

Introduction: The Telling of the Bridge

Jazz on a bridge

A well-known story travels the jazz circuits. On a New York summer's evening in 1961 a music critic of *Metronome* magazine and his wife were strolling from Manhattan to their Brooklyn home, across the little-used pedestrian walkway on Williamsburg Bridge that spanned 488 metres (1,600 ft) over the East River. Directly in front they heard the sound of a saxophone in the hands of a gifted musician playing complex and sophisticated music. It was Sonny Rollins, already a legend, developing a piece of creative work as he struggled to emerge from a difficult and reclusive period. Between 1959 and 1961 Williamsburg Bridge, close to Rollins's home, was where he went to work on this new piece, aptly called *The Bridge*. Perhaps Rollins chose the site due to a single-minded insistence on prolonged place-immersion as part of his composition and performance, or maybe this was just a conducive spot. Rollins insisted that it was for privacy, both his and that of his neighbours, whom he did not want subjected to the loud noise of a saxophone at all hours. Perhaps it was the idea of the bridge that inspired him, a kind of creative cipher, one that condensed both physical structure and root metaphor of a collective imagining.

Certainly there was no shortage of representational contexts. The nineteenth-century bridges of New York had long been 'sung' and a

plurality of narratives imaginatively told in a variety of mediums and genres, from poetry to cinema. The sheer physicality of these bridges was deeply integrated into the fabric of daily life in the city.¹ Some of these bridges had become integral characters in the various scripts of New York, not only as the unofficial capital of America, but the 'capital' of twentieth-century Capital, the pre-eminent global city. The widespread emergence of television, dominated by the US, and the post-war power of Hollywood ensured that, even by the late 1950s and early '60s the bridges of New York, particularly Brooklyn Bridge, were (along with San Francisco's Golden Gate) the most media-visible bridges in modern western popular culture. Williamsburg Bridge itself had featured prominently in the 1948 film *Naked City*, a crime thriller that culminated in a chase across the bridge.² But whatever the reasons for Sonny Rollins's choice of both practice site and theme for his composition, or the meanings generated by the various contexts in which we can place them, the story makes an appropriate starting point and offers a particular methodology for this exploration of the bridge.

While this is a multi-disciplinary study, a broadly communication and cultural studies perspective lies at its core. From within such perspectives, Jean Baudrillard usefully suggests three very different ways of organizing and studying objects. On the one hand there are formal systems of classification, which can be based around almost any criteria. For bridges these could be size, function, type of span, cost, date built, even type of failure, kind of risk involved, and so on. On the other hand, bridges, as with any object, could be studied as 'a kind of epic history of the technical object', a form of analysis which 'notes the changes in social structure associated with technological development'.³ A third approach addresses such questions as 'how are objects experienced, what needs other than functional ones they answer, what mental structures are interwoven with – and contra-

dict – their functional structures, or what cultural, infracultural or transcultural system underpins their directly experienced everydayness.⁴ Such an approach focuses on ‘the processes whereby people relate to them and with the systems of human behaviour and relationships that result from them.’⁵ In a general way, this study approaches the bridge from all three perspectives, with some jazz thrown in. It constantly attempts to contextualize bridges, not just to locate them within a particular setting but to understand them as key elements that actively shape their context. Attention must be given to the way in which a particular bridge is approached, not only conceptually or aesthetically, but also from a literal physical



New York Harbour and Brooklyn Bridge c. 1905.

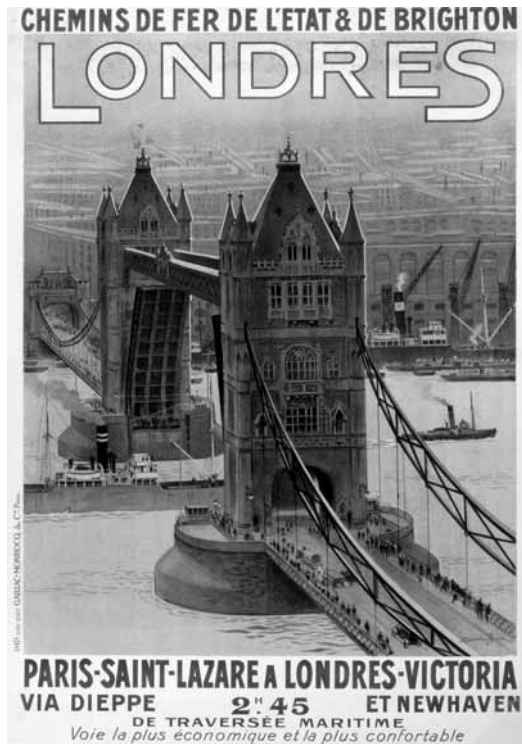
standpoint. Brooklyn Bridge, for example, can be approached from the land or from the harbour. It can be placed in the foreground or in the background. Each approach reveals different contexts and meanings.

The modern bridge

While its ancestry is ancient, a certain kind of bridge and bridge-ness emerged around 200 years ago as one of the prime monuments of modernity. Such a prestige was partly due to the sculptural qualities of bridges that were perfect for a conspicuous display of heroic engineering – for fantasies about overcoming nature, mastering new construction materials, displaying daring visions and computational certainties. It was a prestige that also owed much to a revolution in physical movement, on both a local and global scale, a revolution in mobility that was itself integral to modernity – the reliable and efficient circulation of goods, the



The Bridge. A night view of Brooklyn Bridge.



regulated and rapid mass movement of the population. Such a revolution was also based around the new technologies of transportation and communication – the heroic age of railways in particular, but also the rise of effective roads and of steamships. This radical shift in the meaning, design, purpose and imagining of bridges was simultaneously documented, celebrated and explored through the visual and performing arts, through literary fictions, through a documentary and news media that was radically transformed first by photography and then by cinema, through the newly invented forms of visual reproduction such as postcards,

Londres, a 1930s poster for French railways.

posters and postage stamps. The modern bridge was also represented through an outpouring of new types of bridges and bridging projects, in new possibilities for physical bridges.

The twentieth century saw the golden age of the railway being supplanted first by that of the automobile and then of the aeroplane, forcing yet another re-evaluation of the bridge. New social ideologies and philosophies, new psychological and artistic paradigms emerged around and through the bridge. New paradigms of design and computation, new construction practices and new materials evolved within the shifting contexts of economics, planning and organization, patterns of everyday life and changing global relationships.

While at the dawn of the twenty-first century bridges still remain vital structures, physical transportation itself has been coupled with, and many of its functions supplanted by, vastly complex systems of digital electronic communications, of virtual travel and transportation. Cultural, imaginative, artistic, economic and political contexts have constantly changed during the history of the modern bridge, as have engineering design and practices, plus the development and creative utilization of new materials. There have been radical paradigm shifts as well in the scholarly disciplines that pay close attention to the bridge and to its contextualization.

This book examines the bridge (bridging and bridge-ness), along with the cultural practices – from the civic to the military, architectural to engineering, artistic, poetic and philosophical – that have circulated through it over the past two hundred years, from the onset of modernity to the dawn of the new millennium. The prime focus is therefore the fate of the bridge in western and other industrializing societies and cultures. The approach to such a broad question must of necessity be highly multifaceted, mobilizing a wide range of scholarly disciplines both as theoretical

perspectives and as primary source material. In addition, numerous other sources are deployed, including paintings, written and visual fictions, written and visual documentaries, news, travel texts and advertising.

The bridge is an idea, a kind of imagining that has an ahistorical, archetypal sensibility and function. Bridge/bridging is a root metaphor of cultural and individual imagining. People from all walks of life and all ages dream bridges, engage in reverie on and around them, invent them, find meanings in them. However, this idea, this core fantasy, also shifts and changes from one historical culture to another. At the same time bridges are utterly historical and culturally specific. This applies to the manner of their design and construction, as well as their physical and imaginative use, whether at the time of construction and opening or much later – the subsequent use and symbolization of long existent structures. No less than its design, the representation of a bridge always embodies fantasy. Sometimes this imagining is cast in an apparently realist mode and sometimes one that more clearly shows its stylization and cultural origins.

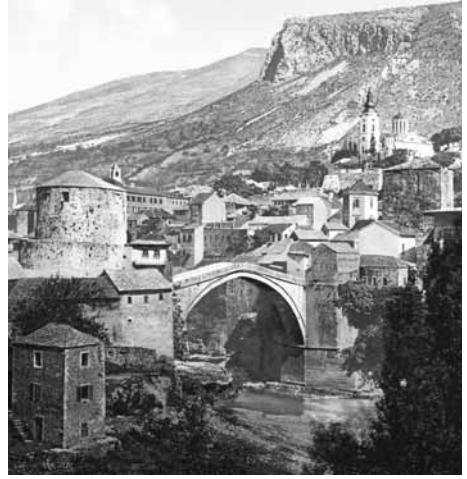


Yoshitora Utagawa, *London and Pedestrian Bridges*, 1866, woodblock print triptych.

Telling the bridge: A double construction

Bridges are things about which stories are told. This telling is integral to the idea and practice of bridges. The varieties of ways such a telling has occurred, the mediums employed, the audiences, the historical shifts in the contexts of this telling, all need to be articulated and mapped. This book is one such telling. Ivo Andrić, in his classic 1946 novel *The Bridge Over the Drina*, tells how after the completion of a great medieval Ottoman stone bridge in Bosnia people 'began to remember details and to embroider the creation of a real, skilfully built and lasting bridge with fabulous tales which they well knew how to weave and to remember'.⁶ In this sense two constructions are involved in the completion of a bridge, one of solid materials and the other of narratives. The multiple telling of the bridge involves shifting styles and contexts of representation. While most bridges are small, almost invisible, many have their own name, are the subject of stories, legends, tourist rhetoric and visual representation. Some bridges are famous and iconic. Others appear for just a moment on the historical stage – often due to war or accident.

The bridge, like other highly aestheticized objects such as art, food and fashion, is saturated with discourses, from those of the connoisseur to the dense technicalities of engineering and architectural design manuals. Individual bridges have been mobilized as benchmarks by which to measure the ranking of any particular civilization on a techno-architectural ladder of attainment. For example, there was widespread refusal in late nineteenth-century western Europe to accept the architectural and engineering capacity of the Ottoman Turks. As a result, architectural masterpieces like the main bridge at Mostar were wrongly attributed to the supposedly superior civilization of the Romans.⁷ The capacity merely to



construct a bridge has been seen as a defining indicator of human civilization. The bridge is classed alongside tools and fire as a founding technology of human culture, for it enhances a necessary land-based mobility and connectivity. Bridges have also been seen as the expression of an individual's 'artistic brilliance', akin to sculpture and architecture, music and painting. As 'wonders of the world', bridges have been gathered in a variety of ways in order to stimulate pleasure, enjoyment and interest, as in the ubiquitous, and at times visually compelling, coffee-table books on the subject.

The intense visual presence of the bridge has long been celebrated by painting. But the invention of photography in the first half of the nineteenth century, an Industrial Revolution companion to the modern bridge, allowed its fuller exploitation. The aesthetics of the modern bridge became somehow intertwined with the new mode of photo-representation, as painting was freed from any lingering documentary obligation. Previously, given the restricted mobility of the general population in most societies, a bridge was

Golden Gate Bridge, San Francisco, 1984.

Mostar, Romer Bridge, Bosnia-Herzegovina, completed 1566, in the 1890s.

known directly only to those who lived in its locality; a famous bridge could only be known through oral narratives – gossip, rumour, travellers' tales. Cheap mechanical reproductive processes now allowed *the image* of the bridge, through countless numbers of photo reproductions, to achieve widespread circulation. The images of previously little-known bridges around the world, as well as more famous ones, were distributed through a diverse range of print media. New engraving processes and especially photography also allowed a fuller documentation of the bridge as a construction process. Through these technologies of visual mass reproduction bridges became inserted into a range of entirely new paradigms, desirable objects for the mass tourist gaze. The opening of a large bridge was, and remains, the occasion of spectacular display and ceremony, celebrations of national and civic pride. Throughout the nineteenth century bridges began to feature regularly on a range of commercial promotions. While cinema then continued this trajec-



Hell Gate Bridge, New York, under construction, 1915.



tory, it also provided yet another paradigm shift. In numerous films, from *Waterloo Bridge* to *Bridge on the River Kwai*, from *Les Amants du Pont-Neuf* (*Lovers on the Bridge*) to *Godzilla*, bridges have regularly featured, not just as pivotal dramatic settings, but as characters in themselves.⁸

But, while the compelling visual presence of the bridge has dominated imaginative engagement it has not completely effaced other approaches. Poetry, novels, myth and philosophy all have a long history of involvement with the bridge.⁹ Andrić's novel *The Bridge over the Drina* is a story of sweeping historical proportions, about a medieval stone bridge in Bosnia, with eleven arches, 250 paces

The opening of the Brooklyn Bridge on the evening of 24 May 1883.

Empire Sewing Machine Co. New York, colour lithograph print, c. 1870, showing a completed Brooklyn Bridge, which was then under construction.

long and 10 paces wide. It is a central symbol of the establishment, duration and ending of a civilization, the Ottoman. The bridge connects epic events with an intensely local culture and everyday life. A vast historical complexity of religious, ethnic, cultural and geographic issues is condensed into the bridge. Initially constructed deep within the territory of an utterly secure Ottoman Empire with its internal communication and transportation requirements, the bridge carries the road to Sarajevo, linking Bosnia and Serbia. Then, as geo-politics changed in the late nineteenth century, the bridge was stranded beyond the Empire's extreme edge and unstable border. Its meanings and purpose altered dramatically as a result. In many ways this tale is a precursor to the tragedy that befell the bridge at Mostar at the very close of the twentieth century. Such fictional accounts, whether written and/or cinematic, allow a fulsome exploration of the gathering and dwelling-ness that permeates the bridge.



Hong Kong's Ting Kau Bridge (completed 1998) at night.

Rapid developments in sound recording have facilitated sophisticated and complex auditory telling and listening. For example, in 1995 Jodi Rose, an Australian sound artist, set out to record the sonic-scape, or sonic profile, of individual bridges around the world. After recording the unique 'sound signature' of Sydney's cable-stayed Glebe Island Bridge, she conceived a vast project, *Singing Bridges*, that would treat numerous major bridges around the world – including Brooklyn and Golden Gate in the USA, Tin Kau in Hong Kong and Tower Bridge in London – as instruments within a global bridge-orchestra. Drawn to the sound of wind through cables and struts, she attached microphones to them so they functioned as giant aeolian harps. Her vision was unashamedly spiritual. The wired-up bridge cables were conceived as echoing a globe-uniting and encircling, fibre-optic, telecommunications network. Jodi Rose imagined an 'International Bridge Symphony . . . A metaphor for spiritual communication'.¹⁰

There are also other, more discordant, even disturbing, soundings of the bridge, although few have been recorded: of construction and workers on the site; traffic noises; whispers, cries and metallic groans in the echoing spaces beneath the span or at its centre overhead; the screeching protest of its collapse or destruction. In the late 1980s, in the grey, damp, gloom of an English mid-winter, I would walk, generally feeling frustrated, to where the infamous M25, the London Orbital, had just been completed. The multi-lane highway, with a volume of traffic that always threatens to overwhelm its carrying capacity, was soon dubbed the world's longest traffic jam. It crossed over a small local road by means of a reinforced concrete bridge, already stained with atmospheric pollution. The endless rumbling of the traffic, overpowering in the confined space beneath the bridge, simply absorbed my therapeutic shouts. Iain Sinclair, documenting his idiosyncratic walk around the M25, says it better:

'We sit for a time under the Bulls Cross Bridge, watching the tide of traffic, the hallucinatory rush. Listening to the shift in the tyre sounds as the road surface changes, the thunderous amplification of the bridge.'¹¹ The experience summoned childhood memories: the Flying Scotsman powering its way north, smoke plume streaming, from King's Cross to Scotland, across a large steel bridge near my north London street. I would push against the huge sound rushing overhead, screaming through the iron and steel of the bridge. These sounds are more shamanic than spiritual, moving down and in, not out and up. Back to Sonny Rollins again, not just playing *on* the deserted places of the giant bridge but, as even a casual hearing of his bridge music suggests, playing *with* the bridge, playing *against* and *through* the complex and paradoxical structure.



Salginatobel Bridge, Switzerland, built 1929–30.

Engineering as story

The most obviously direct telling and representation of the bridge occurs within discourses of engineering – its manuals of analysis, design and project management. In his seminal 1979 study, *The Tower and the Bridge*, David Billington attempted to apply a critical reflexivity from within the engineering paradigm itself and hence to more fully understand and participate in the project of the modern bridge. He insisted upon a new perspective, ‘a new art form, structural art, which is parallel to and fully independent of architecture’.¹² This was, he wrote, ‘a new type of art – entirely the work of engineers and of the engineering imagination’.¹³ A few engineers have ‘consciously practised this art’ since the late eighteenth century, but it was ‘a movement awaiting a vocabulary’.¹⁴

Billington drew heavily upon the work of the twentieth-century Swiss bridge designer Robert Maillart as an exemplary case study in the development of structural art. Maillart, he insisted, ‘was surely neither a sculptor nor architect: all of his works were rooted in the numerical rational world of engineering’.¹⁵ Is bridge design and construction a science, a technology, or art, he asked. What is meant by such terms anyway? How have their meanings and significance, along with that of engineering or the engineer, changed, even throughout recent history?

The annals of structural and civil engineering are certainly full of disagreement and debate about how engineers should tell stories about bridges – the genres of analysis and design. Billington, while part of a minority, is not alone in his stress on the importance of historical understanding, particularly case studies. Indeed, nineteenth-century bridge designers drew deeply upon the history of various bridge designs, their failures and problems figuring strongly in their accounts. Billington suggests that an awareness of broad context,



what he terms the ‘climate of engineering design’, is crucial. He links structural art to democratic society and its anti-totalitarian struggle: ‘the disciplines of structural art are efficiency and economy, and its freedom lies in the potential it offers the individual designer for the expression of a personal style motivated by the conscious aesthetic search for engineering elegance.’¹⁶

Aesthetics and ethics are intractably linked in his vision: ‘lightness, fragility perhaps – closely parallels the essence of a free and open society.’¹⁷ This relationship between aesthetics and politics is

London Bridge opening by King William IV, on 15 August 1831.

The Tay Bridge Disaster, Scotland, 28 December 1879.

crucial. For Billington, the bridge seems simultaneously to condense and amplify entire political cultures and ideologies. The bridge is both a key cipher for interpreting politics and culture, plus a technology of change and affirmation: 'The thinness and openness of the Eiffel Tower, Brooklyn Bridge, and Maillart's arches . . . have a deep affinity to both the political traditions and era in which they arose. They symbolize the artificial rather than the natural, the democratic rather than the autocratic and the transparent rather than the impenetrable.'¹⁸ London Bridge of 1831, by comparison, built of solid masonry, was both costly and monumental, a product of a less democratic and open society, one that was more hierarchical, more autocratic and aristocratic. Billington particularly focused on the Menai suspension bridge of 1826 by Thomas Telford. It was, he wrote, 'the first major work of structural art visually to symbolize, in its thinness, the lightness of the new engineering and the demands of the new politics'.¹⁹ This bridge was contemporaneous with the Reform Bill of 1832, and the struggle to spread the franchise in Britain. Among other bridge-designing social radicals and revolutionaries of the time was Thomas Paine, who combined a dedication to structures and politics. Paine described his seminal work *The Rights of Man* as his political bridge. For Billington there is a direct connection between a revolution in bridge technology and politics.

The emergence of new materials in structural engineering, such as iron, steel and concrete, are used by Billington to date shifts in the fundamental design of bridges and their construction. For him the modern begins in 1779 with Abraham Darby III's Iron Bridge at Coalbrookdale in England and the use of cast iron for complete structures: 'new structural forms began to appear; these required special study and training, which led to the creation of the modern engineering profession.'²⁰ This is clearly an engineering view of the

initiatory moment for the birth of the modern bridge, but provides a useful historical starting point for this book. Other perspectives provide different opening dates – the emergence of new mobilities, radical shifts of perspective in art, new flows of imperialism and capital that demanded innovative systems of communications, major changes in social relations, and so on. Darby's bridge looked backwards in its design, not just to an established arch-form that had evolved for more traditional materials but to established social relationships and mobilities. The modern bridge can be considered not just as an engineering structure, nor as defining a moment in engineering history, but, for example, as a platform for a certain kind of reverie on the modern city. In this regard we could point to Wordsworth's poetry, firstly to his 'Ode on Westminster Bridge', with its elegiac celebration of London, and then to his various drafts of *The Prelude* with their more sombre, even disillusioned, appraisal.²¹ Billington's insistence that the 'development of the new technology of industrial iron brought forth a new means of artistic expression', should go beyond just bridge design to embrace the 'artistic imagination', as he puts it, of an entire era.²²

Unquestionably the advent of railways, a complex and multi-causal event in its own right, was the force that galvanized the development of the modern bridge. There was pressure to use as few natural resources as possible because of their cost, particularly industrialized iron. The immensely higher loading on bridges due to locomotives, the demand for longer spans in order to provide the most direct route for ever-expanding transportation systems, each pushed the boundaries of design. The modern bridge as a form of structural art emerged, as engineers struggled to find both the limits of structure and also forms that were not just light but which conspicuously displayed their lightness.²³

For Billington, the second period of the modern bridge started in the 1880s when iron was supplanted, and largely replaced, by steel and then concrete. This allowed an extraordinary range of design options and a bewildering variety of bridge forms came into being. But conservative powers still prevailed and it has been noted that there were no courses in steel and concrete construction in architectural education for the new engineering. Significantly, for Billington's compelling thesis, Thomas Telford, one of the pioneers of structural art, had taken a strong stand for independence of engineering from both eighteenth-century architecture and eighteenth-century mathematics.

However, at the beginning of the twentieth century mathematics and science were highly prestigious and began to dominate bridge design. Petroski is critical of such developments, insisting that 'highly developed analytical, numerical, and computational design tools' are not enough.²⁴ Like Billington, he stresses the importance for engineers of developing case studies, of knowing history, of an awareness of failure and its causes, of understanding the social, historical and ideological contexts of bridges. Petroski approvingly cites one designer: 'problems are essentially nonquantitative . . . solutions are essentially non-numerical.'²⁵ There is an unavoidable fuzziness in trying to define engineering method. He too points to the example of the Swiss engineer Robert Maillart, who, in 1923, 'developed a limited theory for one of his arch bridge types that violated in principle the general mathematical theory of structures.'²⁶ But during the twentieth century many were 'trapped in a view of an engineering analysis which was so complex that it obscured new design possibilities. Today the undue reliance on complex computer analysis can have the same limiting effect on design.'²⁷

The key issue here is how a cluster of professions and practices such as engineers and engineering, architects and architecture, have



been understood across history. Designers such as Robert Maillart and Santiago Calatrava, whose bridges receive direct acclaim as modern art, are in the forefront of challenging any rigid classifications.²⁸

The extreme possibilities in the telling of a bridge are boldly illustrated by comparing two radically different narratives about the Dartford crossing which opened in 1991, a huge cable-stayed bridge with a main span of 450 metres over the Thames. One is the rather bland, celebratory description using generic promotional-technical rhetoric as told by the company operating what is officially called the Queen Elizabeth II Bridge, and the other is the underworld vision of poet and writer Iain Sinclair on his bizarre walk around the M25.

Calatrava's Alamillo Bridge, Seville, Spain, opened 1992.

For the operating company the bridge is, understandably, a technical structure deserving of celebration:

Now as you travel along the approach roads towards the Dartford River crossing the new Bridge rises dramatically into view, the largest and most dominant feature on the horizon. Slender steel pylons rise from the road deck 137 metres into the sky above the river. Immensely strong galvanized spiral strand cables are anchored down the height of each pylon and connect along the length of the road deck, forming a graceful sweep of steel strands that, when seen from a distance, seem no more than fine threads to the eye.²⁹

By contrast, Sinclair's rich, gritty underworld perspective locates the bridge in a lived context:

Heading east, along the Thames path, the Dartford Bridge (with its necklace of slow-moving traffic) is our horizon. Smearred headlights spit their short beams into the wet night. The bridge spells civilization. And it spells it loud: FUCK OFF. Liminal graffiti. A mess of letters sprayed on grey stone wind-breaks. FUCK OFF . . . The motorway streaks the land with sick light. For half a mile, in every direction, there is hard evidence: burnt-out wrecks, torched and rusting husks, solitary tyres. The trash of transit . . . The sewerage plant hums and seethes . . . Mythic projections invade an unoptioned landscape, the gloom over Gravesend. The bridge is more metaphor than reality, lorries disappear into the clouds.³⁰

The clean promotional language in the first account depersonalizes the bridge. The viewpoint is at a distance. By contrast Sinclair's perspective is close up, figuratively in-your-face. The bridge is grubby from use. It is integrated into the harsh life of the road and

city. The prose is a challenge to the incorporation of bridges into a vision of progress that celebrates an almost dematerialized world of free-flowing transportation and global capital, a view that ignores the inevitable creation of a complex and messy underworld. The two accounts are like the ultra-violet and infra-red ends of a spectrum of stories a bridge evokes.

Gendered bridges

Social class and ethnicity are critical to stories about the bridge. But the voices of the vast historical labour force, involved in



Workers on the cables of Brooklyn Bridge, 1883.

bridging – from design offices to construction and maintenance – have at best been pushed to the margins, while at worst they are simply effaced. The workers remain enigmatically fixed as anonymous figures in the documentary images of the construction or as statistics (4,600 employed on the Forth Bridge construction between 1883 and 1890, with 57 killed). Subsequent chapters begin to explore the power equation, including racist ones, inherent in the telling of bridges. Gender too is inextricably part of the telling. Structural or civil engineering has long been blatantly gendered as a male domain. Back in the mid-1960s when I studied Civil Engineering at a major university in England, out of about 300 first-year engineering students rumour had it that only one was female. While the rates of participation by women in civil and structural engineering vary quite significantly from one country to the next, these professions have always been overwhelmingly dominated by men. With varying success moves have been taken in recent years by engineering organizations and in universities around the world to correct this gross imbalance.

It is difficult to say how the history of structural design/art would have been different if there had been a more equitable gender balance among those who designed and built. However, even the few women who have played crucial roles in bridge design and construction are usually quietly pushed out of sight. Emily Roebling's critical part in the completion of Brooklyn Bridge, for example, took a long time to receive due acknowledgement. After the bridge had killed its prime designer, John Roebling, his son, Washington, had assumed responsibility. Then he too was severely incapacitated by the bridge, permanently crippled by the 'bends' or 'caisson disease' during construction of the foundations. His wife Emily then took over, going far beyond the role of mere go-between or messenger for her house-bound husband that many

have assigned her. In Alan Trachtenberg's seminal 1965 book on the Brooklyn Bridge, Emily warrants just a single brief mention, and then merely as her crippled husband's courier. Others have insisted that she taught herself higher mathematics and the details of engineering in order better to interpret her husband's plans, ideas and notes for his associates. She was therefore in a position to explain the difficult points and directly examine the results.³¹

A more recent example of the belittling of women who have been involved in a major bridging project is that of Marilyn Jorgenson Reece and Carol Schumaker. They designed the complex cluster of bridges that, when completed in 1964, constituted one of the busiest intersections in the world, the San Diego/Santa Monica Freeway interchange in Los Angeles.³² A headline in the *LA Times* of 6 April 1964 read: 'Freeway Builders Are Weekend Housewives: Highway Engineers Look Forward to Ordinary Suburban Chores Around Home.' Nevertheless, the legacy of these engineers remains and the Santa Monica/San Diego intersection has been described as 'a work of art, both as a pattern on the map, as a monument against



Fireworks on the Tsing Ma Bridge, Hong Kong, at the official opening of the Lantau Link.

the sky, and as a kinetic experience as one sweeps through it'.³³ Fictional portrayals of women bridge-builders are few. Frank Worsdale has two of them – one Chinese and one British – in his novel about a plot by Islamic terrorists (based in Afghanistan) to blow up the giant Tsing Ma Bridge, a celebrated Hong Kong icon.³⁴

Of course women claim a place in the telling of bridges in other ways. Sydney Harbour Bridge has been the focus of celebrated women artists, such as Grace Cossington-Smith, Dorrit Black and Gwen Barringer, since its construction phase. Bridges have also been the site of contention by women, from city planners and urban environmentalists such as Jane Jacobs in the 1960s, to ongoing struggles over the right of women to safe mobility in city streets.³⁵ Bridges have not always been seen by women as simply beneficial. As will be seen in Chapter One, Aboriginal women in South Australia were at the forefront of desperate attempts in the 1980s to block approval for a bridge that they insisted would inflict devastating damage to their sacred landscape around Hindmarsh Island.³⁶



George Cruikshank, plate 8 of the series *The Drunkard's Children*, 1848.

Young women in trouble, framed by the underside of the bridge, have long been a favourite of (male) artists, particularly in the Victorian era, as in George Cruikshank's *The Drunkard's Children*, or his explicitly titled 1848 painting, *The Poor girl, homeless, friendless, deserted and gin mad, commits self-murder* or in George Frederic Watts's 1850 painting, *Found Drowned*, or Gustave Doré's 1872 engraving of a young woman, presumably drowned, lying beside the Thames beneath a London bridge. Young women seem to outnumber young men or older people of any gender in artistic portrayals of bridge-related suicides. Intricate complexities – ideological, political, psychological, cultural and social – of gender and technology require careful attention, as they do around all social inequalities which circulate around a technology of power like the bridge.³⁷

New spaces

The story about Sonny Rollins playing his sax on the walkway of Williamsburg Bridge bypasses and relativizes the narrative genres of engineering triumph and architectural aesthetics, of documentary or artistic visuality. Span and mobility are pushed to the very



Praying on Williamsburg Bridge, on New Year's Day, 1909.



Sunset from Williamsburg Bridge, 1915, etching.



edge of the frame as other spaces and functions are moved to the centre. It opens up a very different telling of the bridge, one enunciated from marginalized, or even subaltern, specialities. These marginalized spaces are sometimes transgressive, sometimes demoted, generally problematic.

Over the past two hundred years bridges have been involved in creating new, often paradoxical, spaces as well as new practices, experiences and imaginings of place. At the most local of levels this has involved the bridge structure itself. Most obvious is the span with its centre – the highest point, the crown of the bridge, the desperate leap, the point of reverie, the place of transformation in myth and folk tales, the site of prayer. In an earlier age, to stand on the crown of a large bridge was the closest one could get to flight: surrounded by space, suspended high in space, supported only by a minimum of matter.

A view of Blackfriars Bridge from Waterloo Bridge, London, in 1832.

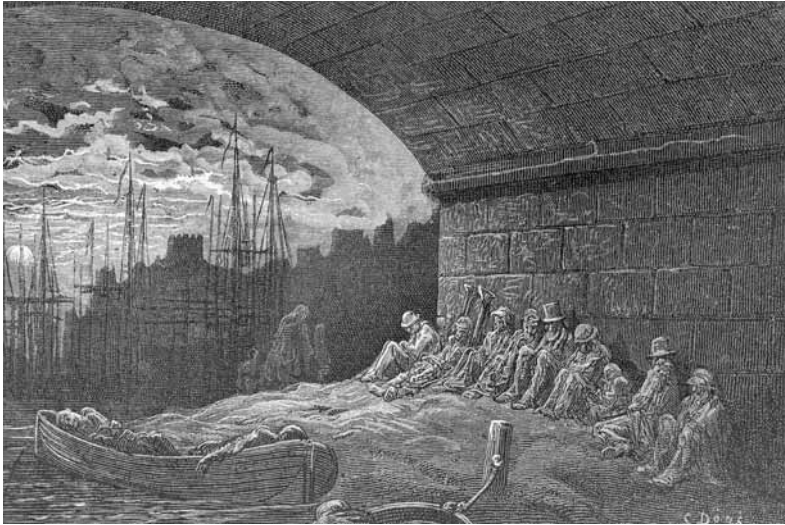


As a platform from which to view, the bridge also opens up another entirely new type of space and subjectivity. Not only does it introduce a unique viewing position, a kind of *offing* is also created, akin to the place revealed by the glance from a ship at anchor, or from the shore over an arc comprising the visible stretch of sea. The bridge becomes a platform for reverie, or for a gaze either critical or admiring, or for survey and surveillance. From Dostoevsky in St Petersburg to Wordsworth in London, the viewing from the bridge is also implicated in a struggle over certain kinds of subjectivity and identity.³⁸ In Andric's novel, *The Bridge on the Drina*, the middle of the bridge over the Drina in Bosnia plays an important role.³⁹ Here the bridge widened into two terraces – the *kapia*. It was a place where men (rarely women) used to meet over coffee, to contemplate the river and life. It was a pivotal place in the town's geography and everyday coherence.

There are also the ends, the entrance and exit (the approaches, the sense of initiation, of defence, of entry and departure). Shops, hotels, cafes and dwellings gathered around the ends of many earlier, and even some modern, bridges.

Finally, there is the space beneath the bridge (the place of secrets, of trolls and tramps, a refuge for wanderers and homeless, a site of crimes, graffiti, the damp smell of water, earth, stone and

The approaches to Brooklyn Bridge, 1881.



concrete, of urine, faeces and of hasty sex). Bridges gather to themselves an underside. To construct a bridge is always to construct an underworld. This is a place of stillness and exile, a world of alternative aesthetic possibilities as well as devalued real-estate.

Road Bridge over Fourth Creek, Morialta, South Australia.

Gustave Doré, 'Under the Bridges', from *London: A Pilgrimage* (1872).



It is outside the rush and flow taking place above, over the bridge. There is something about bridges as a whole that is uncanny, but this uncanniness is at its maximum in the spaces beneath the span. The underside of bridges is both a literal and metaphorical underworld. It can act as a potent frame as in Edward Hopper's sketch of 1906–09, *On the Quai: Suicide*, where the arch of the bridge looms in the background and a solitary viewer stares from the bridge at the small group gathering around an ill-defined corpse, or in the Depression-era photo of a line of men queuing for food beneath a bridge in the USA.⁴⁰ This underside also encompasses the shady deals surrounding bridge constructions, the financial and power play that lies behind many bridges, the misuse of place and environment by a cult of speed, circulation and unrestrained mobility. It also acts as a potent metaphor that has been utilized by artists, poets, writers, philosophers and filmmakers, and acts as

Breadline at McCauley Water Street Mission under Brooklyn Bridge, 1930s.

a sobering counter to the idealistic visions that accompany the soaring span. The construction of any bridge or, I would argue, just the imagining of any bridge, creates an underworld, an inevitable and essential shadow side.

Bridges also affect the immediate gathering of the lands and cultures around them. On a larger scale bridges are involved in the creation of extensive and often global corridors of transportation, communication and power, as well as a reconfiguration of border and territory. Bridges, perhaps more than any other single structure, radically alter the face of a landscape. A massive redistribution of imaginative and social space can result from the construction of a major bridge. This was part of their attraction to early visionary designers. Offices, factories, homes, shops, roads and parks spring up and gather in relationship to a new bridge. There is a shift in the centre of gravity of a landscape, sometimes on a vast scale. Brooklyn Bridge, for example, was conceived as being at the centre of a shift of civilization itself, away from Europe and towards America. Such structures, their eco-imaginative location placed within a broad physical and social context, contribute to the *genius loci* of a landscape. But for many people construction was and is experienced as an imposition, as destruction, an expression of the power of others and of their own powerlessness. As will be seen in subsequent chapters, bridges can focus a considerable disturbance from afar onto a local place and, more often than is acknowledged, stimulate resistance.

At one extreme, bridges create complex places that can be intricate and intimate, social or solitary. At the other they seem to create places of homogenized desolation. In between they are perhaps what Marc Augé has called non-places, ones without the usual defining characteristics of a relationship to meaningful everyday life, or to history, or to concerns with identity.⁴¹ Spaces



of transportation, from aircraft cabins to airports, highways to high-speed trains, are particularly in Augé's sights. Yet, as will be seen, even apparently nondescript bridges, vast and complex multi-level highway intersections that devour bridges and land,

London Bridge, 1833.



derelict undersides of bridges, are often not devoid of meaning, of life. Such gargantuan interchanges, for example, have their own devotees and fans.⁴² As already mentioned, Reyner Banham, while critical of many highway interchanges, admires others, such as the Santa Monica/San Diego intersection, insisting it is ‘a work of art.’⁴³ The exit points of such complexes, where the ramps link to other orders of flow, can be sites where hitchhikers thumb for lifts, kerbside vendors proffer flowers, or carjackers and thieves lurk. The spaces beneath can provide shelter.

There are also small, intimate spaces and corners within and around the bridge. Numerous poets, novelists and filmmakers

Aerial view of four-level interchange at intersection of Arroyo Seco Parkway and Highway 101, Hollywood Freeway.

invoke a poetics of such spaces, and suggest reverie as a way of apprehending the bridge.⁴⁴ Bridges are places of meeting, sites of loss and of parting. As in the 1940s film *Waterloo Bridge*, or the 1991 film *Lovers on the Bridge*, in Guillaume Apollinaire's wistfully graceful poem 'Mirabeau Bridge' lovers eternally meet at the centre of bridges, either physically or in solitary thought, lonely, in moments of reflection.⁴⁵

Under the Mirabeau Bridge there flows the Seine
Must I recall
Our loves recall how then
After each sorrow joy came back again . . .

The intimate bridge is a technology of possibilities. It is a place where tragedy or just sadness always hovers. Memory, nostalgia, dreams and intimacy have long haunted bridges.⁴⁶ Romanticism, the picturesque, psychoanalysis, surrealism, the rhetorical strategies of heritage and tourist promotion, of Feng Shui and garden landscape design, as well as a postmodern irony, have provided just a few of the changing genres within which and around which such sentiments have been mobilized and contested. This is a world of glimpses, of bits of bridges, of meetings and partings.

Psycho-philosophical bridges

Bridges have long attracted the attention of philosophers, theologians and psychologists. One of the earliest psychoanalysts, Sandor Ferenczi, gave a rich, albeit highly reductive, interpretation of the bridge as a symbol. In 'dreams of neurotics', he wrote, 'the bridge is the male organ, and in particular the powerful organ of the father, which unites two landscapes (the two parents in the giant

shapes in which they appear to the infant view). This bridge spans a wide and perilous stream, from which all life takes its origin . . .⁴⁷ He pointed to ‘the two meanings “bridge = uniting member between the parents” and bridge = link between life and not-life (death).’⁴⁸ The ‘bridge anxiety’ is hence a fear of castration: ‘The male member which unites the parents during intercourse, and to which the little child must cling if it is not to perish in the “deep water” across which the bridge is thrown’, is ‘an important vehicle between the “Beyond” (the condition of the unborn, the womb) and the “Here” (life).’⁴⁹ For Ferenczi, the bridge is also a key symbol of the pathway to death, echoing T. S. Eliot’s portrayal in *Four Quartets* of London Bridge as a passageway for the dead.⁵⁰

The constant tension between the physicality and symbolism of the bridge was remarked upon by Heidegger, who insisted that ‘the bridge, if it is a true bridge, is never first of all a mere bridge and then afterward a symbol. And just as little is the bridge in the first place exclusively a symbol.’⁵¹ Heidegger wrote that bridges are ‘things’, *thingness* being the capacity to initiate a fourfold gathering of earth, sky, divinities and mortals. In a famous passage he explained:

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 . . . With the banks, the bridge brings to the stream the expanse of the landscape lying behind them. It brings stream and bank and land into each other’s neighbourhood. The bridge gathers the earth as landscape around the stream.⁵²

Bridges initiate a paradoxical gathering. They are also quintessential technologies of separating and of separation. Around the turn of the century, the classic sociologist and social philosopher Georg Simmel also reflected on the bridge. Humans, by their very nature,



he suggested, ‘separate the connected or connect the separate’.⁵³ Simmel emphasized the bridge’s place within what he called ‘the miracle of the road: freezing movement into a solid structure’.⁵⁴ Within an overall structure of movement the bridge gives visible form to this rhythm of separating and connecting.

The bridge as a technology

Obviously a study of bridges must engage with the idea of technology. In this book I use the word technology not to indicate just a thing, a means or a process, but as a way of knowing, or, in Heidegger’s phrase, ‘a way of revealing’.⁵⁵ For Heidegger, technology ‘actively “enframes” or “emplaces” (Gestell) an aspect of the world’.⁵⁶ He uses the example of a power station on the Rhine – a complex assemblage of various technologies that reveal the river Rhine in a very specific way, very different from, for example,

Bridge over the Rhine at Coblenz, c. 1890–1900.

myth or poetry. Similarly, a bridge, whether ancient or modern, over the Rhine provides another way in which the river is revealed. The problem for Heidegger is that technology's 'mode of revealing the world destroys other possible ways of revealing'.⁵⁷ One possible solution is to embrace a fuller meaning of *techne*, one that 'often had little to do with the "enframing technology"', echoing Billington's call for a structural art of bridge design.⁵⁸

I use the term 'technology' in a way that indicates both an instrumental means, a technique, tool or apparatus, a systems of sciences, and also a regime of practices, a complex world of meanings, of social relationships. It suggests a culture which supports, even encourages, attempts at systematic transformation and systematic applied knowledge. It also indicates a specific type of enframing of the world, posits certain goals, valorizes certain actions, shapes aesthetics, establishes a mythology and a poetics. Technology is, as Robert Romanyshyn eloquently puts it, both symptom and dream.⁵⁹

Bridge biographies

In the telling of bridges the auteurs of design and construction receive star billing. Individual designers such as Brunel, Roebling, Telford, Eiffel, Lindenthal, Ammann, Maillart, Calatrava, and Armajani have an obviously compelling relationship to specific bridges and to the historical narrative about the structural art of bridge-building. But the Sonny Rollins story also introduces other biographical dimensions to the telling of the bridge. A range of people, such as artists, poets, musicians, general users and 'fans', or those in design offices, or construction workers, can also have an intensely personal relationship to bridges. Their stories are heard less often.



Old London Bridge, moved from London to Lake Havasu City, Mohave County, Arizona.

Signa Bridge near Florence being destroyed by Allied bombers in World War II.



Bridges too have their own biography. As Igor Koptoff insists, things have a social life, a complex story that changes across their life spans. Culture and history utterly transform the context of a bridge.⁶⁰ The meanings and functions of bridges are not fixed. An out-of-date rail bridge can give up its original function and instead, in a new era of heritage, environment and fitness, become part of a pedestrian and cycling trail. Bridges even change their structure as elements are added or removed, parts strengthened, carriageways widened. Bridges can become non-functional monuments, themed and landscaped as picturesque ruins, or protected and framed as heritage. Over two hundred years after its completion the seminal Iron Bridge stands at the centre of a historical themed open-air museum. The famed bridge over the River Kwai at Kanchanaburi in Thailand has been transformed from imperial death sentence for war prisoners to a site for tourists and pilgrims.⁶¹ London Bridge's transformation was even more dramatic. Closed after 140 years of use, both functionally and as iconic image of early twentieth-century London, a bustling heart of global finance, trade and entertainment, it was auctioned in 1968. Bought by an American entrepreneur, it was dismantled stone by stone, transported and reassembled in a desert, an instant improbable icon for a city planned and created only in 1963, Lake Havasu City, Arizona.

Australian postage stamp commemorating the 2000 Sydney Olympics.

The bridge as stage and target

The use of the bridge, such as Sydney Harbour's, as an immense and highly visible stage for enacting mass spectacles, is merely the other side of an equation that sees bridges as targets – whether in wars, guerrilla actions or in an era of terrorist threat.

Behind the populist appeals of spectacular firework displays lies corporate–national–civic power and aspiration. From Sydney Harbour to Hong Kong's Tsing Ma, bridges are not just being integrated into the branding of cities and nations, also they are often the *key* branding icon used on everything from postage stamps to nationalistic tourist advertisements. The third phase of the modern bridge, the postmodern bridge, could be said to start after the conclusion of the Second World War. Its genesis can be traced not only to the advent of new materials, new techniques of computation, construction and manufacture, but also to a totally new milieu of globalization and promotionality.

Bridges also have long functioned as quasi-billboards. Winter driving in England down the M1 reveals desperate signs on grim concrete overpass bridges, barely legible through a windscreen covered with grey drizzle and the muck-saturated spray of passing trucks: 'Give me inspiration', or the more ubiquitous 'Jesus Saves'.

Invisible bridges

The countless numbers of small, unprepossessing, mundane bridges that are essential to the communication and transportation networks around the globe – the structurally small but socially significant links so crucial to numberless communities – are often ignored. Glossy photo-illustrated books with titles such as *Bridges that Changed the World* or *Bridges: Three Thousand Years of Defying*

Nature or Bridges: A History of the World's Most Famous and Important Spans, while visually exciting, pay scant attention – like haute couture in fashion or haute cuisine in food – to the small details of everyday life and its engagement with bridges both large and small.⁶²

Bridges have been silently incorporated into the transportation systems of modernity and postmodernity, from vast, complex and often bewildering motorway interchanges (each of which literally devour dozens of bridges whilst simultaneously rendering them invisible) to small individual rail and highway bridges, foot-bridges, as well as bridges that are invisible in their bridge-ness – viaducts, culverts, underpasses.

Complex, multilevel interchanges have been around since 1858, when Olmsted built an overpass to separate intersecting traffic in New York's Central Park. The first cloverleaf interchange was built near Woodbridge, New Jersey in 1928. The imperative behind the



Bridges over an autobahn, late 1930s.

design and construction of modern freeways from the 1920s onwards – such as the 1924 Du Pont Highway in Delaware, the first limited access road in the USA, or the revolutionary German autobahn – was the demand for free-flowing, uninterrupted traffic movement. The fantasy of speed and flow which came to dominate road design also captured the bridge, which became subservient to the road.

The entrances and exits to bridges were traditionally places to pause and where buildings gathered. Now, unless they are quickly forced to stop at a toll booth, it is illegal for drivers to pause at such places. Many large bridges scarcely have any provision for pedestrians. Roebling's insistence on a separate walkway for pedestrians across Brooklyn Bridge in 1883, on which they could pause and breathe the clean air, almost marked the end of an era.



An autobahn with service station and bridge, late 1930s.



On the Promenade, Brooklyn Bridge, New York,
Copyright 1899 by Streibner & Ryan.

The bridge as accident

Lev Zetlin philosophically commented, 'I look at everything and try to imagine disaster'.⁶³ As Paul Virilio has suggested, every technological advance is simultaneously the invention of a new form of accident. The railway accident is integral to the invention of railways, automobile accidents to the invention of the automobile, and so on. A whole culture of disaster clusters around, weaves its way through, any technological 'advance'. Certainly the bridge accident is not entirely new, but in the industrial age such events assumed new, often catastrophic dimensions. The collapse of the Dee Bridge in Scotland in 1847 was the one of the first such disasters of a large metal railway bridge, but the Tay Bridge collapse of 1879 – when a whole section of the bridge, along with a complete train full of passengers, disappeared one stormy Scottish night – came to haunt the construction of long-span railway bridges in the immediate aftermath. Extra strengthening and over-design became the standard practice, admittedly sometimes producing masterpieces such as the Forth Bridge or Roebling's suspension

On the promenade, Brooklyn Bridge, c. 1899.

bridge at Niagara Falls. From the disaster of Quebec Bridge in 1907 to the well-filmed spectacular and tortured demise of the Tacoma Narrows suspension bridge in 1940 in the USA, the collapse of a bridge is a major and very specific event. So frequent were the collapse of major bridges in the early years of the nineteenth century that it became the focus of a well-recognized phobia.

With the invention of the modern bridge has also come the development of new kinds of danger, risk and accident. The bridge, while so much an image of hope and possibility, therefore also takes its place within the changing landscape of a modern risk society.

There is a tendency to focus on the spectacular in all aspects of bridges – whether immense spans, dramatic locations, audacious designs or calamitous disasters. But, as with most troubles associated with specific technologies, the majority of those associated with bridges are small, albeit no less significant or potentially less dangerous. Bridge closures, collapses and failures of one sort or another are a regular feature of the global bridge-scape. Unlike any other structure, bridges by their very nature are prone to some kind of ‘collapse’. In 1995 the US Department of Transportation warned, ‘The continued economic strength and growth of the United States is intimately linked to the strength and reliability of our highways and bridges. The American public is experiencing the effects of an aging and deteriorating highway system . . . [D]eteriorating bridges are becoming more severe choke points in the system.’⁶⁴ The message is clear: corrosion, fatigue and lack of maintenance and inspection result at best in non-functioning bridges, and at worst in collapse, death and injury. In 1992 the cost of repairing the backlog of bridge deficiencies in the US was estimated to be almost \$80 billion. The bill simply to maintain the condition of the bridges was estimated at over \$8 billion. Current funding fell considerably short of this amount. According to one 1980s report, ‘every other

day, a bridge falls, sags or buckles somewhere in the US.⁶⁵ It points out that two out of five of the 524,966 bridges in the USA needed major repairs or replacements. The effort and cost involved in the maintenance of bridges can be astronomical.

As well as structural malfunctions, bridge disasters also encompass social calamities: deaths in crushing, panicking crowds such as at the opening of Brooklyn Bridge; financial scams; and cost blowouts.

Vectorial politics and technologies of power

Bridges have long and widely been used as technologies of power within political, social and cultural landscapes. The contemporary bridge construction programme being undertaken by the Beijing government, in its mission to accelerate the incorporation, occu-



George Westinghouse Bridge, Spanning Turtle Creek at Lincoln Highway (US Route 30), East Pittsburgh, Pennsylvania, c. 1968.

pation, domination and control of Tibet, has its precedent 250 years ago when the governments of England and lowland Scotland put extensive bridge construction in the vanguard of their intent similarly to control the Scottish Highlands, its culture and its people, at best to harness its productive potential, or at worst to neutralize them as a threat. Shifting paradigms of power circulate through and around bridges.

Two key vectors created within a bridge – across the span (horizontality) and up-down (verticality) – are in constant tension, even contradiction. When involved in a politics of horizontality and of extension bridges are key technologies for vast transportation and communication systems. With the bridge as border it becomes a technology of separation as well as one, normally emphasized, of connection. As border technology the bridge controls flow and access, separates out the mobility-rich and mobility-poor.

While this border function usually occurs across a horizontal boundary, it can be vertical, in what Eyal Weizman has called a politics of verticality, the use of bridges physically and symbolically not only to assert power and status, but to inscribe them in space and place.⁶⁶ Eugene Levy has succinctly discussed the way in which two bridges in Pittsburgh illustrate this purpose.⁶⁷ George Westinghouse Bridge is a high bridge, physically, culturally, socially, and symbolically, while Wall Bridge is a similarly low one. The monumental, concrete spans of Westinghouse Bridge dominate the landscape. Wall Bridge, however, covered in graffiti, is a downbeat steel structure. Both were built in the early twentieth century. The high bridge was named after the man who built the famous factory in the 1890s that employed thousands in its best years. A huge steel mill was located next door. In the 1920s travellers on the main US Highway 30 had to drive down into a steep-sided valley through the noisy, crowded and polluted indus-



trial zone. In 1931 the high bridge was built, 460 metres across and 60 metres high, over the Turtle Creek Valley. With bold bass-reliefs inscribed at each end celebrating an idealized techno-triumph-antism, it dominated the town and effectively created a vertical separation in terms of social class. Travellers could pause and scan the town from above, thereby avoiding the industrial atmosphere and working-class people of the valley. By contrast, Wall Bridge, down in the valley, is gritty and small. It gives an eye-level view

George Westinghouse Bridge, East Pittsburgh.



of industrial landscape. Once extensively used by workers going to and from the factories, the graffiti which covers it was once sentimental. Now, in an era of factory closure and unemployment it is mainly confrontational.

There is always a power equation associated with bridges. This can be manifested merely through the name, as was the case with the Verrazano Narrows Bridge.⁶⁸ In 1524 Verrazano, sailing on orders from Francis I, King of France, became the first European to encounter what is now New York harbour. He was an overlooked explorer, due the prominence given to Henry Hudson (and eventual British colonization of the region). Anti-Italian prejudice was blamed for not naming the bridge after him; others said his name was simply too long. Even after opening in 1964 the bridge was often just called ‘the Narrows Bridge’, or the Brooklyn/Staten

Verrazano-Narrows Bridge from Brooklyn, opened 1964.

Island Bridge. The Italian Historical Society worked hard to ensure its proper name is now commonly used. Here was a tale of multiculturalism and the struggles between the historical narratives of rival colonizing powers. The underdog, 'ethnic' connection to the bridge was mobilized in the classic 1977 film *Saturday Night Fever*, which opens with a beautiful shot of the Brooklyn Bridge as seen from the Brooklyn side, which looks dreary by comparison. Tony, the young working-class Italian-American protagonist, is uncomfortable with the glamorous Manhattan over the bridge. Brooklyn Bridge is portrayed as a no-go zone that separates social and ethnic groups. Tony and his gang feel more comfortable with Verrazano Narrows Bridge connecting Brooklyn to Staten Island and that is the one they use. The two bridges are referred to constantly, both visually and in dialogue, as symbols of dreams, hopes, memories and anxieties.

Bridge as crossing

In the context of pilgrimage the Sanskrit word *Tirtha* means a crossing, both geographical and symbolically. It indicates both a physical movement across an obstacle such as a river and a spiritual-psychological movement between two different orders of reality and experience.⁶⁹ A bridge always creates a crossing, indeed is a technology of crossing. For Sonny Rollins the bridge allowed a crossing from one problematic emotional/creative situation to another far more satisfying one. Bridges are sites where disparate tracks cross – transportation, communication, cultural and social, environmental and aesthetic.

Bridges mark a different time scale and rhythm to individual human life. With their longevity and the unique sense of almost sacredness with which they are often associated, they can impart

an intimation of immortality – like great cathedrals, temples and mosques. The bridge as a whole is a liminal space, a transition, a border, a place in-between.⁷⁰ Mythologically this in-between-ness was expressed as something numinous and paradoxical: the rainbow bridge of the gods, *Bifrost*, and the golden-paved bridge, *Gjallarbru*, in Nordic mythology; the Chinvat bridge in Iranian mythology over which the dead must pass – nine lengths wide for the good and just, but as narrow as the blade of a razor for the wicked. Along with hope comes hopelessness.

The bridge was imagined to define a place between life and death, the sacred and the profane, the worlds of gods and of humans. For some this in-between-ness is a kind of limbo, a nowhere place. In Iain Banks's disturbingly surreal modern novel, *The Bridge*, the protagonist enters a coma after a near-fatal accident but then finds himself in a strange, nightmarish landscape, a world constituted almost entirely by a bridge that stretches beyond both horizons.⁷¹ Time and space are suspended, along with normal laws. People inhabit the bridge and live out their lives without leaving it. Indeed, there seems to be no way off the bridge.

The 1970 best-selling song by Simon and Garfunkel, 'Bridge Over Troubled Water', resonated against a rich landscape of metaphor and symbol. Bridges are structures for the performance of connection and gathering, hope and reconciliation, as well as of division, separation and antagonism. Recent mass walks over the Sydney Harbour Bridge and over those in every capital city, calling for social justice and reconciliation between indigenous and non-indigenous Australians, must be placed alongside the deliberate targeting of bridges elsewhere either for symbolic destruction or blockade. Numerous so-called 'Friendship bridges' around the world signal optimism and perhaps desperate hope. The changing contexts of such crossings and divisions, whether military, economic or social, need to be explored.

These include the shifting meaning and purpose of 'taking to the streets' and occupying bridges. Mass demonstrations on contemporary highways have new meaning in our era of online global flows and mass air transportation.

The sense of paradoxical crossing is crucial. In the religious-philosophizing of Thornton Wilder's classic novel of the 1930s, *The Bridge of San Luis Rey*, the collapse of a bridge in Peru and the resulting death of five people becomes the focus of a priest's inquiry into the dilemma between random chance and a cosmic order based upon the judgement of God.⁷² The choice is boldly defined. Attempts are made to exclude paradox from the equation. On the other hand, Hölderlin, in his 1802 poem, 'Patmos', tries to embrace it:⁷³

Near is
The God and hard to grasp,
But where there is danger,
The saving powers go too.
In darkness dwell
The eagles, and fearless across
The abyss go the sons of the Alps
On lightly built bridges.

In *Thus Spoke Zarathustra* (1883) Nietzsche imagined humanity as a rope, stretched between the beast and the superman – and spanning an abyss. It was a perilous crossing and it was dangerous to look back; any hesitation was disastrous and treacherous. Humanity is great because a human being is a bridge and not a goal, fit to be loved only when in transition and a failure.⁷⁴

Bridges, along with tunnels and ferries, constitute the core technologies of crossings and their associated activities: bridging; tunnelling; ferrying. Each has their specific field of associations

and symbology. While awesome and uncanny, tunnels lack the affection given to ferries and bridges. They also lack their spiritual associations. Even bridges can want for the nostalgic associations so often given to ferries. Bridges cross *over*; tunnels cross *under*; ferries go *across*. The symbolic strength and physical quality of what is being crossed by the bridge is also crucial: The Rhine; Victoria Falls; Niagara Falls; Sydney Harbour; the Mississippi; the Seine; the Thames; the Ganges.

Time and again, in the examples that are elaborated in the following chapters, it will be seen how a bridge condenses and displaces, almost as if in a Freudian dream process, complex and often contradictory narratives. For example, in the Victorian British



Brooklyn Bridge, New York, from the Manhattan Bridge.

painting *Past and Present, Number 3* (1858), Augustus Egg portrays a highly moralistic and melodramatic view of the terrible consequences of a wife's infidelity. The distraught 'guilty' woman, exiled from her home, is shown taking shelter under a bridge near the Strand in London. The underside of the bridge is mobilized, with all its complex connotations and associations. The painting condenses the realities and the fantasies about the Victorian city, ideas about gender, morality, power, of melodramatic moralizing and genuine social concern. The powerless plight of women under Victorian patriarchy is displaced into the underside of the bridge, which becomes a site of punishment and refuge, perhaps a site also of remorseful reverie. At the same time, a complex, difficult critique is aestheticized and thereby in some ways deflected, displaced or even nullified.

The smart bridge

Gone are the days when I worked on bridge design with a slide-rule, hand-operated mechanical calculator and bulky volumes of ten-figure logarithms. But the digital era has not just radically changed design, manufacture, logistics and project management, it has also been responsible for a revolution in the telling, promotion and selling of the bridge.

Extraordinary resources now exist online for anyone interested in anything about bridges, from engineering-oriented sites, both professional and corporate, to highly specific bridge blogs by fans, from educational sites to localized bridge heritage sites, from databases for posters, paintings and photos. This comparatively recent digitalizing of the telling, the way it has spawned a diversity of narrative genres around an immense compilation of bridge material and has made all this readily and quickly available, marks a dramatic moment in the story of the bridge.⁷⁵

The extensive use of digitalization by creative advertising, especially around tourism and national or city branding, has profoundly extended the practice of 'selling' the bridge. As will be seen, the practice itself is certainly not new. In the USA, as early as the mid-nineteenth century, photographs of bridges on the new railways spreading westward were deliberately used to promote the railway line, the landscape, tourism and development of the 'frontier'.⁷⁶ But not only have crucial shifts occurred because of digital technology, such images of bridges are now embedded in a hyper-promotional culture, one in which boundaries of previously distinct genres are blurred and hybrid genres have emerged: infomercials, advergames, advertorials, infotainment. Under such a regime the bridge is both a commodity and a brand.

This shift between two orders of technology and their associated cultures, the one based on industrial construction that originated in the nineteenth century and the other based on digitalization, micro-electronics and virtual reality, is darkly explored in William Gibson's trilogy of cyber-punk novels set in the near future.⁷⁷ After a major earthquake damages the San Francisco-Oakland Bay Bridge, it is abandoned. Its transportation function is then superseded by a tunnel built using nanotechnology. A range of dispossessed people have illegally taken over the bridge. They are alienated or just excluded from the mainstream culture where inequalities of power and wealth have reached grotesque proportions and where fear and decadence run side by side. A vast squatter community, a shanty town full of vitality, emerges. A full range of technologies, both modern and postmodern, are used by the bridge community but in ways that are ad hoc and grassroot. This compares with the power- and wealth-driven use of advanced technology within corporations and organized crime. The massive decommissioned bridge is revealed as a complex and multifaceted

series of places. It occupies an ambivalent position in the social structure. It is a site of fascination, one that is only just tolerated but also feared and even admired.

Approaching the bridge

What follows in this book are a series of in-depth examples that significantly develop the ideas sketched out in this introduction and thickly contextualize them. I have tried to avoid only focusing on the 'big' and the 'famous' bridges in these studies and instead have gone into detail about perhaps lesser known but no less significant examples. These include the ignored, or even invisible, bridges – often marginalized because they are deemed to be structurally mundane, or because their position lies outside the global spheres and networks dominated by a few wealthy and media-rich countries. The more famous bridges and contexts still receive their due attention. The hyper-contextualization or 'thick description' used in the case studies allows local, often marginalized, voices to speak, allows the complex and paradoxical nature of a bridge as a lived experience and as a site of contested imaginings to be explored.⁷⁸ Often the complexity of issues that entangle a bridge – whether its location, design, meanings, subsequent use, environmental or social impact, or artistic representation – cannot be understood without a careful elaboration of history and wider context. By triangulating out from these examples each chapter then fixes locations within a mapping of the bridge as 'a technology': of connection and separation; of the border; of reconciliation and estrangement; of mobility and immobility; of horizontality and verticality; of extension; of crossing; of nation- and city-building.

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