the tour of provincial towns which he had projected. See the long account, 'Garibaldi at the Railway Station', *Bath Chronicle* 28 Apr 1864.
 - 23 James Dredge is a shadowy figure, but his design received much attention in the 1830s and 1840s: see J. Sawtell, 'The bridge of sighs', *Bath Chronicle*, 4 Oct 1980. See also J. Elton, *Catalogue Number 4: Suspension Bridges* (London, 1989), pp. 8–9 and 16–17, for further references.
 - 24 H.J. Hopkins, *A Span of Bridges* (Newton Abbot, 1970), p. 196, which refers to the *Mechanic's Magazine* for 23 Sept 1843. The quotation from Motley is taken from his account, 'Description of the Tiverton [sic] Suspension Bridge', *Mechanic's Magazine* 8 Apr 1843, and there are many other references to the controversy in the pages of this journal for 1841–1844. I am grateful to Mr John Sawtell for alerting me to these references.
 - 25 Sawtell, *op. cit.*, includes an account of Motley's bridge. J.H. Clive does not appear to have been an engineer, but had produced his bridge design after

reflecting on a cat walking along the bough of a young beech tree with minimum deflection: *Mechanic's Magazine* 30 May 1843. Dredge was able to observe that while nobody had adopted Clive's design, and only one specimen of Motley's design had been built, his own design was becoming popular with bridge builders all over the world: *Mechanic's Magazine* 3 June 1843.

- 26 The Bath Reference Library "Cuttings" collection has an interesting set of items and pictures marking the various stages of the reconstruction works, including the installation of two temporary bridges.

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