FROM BRYCGSTOW TO BRISTOL IN 45 BRIDGES

crossing each one only once

Photography and text by Jeff Lucas

BRISTOL BOOKS

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From Brycgstow To Bristol In 45 Bridges
Written and researched by Jeff Lucas

Photography by Jeff Lucas

The original concept of solving The Königsberg Bridge Problem
for Bristol was devised and researched by Dr Thilo Gross.

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JEFF LUCAS

Jeff read sciences at the University of Leicester and obtained a masters degree in geochemistry at Leeds in 1974. He lived in Bristol for 25 years before moving to Portishead, after retirement from a career in occupational health and safety. He is a long-standing member of Bristol Civic Society and was the events organiser for several years. He has led walking tours through various parts of the city for the Society.

He is a keen amateur photographer. His work has been shown in the Royal West of England Academy Open Exhibition, he has received a commendation in the Sony World Photography Awards and was a prizewinner in the "24 hours in Bristol" competition. He regularly exhibits his photographs as a founder member of the Portishead Arts group of artists. He is married and has two cats.

INTRODUCTION

This book is composed of the individual stories of the 45 bridges that span Bristol's main waterways which can be crossed on foot. They illuminate many key aspects of the 1,000 year history of the city. The bridges are linked into a 45km walk which is a solution to a quirky puzzle which eventually had a huge significance in mathematics — how to cross a given set of bridges *crossing each one only once*. The puzzle was first propounded and solved nearly 300 years ago in Königsberg (now called Kaliningrad), hence the name The Königsberg Bridge Problem.

A few years ago my attention was caught by a short article in the Bristol Post relating that a maths lecturer at Bristol University had solved The Königsberg Bridge Problem for the (then) 43 bridges of Bristol. Intrigued by this I contacted the academic in question, Dr Thilo Gross, who gave me permission to write a longer article and draw a proper map of the walk for the Bristol Civic Society Magazine where it was duly published.

That article has now been expanded into the book that is before you. Thilo has provided a new solution to the "Problem" to take account of two new bridges which have necessitated a completely new route.

With the current number and location of the bridges the walk is fortuitously circular, so you can start and finish at a point of your own choosing. I chose to begin the book at Bristol Bridge, the city's point of origin, which means, very neatly, that you finish the walk at one of Bristol's newest bridges, Castle Bridge. I ask your forbearance for a little repetition of facts in different chapters to take account of those who start at a location other than Bristol Bridge.

Before you start, it might be helpful to read the short chapter on the history and layout of Bristol's waterways (page 136.)

I hope you will enjoy exploring Bristol in this new and unusual way. This walk will take you into strange and not–so–strange places where you will discover the delightful and the dreadful.

In everyday life we rarely pay attention to bridges but they are vital to human society and its history. They are of significance economically and socially. They are strategically important in warfare — battles are fought over them. They constitute powerful imagery in literature and poetry. They can be as simple as a plank, but also superlative feats of design and engineering. They are often the primary subject of visual art, and can be sculptural objects in their own right.

Take the time to explore the bridges. Go down to the water — look underneath and from the sides — this is often where most interest is found. I hope you will be spurred on to make detours and extensions, and to find out more about the history, the development, and the complex layers of life of the city of Bristol. This book is also my personal homage to a great city that was my home for 25 years.

Jeff Lucas

“The bridge swings over the stream with ease and power. It does not just connect banks that are already there. The banks emerge as banks only as the bridge crosses the stream. The bridge causes them to lie across from each other. One side is set off against the other by the bridge. Nor do the banks stretch along the stream as indifferent border strips of the dry land. With the banks, the bridge brings to the stream the one and the other expanse of the landscape lying behind them. It brings stream and bank and land into each other’s neighborhood. *The bridge gathers the earth as landscape around the stream.* Thus it guides and attends the stream through the meadows. Resting upright in the stream’s bed, the bridge–piers bear the swing of the arches that leave the stream’s waters to run their course. The waters may wander on quiet and gay, the sky’s floods from storm or thaw may shoot past the piers in torrential waves — the bridge is ready for the sky’s weather and its fickle nature. Even where the bridge covers the stream, it holds its flow up to the sky by taking it for a moment under the vaulted gateway and then setting it free once more.”

Martin Heidegger, “*Building, Dwelling, Thinking*”

FOREWORD

It is my pleasure on behalf of the University of Bristol to write a foreword to this beautiful book. My erstwhile colleague Dr Thilo Gross is really a singular individual. He is a leading international expert on the theory of networks; that is, if you like, the global interconnectedness of everything. Among other things, he has applied these ideas to ecology, industrial supply chains, voting patterns and to city demographics. We feel honoured that for eight years he chose to make Bristol his home.

Thilo has an intense attitude to life. Often surviving on very little sleep, he has periods of extreme academic productivity. He approaches hobbies similarly. After arriving in Bristol he discovered a love of walking. Not necessarily hiking in the beautiful rural West–country, but just walking. Walking along familiar trails from his flat, around the streets of Bristol, and beyond. Hundreds of miles a week.

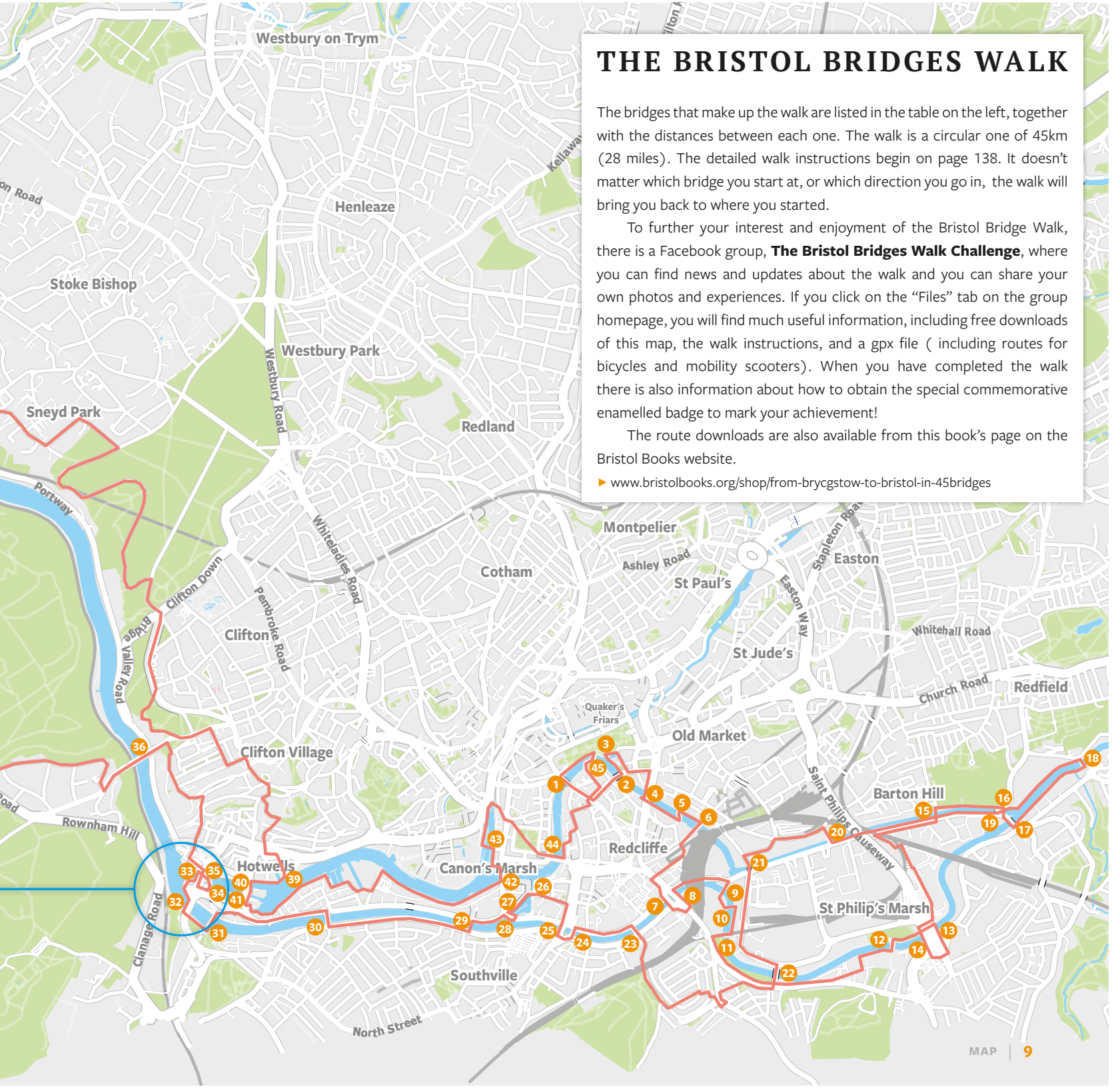
Then he hit upon an idea. Leonhard Euler (1707–1783) is thought to be the most prolific mathematician ever to have lived. The origins of network theory can be traced to Euler's solution to a famous walking puzzle. In the city of Königsberg, a port city with similarities to Bristol, the gentry liked to promenade through the central district built across two large islands in the river Pregel, connected by seven bridges. The challenge was to devise a route that crossed every bridge once and once only. Euler proved that no such route existed.

Bristol, Thilo realised at the time, had 42 bridges connecting the various mainlands and islands formed by the River Avon and the Floating Harbour. By studying the layout, he was able to prove mathematically that a route which crosses each bridge once and once only is indeed possible. Moreover, he devised such a path and set out to walk it one February Saturday. Unfortunately, the journey, including both the Avonmouth Bridge to the West and the bridge near Hanham on the Eastern ringroad, stretched over 30 miles and took him from pre–dawn until well into the evening.

Thilo wrote about his walk in the Bristol Evening Post, and in a publication 50 Visions of Mathematics that I helped to edit for the 50th anniversary of the UK's Institute of Mathematics and its applications. The rest is history. Thilo met Jeff Lucas and the idea for this book was born. Forty-two bridges became 43, and now 45. Yet, Thilo tells me it is still possible to compose a walking route that crosses all of them once and once only — not that I recommend attempting it in a single day. Nevertheless, I hope readers who are inspired to visit the landmarks featured here will not just ponder on the history of Bristol, but will also use the time to think about networks, mathematics and the interconnectedness of everything.

***Professor Alan Champneys,* Head of the Department of Engineering Mathematics, University of Bristol**

		Distance from start	Distance from previous bridge
1	Bristol Bridge	0km	
2	St Philip's Bridge	0.4km	400m
3	Castle Ditch Bridge	0.6km	200m
4	Temple Bridge	1.0km	400m
5	Valentine's Bridge	1.3km	300m
6	Meads Reach Bridge	1.5km	200m
7	Bath Bridge (West)	2.2km	700m
8	Bath Bridge (East)	2.4km	200m
9	Brock's Bridge	2.8km	400m
10	St Philip's Footbridge	3.0km	200m
11	Temple Meads Relief Line Bridge	3.2km	200m
12	Sparke Evans Park Bridge	4.7km	1.5km
13	St Philips Causeway Bridge (East)	5.0km	300m
14	St Philips Causeway Bridge (West)	5.4km	400m
15	Barton Hill Bridge	6.6km	1.2km
16	Netham Lock Bridge (East)	7.1km	500m
17	New Brislington Bridge	7.2km	100m
18	St Anne's Footbridge	7.8km	600m
19	Netham Lock Bridge (West)	8.4km	600m
20	Feeder Road Footbridge	9.4km	1km
21	Marsh Bridge	10.1km	700m
22	Totterdown Bridge	10.9km	800m
23	Langton St Bridge (Banana Bridge)	12.4km	1.5km
24	Bedminster Bridge (East)	12.8km	400m
25	Bedminster Bridge (West)	12.9km	100m
26	Bathurst Basin Footbridge	13.3km	400m
27	Bathurst Basin Roadbridge (East)	13.5km	200m
28	Bathurst Basin Roadbridge (West)	13.6km	100m
29	Gaol Ferry Bridge	13.9km	300m
30	Vauxhall Bridge	14.8km	900m
31	Ashton Avenue Bridge	15.5km	700m
32	Avon Bridge	15.8km	300m
33	South Entrance Lock Bridge	16.0km	200m
34	South Entrance Lock Walkway	16.2km	200m
35	Plimsoll Bridge	16.3km	100m
36	Clifton Suspension Bridge	17.3km	1km
37	Avonmouth Road Bridge	27.1km	9.8km
38	Portway Viaduct	34.1km	7km
39	Poole's Wharf Bridge	40.8km	6.7km
40	North Junction Lock Bridge	40.9km	100m
41	South Junction Lock Bridge	41.0km	100m
42	Prince Street Bridge	43.0km	2km
43	Pero's Bridge	43.2km	200m
44	Redcliffe Bridge	44.0km	800m
45	Castle Bridge	44.9km	900m
1	Bristol Bridge	45.2km	300m



THE BRISTOL BRIDGES WALK

The bridges that make up the walk are listed in the table on the left, together with the distances between each one. The walk is a circular one of 45km (28 miles). The detailed walk instructions begin on page 138. It doesn't matter which bridge you start at, or which direction you go in, the walk will bring you back to where you started.

To further your interest and enjoyment of the Bristol Bridge Walk, there is a Facebook group, **The Bristol Bridges Walk Challenge**, where you can find news and updates about the walk and you can share your own photos and experiences. If you click on the "Files" tab on the group homepage, you will find much useful information, including free downloads of this map, the walk instructions, and a gpx file (including routes for bicycles and mobility scooters). When you have completed the walk there is also information about how to obtain the special commemorative enamelled badge to mark your achievement!

The route downloads are also available from this book's page on the Bristol Books website.

▸ www.bristolbooks.org/shop/from-brycgstow-to-bristol-in-45bridges

BRISTOL BRIDGE

1

Bristol began right here in the Saxon period, probably around the year 900. The Anglo–Saxon Chronicle of 1051 has the first written reference to Brycgstow (subsequent spellings vary), which means "place by the bridge". At first, the bridge may have been something like a set of floating pontoons which only later became a fixed timber bridge. As you stand on the modern bridge, look back towards Castle Green and try to imagine away the traffic and the buildings. Picture muddy banks with longboats resting on them, smoke rising from a cluster of huts, with trees in the distance. Imagine the silence!

This site ticked all the boxes for a fortified settlement which would protect against Viking raids — a rocky elevated spot surrounded by marshy flat plain almost encircled by two rivers, the Avon and the Frome. The settlement thrived on trade with Devon, Somerset, Wales and Ireland. By the mid–1100s, an early history book records that here was "almost the richest of all the towns in the Kingdom". By 1300, it was an international port and commercial centre with an impressive royal castle.

In the mid–13th century the timber bridge was replaced by something far more impressive — five pointed arches of Courtfield Stone from Monmouthshire about six metres wide. There were shops and houses up to five storeys high built on it each side of the roadway, perhaps modelled on London Bridge which had been built just 40 years earlier. In 1360, a chapel to Virgin Mary was added, built across an archway over the centre of the bridge, extending upstream on a flanking pier. At street level was a room used by the city council for meetings. On the next floor the chapel, surmounted by a bell

tower, straddled the bridge. The chapel was a grand space measuring 23m x 6.5m, and having four large windows on each side. A number of notable men were born in the houses on the bridge, such as William Thomas (born 1546), who became Archbishop of York.

By 1750, the bridge was 500-years-old and, according to Alexander Pope, crammed "*...with a strange mixture of seamen, women, children, loaded horses, asses and sledges with goods, dragging along altogether*". But it was no longer fit for purpose. Carts often tipped over and "*many limbs and lives...(were)... lost by the narrow passage of Bristol Bridge.*" Daniel Defoe's editor compared its narrowness with the minds of Bristolians. Something had to be done. After many years of argument about what a new bridge should look like, a three–arch design by the appropriately named James Bridges was chosen. The old bridge was demolished and the new one built on the same spot, using the existing mediaeval foundations. It was completed in 1768. The construction costs were a modest £10,300, but the necessary land purchases, demolition work, and numerous reports and surveys brought the total cost for the city corporation to £49,000 (roughly £10.5m at current value). It had imposing Portland Stone balustrades and four small stone toll booths, one at each corner. No more houses on the bridge — that was old–fashioned.

In 1793 Bristol Bridge gained notoriety as the scene of a horrific massacre of civilians by the military. Bristolians had paid tolls to cross the bridge for 25 years. There was eager anticipation that all tolls would be abolished on 29th Sept of that year. However, word went round beforehand that the Bridge Commissioners were going to charge tolls for yet another year. This did not go down well with the citizenry. In the final days of September, as the due date approached, the toll gates were pulled down and burned three times - on the last occasion in front of a crowd several thousand strong. The corporation called in the army. The Riot Act was read. A squad of soldiers fired 100 rounds into the unarmed crowd, killing 14, and wounding 45. It soon became clear that many of these were innocent bystanders. But despite huge public pressure no official enquiry was ever held into one of the worst civilian massacres of the 18th century. No one was brought to trial or even held to account.

Sadly, the present appearance of the bridge bears no relation to its former glories. It was widened in 1861 (east side) and again in 1873 (west side) by placing cast iron "wings" each side, supported by additional columns which obscure much of the original stonework. Even then this aesthetic degeneration caused controversy. At the same time, the stone toll booths were demolished and the stone balustrades replaced with ones of cast iron. In the 1960s, the wrecking job was completed when the latter were replaced with the present dull railings. We must now be content with recalling the past splendours of Bristol Bridge rather than contemplating it's current state.

ST PHILIP'S BRIDGE

2

St Philip's Bridge, like Bristol Bridge, is located in the heart of mediaeval Bristol. A ferry crossing was established here in the 12th century, linking Old Market with the Temple area. In 1651, the Corporation took it over from the private operator, calling it the Bathavon ferry. The name changed over the centuries to Queen Street ferry, then Temple Back ferry, then Counterslip ferry – the latter name derived from the "Countess Slip" on the south bank. From the early 19th to well into the 20th century, the area immediately upstream of the bridge was the centre of the manufacturing city, dominated by heavy industry such as iron foundries, lead works, gas works, glass making and soap manufacture. The ferry became a very busy crossing point and there was clearly a case for a bridge. In 1837, a company was set up to build one, financed by private capital from local influential citizens. Firstly, it bought the ferry from the Corporation for £2,157. This was carrying an estimated 300 passengers per day, a considerable number considering the then small size of the city (In 1801, only 64,000 inhabitants). A temporary wooden bridge was constructed in 1838 and removed when the new bridge was finished. The new bridge was a grand thing, "*handsome, elegant and airy*" with a two–arched span of Pennant Sandstone, with a central drawbridge. It was designed in Gothic and Tudor style by a Mr. Gravatt, an engineer. It cost £11,000.

The Bristol railway companies had taken a keen interest in how the bridge was to be designed. They applied considerable pressure to the Bridge Company to ensure that the new bridge was one which opened and would not therefore impede river traffic of any height — because this traffic was carrying goods that could be or had been transported by rail. The railway companies eventually contributed more than a third of the cost of the bridge in order to get their way. Evidence suggests that the railway directors were also expecting to get the (fixed) Bristol Bridge modified to be an opening bridge as well.

The bridge was opened in December 1841 by the mayor with considerable razzamatazz including a procession of the city's dignitaries through the streets. Three hearty cheers were taken up "*by the vast crowd assembled*" and this was accompanied by the firing of cannon and ringing of churchbells. A banquet then ensued for all the VIP's. During the first 12 months, nearly 1,000 people a day were crossing it for a toll of half a penny. Although it was acknowledged that the company was not charging the full market rate to cross the bridge, over the next 30 years annoyance grew at