Changing Landscapes of Time and Space: the Bristol Channel Region c.1790-1914

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Submitted to Swansea University in fulfilment of the requirements for the Degree of Doctor of Philosophy

Swansea University

2021

Abstract

The thesis considers how perceptions of time and space changed during this period in the Bristol Channel region as new forms of transport and communications stimulated an unprecedented movement of people, freight and messaging at speeds which appeared to compress space, bringing the outside world closer. Newspapers are used as the principal primary source, and, as expressions of locality, they provide an insight into the diverse mental landscapes concerning speed and space that were emerging across the region. The region was on the margins of Great Britain prior to these changes, but new transport and communications networks brought the region into the mainstream.

New forms of transport and communications tended to favour urban areas and the experience of rapid movement was uneven across the region. The revolution in individual travel and passenger transport was populated principally by men, with the exceptions of the railway excursion and the urban tram, which expanded the horizons of leisure for working classes, but the level of railway fares excluded many potential working-class travellers. Perceptions of time and space, therefore, did not only vary between locations across the region, but also between men and women and social classes as they experienced travel differently.

The railway and telegraph, Britain's 'nervous system', connected the region with markets throughout the British Isles and globally. Steamships forged 'ocean highways' and telegraph cables bounded the planet, creating an international communications system that also standardized 'railway' time everywhere. As the outside world became more accessible, nearer and more connected, new forms of landscapes regarding place, identity and 'others' were defined as a measure of human progress. These changes helped define what is meant by 'modern'; but they originated in industrial change from the 1790s which was made possible by new technologies in transport and communications.

Declaration and Statements

Declaration

This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

Signed [redacted] ate 15 December 2021

Statement 1

This thesis is the result of my own investigations, except where otherwise stated.
Other sources are acknowledged by footnotes giving explicit references. A bibliography is appended.

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Statement 2

I hereby give consent for my thesis, if accepted, to be available for photocopying and for inter-library loan, and for the title and summary to be made available to outside organisations.

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Acknowledgements

I would like to thank my supervisors, Professor Louise Miskell and Professor Martin Johnes, for their invaluable guidance in shaping this thesis. Their advice improved the structure of the chapters, in particular, and I am grateful for the time and effort Professor Miskell spent in commenting in detail on the drafts of the chapters. I would also like to thank staff at Swansea University Library, Gloucester Archives and The National Archives for providing access to library and archive services during the pandemic at some risk to themselves. It would not have been possible to complete the thesis without their support. Finally, I would like to thank Pamela for her steadfast support and encouragement throughout this process and for her questions and suggestions which made me reflect on different aspects of the thesis. The thesis was improved as a result.

Abbreviations

C&GWR	Cheltenham and Great Western Union Railway
CTC	The Cyclists Touring Club
GA	Gloucester Archives
GWR	Great Western Railway
LBR	London and Birmingham Railway
NCU	National Cyclists' Union
SWR	South Wales Railway
SITC	Swansea Improvements and Tramway Company
TNA	The National Archives
TVR	Taff Vale Railway

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Chapter 1 Introduction

> it is wonderful by the divine spark of heaven, the attribute of reason, how he has subjected the whole creation to himself. The animal, the vegetable, and the mineral kingdoms are made subservient to his use. The elements themselves are, in some degree, under his control.[1]

Writing in 1833 in extolling the virtues of steam technology, John Britton, antiquarian and topographer, was expressing a sense that human ingenuity had revolutionized the relationship with the natural world and in important ways brought that world under human control. A central feature of this revolution was an apparent ability to manipulate time and space in the interests of human progress and if time and space could be made subject to human agency, then it became possible that there may be no limits to human achievement. 'The mind of man is illimitable' as the American diplomat, Elihu Burrett, put it in 1846.[2] Rhetoric around the 'conquest' of space derived from unprecedented advances in transport and communications in a relatively short space of time between approximately 1780 with the construction of canal and tramroad networks and the advent of mass urban transport and the steamship's domination of world trade from the 1880s. Anthony Burton has described canal building in the late eighteenth century as a 'pause between an older Britain and a new' and this 'pause' was extended across a raft of changes and innovations in mobility that marked the transformation from one society to another.[3]

Rapid movement became a part of everyday life but also spanned great distances on a global scale. Distance became measured in terms of time and the shorter the time that was travelled, the nearer seemed the destination. Space was compressed through the speed of travel, transport and communications. P. J. Corfield has expressed this sense of compression created by speed.

> The physical universe cannot be squashed. Yet we can, with technological aids, greatly speed human movement and, above all, the sending of messages around our own local planet, making the distances immensely faster to bridge, so that the effect seems like compressing space.[4]

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[1] John Britton, *On the road-ways of England, pointing out the peculiarly advantageous situation of Bristol for the commerce of the west: with remarks on the benefits likely to arise from a rail-road between that port and London* (Bristol: Gutch and Martin, 1833), p. 6.
[2] Letter from Elihu Burrett published in the *Monmouthshire Merlin*, 29 August, 1846.
[3] Anthony Burton, *The Canal Builders*, 2nd edn (London: Eyre Methuen, 1972), p. 4.
[4] P. J. Corfield, *Time and Shape of History* (New Haven and London: Yale University Press, 2007), p. 8.

Wolfgang Schivelbusch in *The Railway Journey* outlined how this compression of space was achieved through speed. The annihilation of 'the traditional space-time continuum which characterised the old transport technology... What Bergson called the *durée* (duration, the time spent getting from one place to another on a road) is not an objective mathematical unit, but a subjective perception of space-time.'[5] However, the 'annihilation' of distance through speed was not as straightforward as nineteenth-century rhetoric implied. As Anne Guerts and R. W. Musson have shown, speed could expand and compress a sense of distance and there were invariably differences between cognitive and actual geographical distances; places could be 'nearer' or 'farther' than they actually were.[6] Comfort or discomfort in travel could also contract or expand the sense of time and therefore of distance. The diminishing of distance was not solely dependent upon speed. The increased capacity of canal boats, compared to road transport, appeared to make destinations more accessible and therefore closer. An important aspect of the early impact of steam railway was its combination of speed and volume which was unprecedented. Urban electric trams in the early twentieth century were not much faster than carts but the saving of energy compared to walking and the frequency of trams compressed urban space.

This thesis considers how the experience and perceptions of time and space changed during this period under the impact of a revolution in transport and communications which can be traced from the 1780s using the Bristol Channel region as the study area. These new perceptions or 'landscapes' marked a break with the past as distance was challenged, the world around came closer. Science and technology were seen as instrumental in a new-found ability to dominate the natural world. In the rhetoric of élites, these changes were described as 'progress' which was a one-dimensional view of change that failed to embrace the diversity of change. Changes in the perceptions and experiences of time and space were not uniform. The revolution in transport and communications represented by canals, tramroads, steam railways and the electric telegraph tended to favour urban 'middling classes' while urban and rural working classes were relatively disadvantaged. The electric tram did open new horizons in everyday mobility for urban working classes which were

[5] Wolfgang Schivelbusch, *The Railway Journey: The Industrialization of Time and Space in the Nineteenth Century* (Leamington Spa: Berg, 1986), p. 36.
[6] Anne H. P. Guerts, 'Trains, bodies, landscapes. Experiencing distance in the long nineteenth century', *The Journal of Transport History*, 40.2 (2019), 165-188; R. M. W. Musson, *The Perception of Geographical Distance and the Philosophy of Space* (unpublished doctoral thesis, University of Edinburgh, 1979).

denied to many rural communities lacking the tram or a railway connection to urban services and facilities.

In the 'guiding spirit' of the thesis, there are two distinct but connected aspects to the enquiry – challenge and opportunity.[7] Space, or geography, presented a series of challenges relating to the need to improve transport and communications as one of the foundations for successful industrial and commercial enterprises in local, regional, national and global environments. Geography, on the other hand, also presented opportunities for these enterprises, as outlined in Lucien Febvre's and Lionel Bataillon's hypothesis on the close relationship between geography and history. The hypothesis argues for a close interaction between the physical environment and society. This is not a determinist hypothesis but one which allows for human agency in shaping society allowing for environmental impact. As Febvre put it,

> There are no necessities, but everywhere possibilities; and man, as the master of possibilities, is the judge of their use. This, by the reversal which it involves, puts man in the first place – man, and no longer the earth, nor the influence of climate, nor the determinant conditions of localities.'.[8]

In 1971, ahead of Febvre and Bataillon, the British geographers L. Dudley Stamp and Stanley H. Beaver had adopted similar principles in their analysis of the geography of the British Isles and its relationship with economic opportunity. They described the purpose of their book to

> examine the natural environment afforded by the British Isles for their human inhabitants; to examine the advantages and disadvantages of that environment; to analyse the natural resources of value to man which are proper to the islands; to see the use which the inhabitants have made of those resources…[9]

The framework for the primary aspect of this thesis is to examine how perceptions, and the everyday experience, of time and space altered in response to the challenges presented by the natural environment. Increasing mobility and the

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[7] Marc Bloch, *The Historian's Craft*, trans. by Peter Putnam (Manchester: Manchester University Press, 1992), p. 54.
[8] Lucien Febvre in collaboration with Lionel Bataillon, *A Geographical Introduction to History*, trans. by E. G. Mountford and J. H. Paxton (Westport: Greenwood Press, 1974), p. 236; *A New Kind of History: from the Writings of Lucien Febvre*, trans. by K. Folca, ed. by Peter Burke (London: Routledge and Kegan Paul, 1973).
[9] L. Dudley Stamp, and Stanley H. Beaver, *The British Isles: A Geographic and Economic Survey* (London: Longman, 1971), p. 1.

connection between time and space played important roles in the changing perceptions of distance. R. M. W. Musson had shown some of the ways in which distance is imagined.[10] These changes signalled something distinct and new in the human past, as a break in how people viewed and acted in the world and can reasonably be categorized as 'modern'. These perceptions are described as 'landscapes'. The concept of 'landscape' has been used by a number of historians as a way of describing perceptions or ways of seeing.[11] Alan Baker has defined it as 'the form, to the structure, to the appearance, to the visible manifestation of the relationship between people and the space/land they occupy, their "milieu" (both human and physical) ...'[12] This thesis has been influenced by histories that have placed perceptions at the centre of their enquiries.[13] R. G. Collingwood considered history to be essentially the history of ideas, the purpose being to find out what people thought.[14] In 1985, Jacques Le Goff proposed 'a new kind of history, the history of the imagination.'[15] For Le Goff, imagination 'nourishes man and causes him to act... A history without the imagination is a mutilated, disembodied history'.[16] Le Goff defined the imagining of the outside world as 'representation', which he placed on an equal footing with economic and social history, but 'landscape' is more commonly used.[17]

Burton's description of canal-building as a 'pause' between the old and the new provides an important framework for the thesis. Peter Laslett has explored this 'lost' world.[18] The changes discussed in the thesis mark a movement from one form of society to another, of which changes in the experience and perception of time and

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[10] R. M. W. Musson, 'The Perception of Geographical Distance and the Philosophy of Space' (unpublished doctoral thesis, University of Edinburgh, 1979).
[11] Wendy Joy Darby, *Landscape and Identity: Geographies of Nation and Class in England* (Oxford: Berg, 2000); Simon Schama, *Landscape and Memory* (London: HarperCollins, 2004); D. B. Smith, 'The Valleys: Landscape and Mindscape', in *Glamorgan County History* , vol. 6, *Glamorgan Society 1780-1980*, ed. by Prys Morgan (Cardiff: University of Wales Press, 1988), pp. 130-150; Susanne Seymour, 'Historical geographies of the landscape', in *Modern Historical Geographies*, ed. by Brian Graham and Catherine Nash (Harlow: Pearson, 2000), pp. 193-217, (p.195).
[12] Alan R. Baker, *Geography and History: Bridging the Divide* (Cambridge; New York: Cambridge University Press, 2003), p. 78.
[13] Norman Cohn, *The Pursuit of the Millennium: Revolutionary Millenarians and Mystical Anarchists of the Middle Ages* (London: Paladin, 1984); Jacques Le Goff, *The Birth of Purgatory*, trans. by Arthur Goldhammer (London: Scolar Press, 1984).
[14] R. G. Collingwood, *The Idea of History* (Oxford: Oxford University Press, 1994), p. 217.
[15] Jacques Le Goff, *The Medieval Imagination*, trans. by Arthur Goldhammer (Chicago: University of Chicago Press, 1992), p. 5.
[16] Le Goff, *Medieval Imagination*, p. 5.
[17] *The Medieval World*, ed. by Jacques Le Goff, trans. by Lydia G. Cochrane (London: Parkgate Books, 1992), p. 9.
[18] Peter Laslett, *The World We Have Lost – further explored*, 3rd edn (London: Methuen, 1983).

space are one important aspect. Robert Heilbroner has divided historical time into the 'Distant Past', 'Yesterday', 'Today' and 'Tomorrow' and this framework for time informs this thesis.[19] According to Heilbroner, 'the scaffolding of social life' was essentially unchanged for thousands of years in Europe until a revolutionary change occurred in a relatively short space of time which marked the end of the 'Distant Past' and the beginning of 'Yesterday' around 1750.[20] 'Yesterday' was characterised by

> a degree of dynamism for which no parallel exists earlier, but it also endorses and explains this dynamic tendency in a two-syllable word for which there is no equivalent nether in primitive nor stratified society ... "progress", a term with many specific meanings, but one overarching signification: that the present is in some fashion superior to the past and, by extension, the future will be superior to the present.[21]

Optimism about the present and future principally stemmed from the apparent ability to control the natural world in the interests of the production and exchange of commodities. 'Yesterday' joined together 'belief that science could reveal the secrets of nature; the organizing power of capitalist production and exchange; the will of the people. The future would be characterized by power over nature, improved material well-being, political responsibility for its fate'.[22] A significant element in the rhetoric of 'Yesterday' was a belief that both time and space were also subject to human agency which is the subject of this thesis.

In the wake of a belief that science in the form of practical technologies could transform the world, human agency adopted an aggressive stance towards the natural world which was one of the characteristics which marked the movement from one society to another. In the 'distant past', relationships with the natural world tended towards harmony. The power of the natural world was respected as well as feared. Keith Thomas has shown that attitudes towards animals were changing by the eighteenth century and moving towards a greater understanding of and empathy with the needs of animals as living creatures.[23] This change was reflected in the concern shown during the nineteenth century for the well-being of horses and the allegations

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[19] Robert Heilbroner, *Visions of the Future: The Distant Past, Yesterday, Today and Tomorrow* (Oxford: Oxford University Press, 1995).
[20] Heilbroner, *Visions*, p. 42.
[21] Heilbroner, *Visions*, p. 43.
[22] Heilbroner, *Visions*, p. 93.
[23] Keith Thomas, *Man and the Natural World: Changing Attitudes in England 1500-1800* (Harmondsworth: Penguin, 1984).

of cruelty that were often made by passengers towards omnibus and horse tramway companies. By contrast, attitudes towards the inanimate world were increasingly aggressive, which included agriculture.[24] Nature was something to be dominated in the interests of manufacturing industries, trade and the capitalization of agriculture. John Phillips, referring in 1803 to the canal system in Monmouthshire, demonstrated this new landscape of dominion.

> The bowels of the earth are here loaded with minerals – hitherto unsought for, and little known, except for want of such a conveyance to market. This is now obtained, old mines will be explored, new ones discovered, and mother Earth ransacked for her hidden treasures. Nor will the forests on her surface longer remain neglected; all will yield to the converting hand of industry.[25]

While this notion of progress is a thread that runs through this thesis, in delineating the immediate past or 'Yesterday', David Lowenthal has made the useful distinction between before and after 1840 where 'they do things differently'.[26] Lowenthal argued that 'the widening franchise, the railways, steamships, telegraph and trams made the two generations after 1840 as dramatically disorientating as the two generations before.'[27] This division is broadly followed in this thesis where it is argued that the 1780s and the 1840s represented breaks with the past but where some common themes were shared across the break in the 1840s. One of themes was 'progress' while the other, which contributed to the notion of progress, were the attempts to mitigate the negative effects of distance on economic and social life. While the 1840s and the 1780s were linked in this respect, the 1840s represented a major change in how distance was imagined and challenged, with consequences for how time was perceived and measured.

'Landscapes' and 'ways of seeing'

The concept of 'landscape' is used as a unifying link between the various aspects of the research. Landscape describes how the human imagination perceives the outside

[24] J. L. Hammond and Barbara Hammond, *The Village Labourer* (Stroud: Nonsuch, 2005); *The Victorian Countryside*, 2 vols, ed. by G. E. Mingay (London: Routledge and Kegan Paul, 1981).
[25] John Phillips, *The General History of Inland Navigation, foreign and domestic*, 4th ed (London: J. Taylor, 1803), pp. 276-277.
[26] David Lowenthal, *The Past is a Foreign Country* (Cambridge: Cambridge University Press, 1993).
[27] Lowenthal, *Foreign Country*, p. 97.

world as a way of seeing and there are many ways of seeing, many landscapes.[28] 'Atlantic history', for example, has been prominent in exploring the diverse perspectives or landscapes of this ocean which are sometimes described as 'worlds' as a way of demonstrating separate and distinctive characteristics.[29] These 'ways of seeing' or 'landscapes' changed substantially over this period; 'modern' perceptions of time and space can be traced to this period of change and are a comparatively neglected aspect in the historiography of this period.

The natural world has presented challenges to human societies throughout the recorded and pre-historic past. Societies across the globe responded to these challenges in their different ways in agriculture, industry, transport, coastal and oceanic navigation and international trade. Despite these considerable achievements, the 1780s in the British Isles including the Bristol Channel region witnessed a major shift in human ingenuity in addressing challenge. The exploitation of mineral resources in the region was made possible by a conjunction of two new and distinct transport technologies, the canal and the tramroad, which built upon older technologies with movement powered largely by horses. This was followed by a further transport revolution approximately fifty years later, powered by steam in the form of railways and steamships which achieved unprecedented speeds in transport and travel on land and at sea. The 'steam revolution', representing the second break with the past, was accompanied by the development of the electric telegraph, railway's twin, as a revolution in communications and the measurement of time. The telegraph was imagined at the time as "Ariel's girdle" instantaneously encompassing the planet following the laying of the Atlantic telegraph cable.[30] The radical changes in the speeds of transport and communications also enabled an unprecedented movement of people, as well as of freight and raw materials.[31] Steam-powered

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[28] John Urry, *The Tourist Gaze: Leisure and Travel in Contemporary Societies* (London: Sage, 1990); Michael Benbough-Jackson, 'Ceredigion and the changing visitor gaze, c.1760-2000', *Ceredigion,* 14 (2003), 21-41; *Implicit Understanding: Observing, Reporting and Reflecting on the Encounters between Europeans and Other Peoples in the Early Modern Era,* ed. by Stuart Schwartz (Cambridge: Cambridge University Press, 1994); Peter Berger and Thomas Luckman, *The Social Construction of Reality: a treatise in the sociology of knowledge,* new edn (Harmondsworth: Penguin, 1991).

[29] *The British Atlantic World, 1500-1800,* ed. by David Armitage and Michael J. Braddick (Basingstoke: Palgrave Macmillan, 2002); Alison Games *Migration and the Origins of the English Atlantic World* (Cambridge, Mass., London, England: Harvard University Press, 1999); Paul Gilroy, *The Black Atlantic: Modernity and Double Consciousness* (London: Verso, 1993).

[30] *Brecon Reporter*. 15 September 1866.

[31] *Atlas of Industrializing Britain,* ed. by John Langton and R. J. Morris (London: Methuen, 1986); *The Cambridge Economic History of Modern Britain,* vol. 1, *Industrialisation, 1700-1860,* ed. by Roderick Floud and Paul Johnson, 2nd edn (Cambridge: Cambridge University Press, 2004).

mechanical mobility was directly experienced by millions of people by the 1850s and this was followed by a third revolution, in urban mobility, with the advent of the horse and electric tram from the 1880s which engaged all classes in mass movement. By 1900, railways carried in excess of one billion passengers with trams carrying twice that number in urban areas. Movement was powered by horses, steam and electricity, as well as walking.

This mass movement of people affected how 'others' were perceived within the British Isles. The notion of 'shared community' was reinforced by the speed by which newspapers were distributed nationally by the railway and the 'instant news' transmitted by the telegraph – readers throughout the British Isles shared similar information systems and at similar times.[32] Provincial newspapers may have strengthened a sense of a shared identity at the local and regional levels, but the connection between the railway and the newspaper was of key importance in the emergence of shared identity across mainland Britain. Provincial newspapers were 'the canal of information which irrigates the country ... it is the great system of arteries which, circulating through the body politic, carries nourishment to and receives strength from the heart which is in London...'[33] Railways became 'the great connector ... making one England out of many.'[34]

Changing identities at home were reflected in the developing identities of the nation in respect of other nations. Increased speeds at sea, expanding trade and international telegraphic communications brought the outside world closer. Emigration to Canada and Australia, in particular, was promoted in the interests of a 'Greater Britain' and the opening up of world travel and migration altered perceptions of the outside world. Identities changed to accommodate a new international dimension of 'others' in which kinship was a defining characteristic.[35] Kinship deconstructed distance and placed Canada 'nearer' than France. There was a perceived link between those nations who had apparently conquered time and space and who had been drawn closer together through telegraphic communications and

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[32] Benedict Anderson, *Imagined Communities: Reflections on the Origin and Spread of Nationalism* (London: Verso, 2006).
[33] *History of British Journalism*, in *The Newspaper press of the present day: its birth and growth throughout the United Kingdom and British islands* ... (Newcastle: Cowen Tracts, 1860) cited on p. 68.
[34] Harold Perkin, *The Age of the Railway* ((Newton Abbot: David and Charles, 1970), p. 101.
[35] Schwartz, *Understanding*.

steam transport; 'advanced' nations had duties, singly and in combination, towards less 'advanced' or 'civilized' states.

Rapid movement, accompanied by what was interpreted as instant communication across vast distances, served to promote and strengthen rhetoric around the power of human agency over the natural world. By the late nineteenth century, telegraphic communication with North America coupled with steamship lines had 'dried up' the Atlantic and paddle steamers had converted the fearsome Bristol Channel of the early century into a tourist attraction for day-trippers. The walking horizon of around 30 miles which was the daily limit of most people's mobility in 1830 had been surpassed by the steam railway complemented later in the century by the urban tram and the bicycle. By the turn of the century, further dramatic change built upon these earlier innovations. Wireless telegraphy and the telephone were advances on the electric telegraphic and motorized transport stimulated a further revolution in personal and public mobility. What appeared to be perpetual change, interpreted as 'progress', had created a sense of superiority over the natural world and fed speculation over whether human ingenuity had limits and, if so, what these were.

Historiography

Landscapes of time and space and the impact of rapid and extended movement do not figure prominently in the social, economic or transport historiographies of the period. Although contemporaries attributed the railway, the steamship and the telegraph in combination as forces that forged a different world, historians have largely failed to investigate or attempted to explain how time and space were redefined in everyday life or in the imagination. Stephen Kern's *Culture of Time and Space* addressed how art, literature, philosophy and the social sciences from the 1880s pointed to the importance and impact of inventions such as the wireless telegraph, the telephone and the aeroplane upon the imagining of time and space and how new perceptions of time were portrayed in novels.[36] Robert Wohl, in his review of Kern's work, has suggested a reason for the failure of historians to take account of the 'magnitude' of these changes. Historians were unsure of how to connect technology, where they were uncomfortable, with social, economic and cultural history where they felt 'more

[36] Stephen Kern, *The Culture of Time and Space, 1880–1918* (Cambridge, Mass.: Harvard University Press, 2003).

at home', but they possessed 'no analytical instrument for studying the revolution in perception and showing how it expressed itself in thought and action.'[37] Valuable as Kern's work is in demonstrating how perceptions changed, the significant change in these perceptions and experiences began a century before Kern's study period. From the 1780s, canals and tramroads combined to bridge distance, aqueducts appeared to suspend canal boats in the air and new experiences around time and space began to penetrate everyday life.

Although all historians use time and space as coordinates for their work, they are rarely investigated in combination. Time and space tend to be separated as distinct concepts. There is a considerable historiography on time. Stephen Toulmin and June Goodfield have investigated how time was viewed historically by different societies which focused upon the discovery of the past.[38] G. J. Whitrow has followed a similar theme in *Time in History* where he attempted to show that 'modern' perceptions of time were different from previous 'epochs'.[39] In a wide-ranging discussion of time, *The Story of Time* considered how time has been measured and depicted as well as experienced.[40] There has been considerable interest in how time was culturally conceived and measured in different societies in the past.[41] In her doctoral thesis, Marie Ventura proposed using frameworks of time ('timescapes') as a historical method to complement chronological time. She has argued that 'it is necessary for historians to engage more directly with time as an object of study rather than just a chronological scaffold' and that historians have lost touch with its 'fundamental temporal framework'.[42]

Clocks, the measurement of time and how time has been used to regulate social life from the timing of religious festivals and events to social discipline within

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[37] Robert Wohl, review of *The Culture of Time and Space, 1880–1918* by Stephen Kern, *Journal of Social History*, 18.4 (1985), 635-641.
[38] StephenToulmin and June Goodfield, *The Discovery of Time* (Chicago: University of Chicago Press, 1977).
[39] G. J. Whitrow, *Time in History: Views of Time from Prehistory to the Present Day* (Oxford: Oxford University Press, 1989).
[40] *The Story of Time*, ed. by Kristin Lippincott (London: Merrell Holberton in association with the National Maritime Museum, 1999).
[41] Nancy T. Munn, 'The Cultural Anthropology of Time: A Critical Essay', *Annual Review of Anthropology*, 21 (1992), 93-123; Erwin Panofsky, 'Reflections on Historical Time', *Critical Inquiry*, 30.4 (2004), 691-701; Paul Glennie and Nigel Thrift, *Shaping the Day: A History of Timekeeping in England and Wales 1300-1800* (Oxford: Oxford University Press, 2009); D. S. Landes, *Revolution in Time: Clocks and the Making of the Modern World* (London: Viking, 2000).
[42] Marie Ventura, 'Divergent timescapes: tracking a temporal revolution through the long nineteenth century (1750-1914)' (unpublished doctoral thesis, St. Andrews, 2017), pp. 24 and 28.

industrial capitalism have also been the subject of considerable historical debate.[43] There has been little interest, however, in how time affects perceptions of space and how speed, in particular, appears to narrow distance. Duncan Bell has explored this relationship in his studies of empire and distance and the impact of technology on perceptions of distance.[44] In a doctoral thesis, R. M. W. Musson considered how distance was imagined using two control groups to estimate distance on national and global perspectives.[45] Frank Broeze has charted the attempts to narrow distance in the pursuit of a steamship connection to Australia.[46] Historical geography, as a discipline, has explored the connection between history and geography and the study of spatial relations has largely been left to geographers.[47]

Tobler's First Law of Geography, formulated in 1970 by Waldo Tobler, stated that all things are related but things that are nearer are more related than things that are distant. The First Law has not been given any prominence in historiography, even though the 'friction of distance' has been near the forefront of human endeavours across most societies.[48] The Law involved two related concepts of historical interest which have challenged societies since at least Neolithic times in the 'Distant Past'. The 'friction of distance' stated that greater energy and time was required in movement across greater distances as opposed to destinations that were nearer which militated against longer-distance transport and travel. 'Distance decay', as a consequence of 'friction', adversely affected cultural relations between peoples who were farther away than with those who were nearer. These concepts stated that

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[43] Jacques Le Goff, *Time, Work and Culture in the Middle Ages*, trans. by Arthur Goldhammer (Chicago; London: University of Chicago Press, 1980); David Rooney and James Nye, '"Greenwich Observatory Time for the Public Benefit": Standard Time and the Victorian Networks of Regulation', *The British Journal for the History of Science*, 42.1 (2009), 5-30; Schivelbusch, *The Railway Journey:* E. P. Thompson, 'Time, work discipline and industrial capitalism', *Past and Present*, 38 (1967), 56-97; Hans-Joachim Voth, *Time and Work in England 1750-1830* (Oxford: Clarendon Press, 2007).

[44] Duncan S. A. Bell, 'Dissolving Distance: Technology, Space, and Empire in British Political Thought, 1770–1900', *The Journal of Modern History*, 77.3 (2005), 523-562.

[45] Musson, 'Geographical Distance'.

[46] Frank Broeze, 'Distance Tamed: Steam Navigation to Australia from its beginnings to the outbreak of the Great War', *The Journal of Transport History*, 10.1 (1989), 1-21.

[47] David Harvey, 'Between Space and Time: Reflections on the Geographical Imagination', *Annals of the Association of American Geographers*, 80.3 (1990), 418-434; D. Lowenthal, 'Past time, present place: landscape and memory', *Geographical Review*, 65.1 (1975); Graham and Nash, *Historical Geographies.*

[48] Daniel Z. Sui, 'Tobler's First Law of Geography: A Big Idea for a Small World?', *Annals of the Association of American Geographers*, 94.2 (2004); D. Gregory, 'The friction of distance? Information circulation and the mails in early nineteenth-century England', *Journal of Historical Geography*, 13.2 (1987), 130-154; Hans Westlund, 'A Brief History of Time, Space and Growth: Waldo Tobler's First Law of Geography Revisited', *Annals of Regional Science*, 51.3 (2013), 917-924.

social and economic relations were constricted by distance; that relationships were closer the less distance was involved and more remote the further the distance. They had particular significance for economies. The 'friction of distance' increased costs and time involved in travel over greater distances and, by implication, economies which could not overcome this friction were limited to particular localities. Jonathan Eaton and Samuel Kortum have shown how powerful the 'friction of distance' has been in international trade and the importance of technology in delivering advantages in trade over rivals.[49]

These were the challenges that were met in the region from the 1780s onwards as canals, tramroads, railways, steamships, docks, trams and the electric telegraph combined to challenge distance. These inventions released economic and social activity from the 'tyranny of distance' in large part, reduced the impact of friction and undermined 'distance decay' as previously remote peoples, markets and resources became 'closer'. These changes signalled a change between the old and the new as Burton and Lowenthal have observed and the onset of Heilbroner's new world of 'Yesterday'. While Tobler's Law is significant in analysing the effect of distance on relationships and economies, it does not explain the cultural definition of distance through the concept of 'kinship'. Kinship manipulates distance by placing kin 'nearer' than those who are 'foreign'. Much of the outside world during this period was divided between 'empire' and 'foreign' in which 'near' and 'far' were defined by culture and not distance. 'Distance' was a product of the imagination.

The attack on 'friction' and its consequent 'decay' represented by these technological innovations in trade and industry, commonly referred to as 'the industrial revolution', were not limited to the material world, but introduced new notions around time and space. As transport technologies made more rapid movement of goods and people possible, distance appeared to shrink with the decline of 'friction' which also affected how time was perceived. Change meant that movement between places was not only practical, but also quicker and the two concepts of 'distance' and 'time' became enmeshed as distance diminished and movement across distance quickened. As former absolutes, 'time' and 'space' were perceived as subject to human agency, along with the rest of the natural world, and as

[49] Jonathan Eaton and Samuel Kortum, 'Technology, Geography, and Trade', *Econometrica*, 70.5 (2002), 1741-1779.

such were defining characteristics of the new world of 'Yesterday'. The notion of 'space-time' was not formulated until late in the nineteenth century within theoretical physics, but was expressed by commentators and editors of newspapers in a different form – often as 'the end of time' or the 'annihilation of distance'. However, 'space-time' was experienced as an everyday practice much earlier. It originated in the late eighteenth century with the canal and tramroad systems and was heightened by the onset of the steam railway, the electric telegraph, 'railway' time and the tram.[50]

The Bristol Channel as a Region

The coastal areas that border the Bristol Channel waterway are selected as a study region because the people in the region experienced collectively the extensive range of changes that characterized the movement from one form of society to another during this time. The region was diverse in its agriculture, industry, transport, communications and demography in 1780 and by 1900 had experienced as revolution in most aspects of life. Although the 'first' industrial revolution in textile manufactures was associated principally with Lancashire, the Bristol Channel region's subsequent spectrum of changes across industry, society and communications was a microcosm of change across the British Isles.[51] As such, a study of the region gives insight into change that embraced many communities during this time.

The thesis treats the Bristol Channel as a region which is unusual. The area is more usually divided between 'South Wales' or 'Wales' and the 'West Country'.[52] Here, the Bristol Channel as a region is defined as those coastal and inland areas that used the Bristol Channel, either directly or indirectly, as a waterway. The waterway was the single most important factor in change during this period without which the region would not have existed. While Bristol was the largest urban area in the region and a significant entrepôt for the region, a number of ports in the Channel, including Swansea, Cardiff, Newport, Barnstaple and Bideford, traded in their own right and

[50] Deborah Warner, 'The Ballast-Office Time Ball and the Subjectivity of Time and Space', *James Joyce Quarterly*, 35.4-36.1 (1998), 861-864.
[51] Phyllis Deane, *The First Industrial Revolution,* 2nd edn (Cambridge: Cambridge University Press, 1979).
[52] *The Cambridge Social History of Britain*, 1750-1950, vol 1, *Regions and Communities,* ed. by F. M. L. Thompson (Cambridge: Cambridge University Press, 1990); *The Cambridge Urban History of Britain*, vol 2, *1540-1840,* ed. by Peter Clark (Cambridge: Cambridge University Press, 2000).

the coastal trade dated from at least from the fifteenth century.[53] In his doctoral thesis, Duncan Taylor suggests a diversity of trade and rivalries between competing interests across the Channel, rather than one where Bristol was a provincial capital, or metropolis.[54] Ralph Griffiths followed a similar theme in his discussion on medieval Severnside.[55] Bristol has been defined in this way historically, although its 'region' or hinterland has varied, depending upon the context.[56] In this thesis, the Bristol Channel has no capital or centre, apart from the waterway as a focus, and was marked by diversity rather than homogeneity.

The reasons for using a region in the research and how this region is defined in the choice of the Bristol Channel require explanation and clarification. A region is large enough to demonstrate the diversity of opportunity and experience faced by different communities. Using a region as a study area avoids the relative narrowness of local study (which has different strengths) but is not as extensive as a national or inter-regional study where local differences may be lost. The concept of 'the region' is usually described as a relatively large space, the size of which is not defined but is larger than a city and its environs, with boundaries which are indeterminate but which has a distinct character that is shared across the space. For Edward Royle, a region in history is 'a term of convenience, located specifically in time as well as space, with no promise of more than a temporary existence.'[57] According to Neil Evans, regions are 'complex but shifting social formations in which movement of peoples and goods – and the consequent reordering of spatial relations – are regarded

[53] Duncan Taylor, 'The Maritime Trade of the Smaller Bristol Channel Ports in the Sixteenth Century' (unpublished doctoral thesis, Bristol University, 2009); Ralph A. Griffiths, 'Sailing the Severn Sea in the Fifteenth Century' in *The World of the Newport Ship: Trade, Politics and Shipping in the Mid-Fifteenth Century* ed. by Evan T. Jones and Richard Stone (Cardiff: University of Wales Press, 2018), pp. 95-114; Michael Nix, 'A Maritime History of the Ports of Bideford and Barnstaple 1786-1841' (unpublished doctoral thesis, Leicester University, 1991).
[54] Taylor, 'Maritime Trade'.
[55] R. A. Griffiths, 'Medieval Severnside: The Welsh Connection' in *Welsh society and nationhood: historical essays presented to Glanmor Williams*, ed. by R. R. Davies and others (Cardiff: University of Wales Press, 1984), pp. 70-89.
[56] W. E. Minchinton, 'Bristol: Metropolis of the West in the Eighteenth Century', *Transactions of the Royal Historical Society*, Fifth Series, 4 (1954), 69-89; Louise Miskell, 'The making of a new 'Welsh metropolis': science, leisure and industry in early nineteenth-century Swansea', *History*, 88.1 (2003), 32-52; Spencer Kenneth Jordan, *The Development and Implementation of Authority in a Regional Capital: A Study of Bristol's Elites, 1835-1939* (unpublished doctoral thesis, University of the West of England, Bristol, 1999)

[57] *Issues of Regional Identity*, ed. by Edward Royle (Manchester: Manchester University Press, 1998), p. 1.

as central aspects.'[58] The concept originates in geography and has also been used in economic history, although the discipline of geography has more recently redefined how it used regions and, significantly altered the original concept.[59] The 'artificiality and the necessity of the concept' is a rather reluctant acceptance of having to use an imperfect tool. Alan Baker has compared the use of 'regions' within geography with the historian's use of 'ages' or 'periods' in the sense that the people who occupied these spaces or times may not have experienced them in the ways described by geographers or historians.[60] Because of its geographical origin, 'region' was usually defined by natural physical features that were intended to mark areas by their similarities and dissimilarities with other areas or regions. Nonetheless, the boundaries of these regions were cultural constructs made by geographers and as such the boundaries of these regions were not always clear and could vary according to the geographer. Geographical regions were always problematic in terms of what they shared, how they differed from other regions and in defining boundaries, which Baker and others have recognised.[61]

However, historical studies of regions have presented various difficulties. The attempts by historians to use regions as a framework for analysis similar to the ways they have been used in geography have proved problematic. The difficulties stem from the attempt to establish historical boundaries in parallel with geographical or political boundaries which rarely coincided. Such divisions are invariably arbitrary and 'have nothing to do with academic standards and consistency, as, for example, by the publishers of a regional series who, it would seem, merely wished to see chunks of England allocated to authors chosen by a general editor.'[62] J. D. Marshall's comment could apply equally to those social and urban histories of Britain that attempted to use historical regions as a framework. Inevitably, contributors found themselves having to justify why their region was a 'region', producing different reasons for the rationale.[63] John Walton acknowledged this in his study of Lancashire which he regarded as a region, but found it difficult to define what was

[58] Neil Evans, 'Regional dynamics: north Wales, 1750-1914', in Royle, *Regional Identity*, pp. 201-225 (p. 203).
[59] Alan R. Baker, 'Regional Geographies and Histories', in Baker, *Bridging the Divide,* pp. 156-205.
[60] Baker, *Bridging the Divide,* p. 61.
[61] D. R. Goldfield, 'The new regionalism', *Journal of Urban History,* 10 (1984), 171-186.
[62] J. D. Marshall, 'Why Study Regions? (1)', *Journal of Regional and Local Studies*, 5 (1985), 15-27 (p. 20).
[63] Clark, *Urban History;* Thompson, *Social History*.

shared across the county 'for these broad and sprawling acres are more a geographical expression than a cultural unity... the contrasts are vivid and inescapable. It is easier to describe the divisions in the county, than to say what unites it.'[64] He had a similar problem in defining what was shared in 'North' as a region in Peter Clark's *Urban History*.[65] Despite these difficulties, Walton pointed to what defines a region: that which is shared or common across a space which he found to be elusive in both 'Lancashire' and 'North'.

Despite the difficulties presented by regional historical studies, the concept of the historical region has been used successfully in histories of industrial regions which, generally, have ignored geographical features except where they are relevant to manufacturing (the location of coalfields, for example). They have similarly ignored political boundaries like counties.[66] These industrial histories use a common characteristic which is industrialisation, or manufacturing or trade or some other aspect of economic activity and rely upon this common characteristic as the guide to the defining of space or geography.[67] This thesis is not an industrial history but it lends itself to a regional method that has been successfully used in industrial histories. The concept has also been successfully used by Hugh Prince in dividing England into regions by soil types which ignored other geographical features and political boundaries.[68]

The use of comparisons in a regional study can test a hypothesis and reflect diversity and in this context, the thesis has drawn upon the work of Marc Bloch and J. D. Marshall in particular.[69] Marshall, along with Bloch, argued that history must have a form of enquiry within a context; otherwise, the discipline becomes an

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[64] J. K. Walton, *Lancashire: A Social History, 1558-1939* (Manchester : Manchester University Press, 1987) , p. 1.
[65] John K. Walton, 'North', in Clark, *Urban History*, pp. 111-131.
[66] *The Origins of an Industrial Region: Robert Morris and the first Swansea copper works, c.1727-1730*, ed. by Louise Miskell (Newport; South Wales Record Society, 2010).
[67] P. Hudson, *Regions and Industries: A Perspective on the Industrial Revolution in Britain* (Cambridge, New York: Cambridge University Press, 1989); J. Stobart, *The First Industrial Region* (Manchester: Manchester University Press, 2013).
[68] Hugh C. Prince, 'The Changing Rural Landscape, 1750-1850', in *The Agrarian History of England and Wales 1750-1850*, vol 6, ed. by G. E. Mingay (Cambridge: Cambridge University Press, 1989), pp. 7-83 (p.21).
[69] Bloch, *Historian's Craft*; Alette Olin Hill and Boyd H. Hill Jr., 'Marc Bloch and Comparative History', *American Historical Review*, 85.4 (1980), 828-846; J. D. Marshall, *The Tyranny of the Discrete: A Discussion of the Problems of Local History in England* (Aldershot: Scolar Press, 1977); J. D. Marshall, 'The Study of Local and Regional "Communities": Some Problems and Possibilities', *Northern History*, 17/18 (1981/82), 203-230; J. D. Marshall, 'Regions' (1) and 'Why Study Regions?' (2), *Journal of Regional and Local Studies*, 6 (1986), 1-12.

accumulation of facts, an empirical exercise which Marshall referred to as 'quarrying' as possibly the fundamental weakness of much local history.[70] Regional history was a sound method for providing a framework for local histories which could be compared for their similarities as well as their contrasts; this approach also allowed for comparisons to be made between regions. In Marshall's view,

> A regional history must be concerned primarily with regional society, change and development. Yet that society may be made up of so many "communities", and have so many levels of human activity within it, that the student of the subject can only begin to make sense of it by pursuing a number of basic but interrelating themes.[71]

The thesis attempts to use the underlying theme of the changing experiences and perceptions of time and space within the region, but also to demonstrate the diversity of different 'communities' and how these changes were experienced through comparative studies. The region is not defined in this thesis by how people viewed the Bristol Channel as a shared identity. The focus of the thesis is to examine changing perceptions of time and space using the region as the study area. The boundary of the region, as with all regions, is flexible but is informed by the impact the waterway had upon urban and rural areas. All areas within the boundary were dependent to a greater or lesser degree on the waterway.

The diversity of the Bristol Channel also illustrates the diversity of the human experience across Britain as a whole. For Marshall, regions are not studied for themselves but are 'instrumental' in illustrating wider issues or developments.[72] While areas within the region 'industrialized', in terms of land use and occupation, the region could not be described simply as an 'industrialized' region. It retained, through a period of significant change, diversity in the mix between agricultural and industrial local economies which was reflected in how the region used different forms of transport and communications. Its location, centred on a major estuary with a long coastline, a huge tidal range which enabled the region to develop inland ports, and which encompassed two of the principal navigable rivers in England and Wales, meant that the region used a diverse range of transport systems for trade, communications and manufacturing. The unequal distribution of mineral resources between the English and Welsh counties contributed to this diversity as natural

[70] Marshall, *Tyranny*, p. 15.
[71] Marshall, 'Problem and Possibilities', 219.
[72] Marshall, *Tyranny*, p. 3.

resources were exploited unevenly across the region. In that sense, with the exception of textile industries, the region was a microcosm of change and continuity for the nation as a whole.

A profile of the Bristol Channel region

In defining the region by those communities that accessed the waterway, the 'boundary' of the region is to some extent arbitrary (see Figure 1). The boundary includes, for example, Cheltenham and Bath which throughout their past had mainly a land orientation towards gentry in the east, London and the 'Home Counties' as centres of élite leisure. They are both included, however, because they depended upon Gloucester and Bristol respectively for supplies and services which in turn used the waterway for trade. In 1812, a tramroad was constructed between Cheltenham and Gloucester to make the supply of services and domestic coal easier, and Bath connected to Bristol through the navigable Avon. Southern Pembrokeshire, the 'little England beyond Wales', is included because the waterway was important for the export of coal and coastal trade with Bristol.[73] Carmarthen was an inland port and is therefore included, while Llanelli was a coast port in its own right. In the eastern areas of Wales in Glamorgan, Monmouthshire and Brecon counties, areas south of the mountainous region have been included because they focused upon access to waterway as a transport system to markets for industrial products. Brecon and Abergavenny connected to Newport through the Brecknock and Abergavenny Canal and Monmouth Canal. Northern Somerset includes the hinterland of the inland port of Bridgewater which incorporated Taunton and its rural districts. The northern coastal regions of Devon were active in coastal trade which included the two ports of Barnstaple and Bideford.

The region was marked during this period by an expansion in trade and industry and by 1900 was one of the leading industrialized and trading regions in the United Kingdom. Iron, limestone and coal deposits in south Wales were exploited in two phases of industrialization. Copper smelting in the lower Swansea valley dated from early in the eighteenth century, but a major impetus to industrialization came in the 1790s with canal and tramroad systems in the valleys of south-east Wales as well as the Swansea valley. Copper smelting and coal production in the Swansea valley

[73] *The Description of Pembrokeshire: George Owen of Henllys* (Dyfed: Gomer Press, 1994), ed. by Miles Dillwyn, p.14.

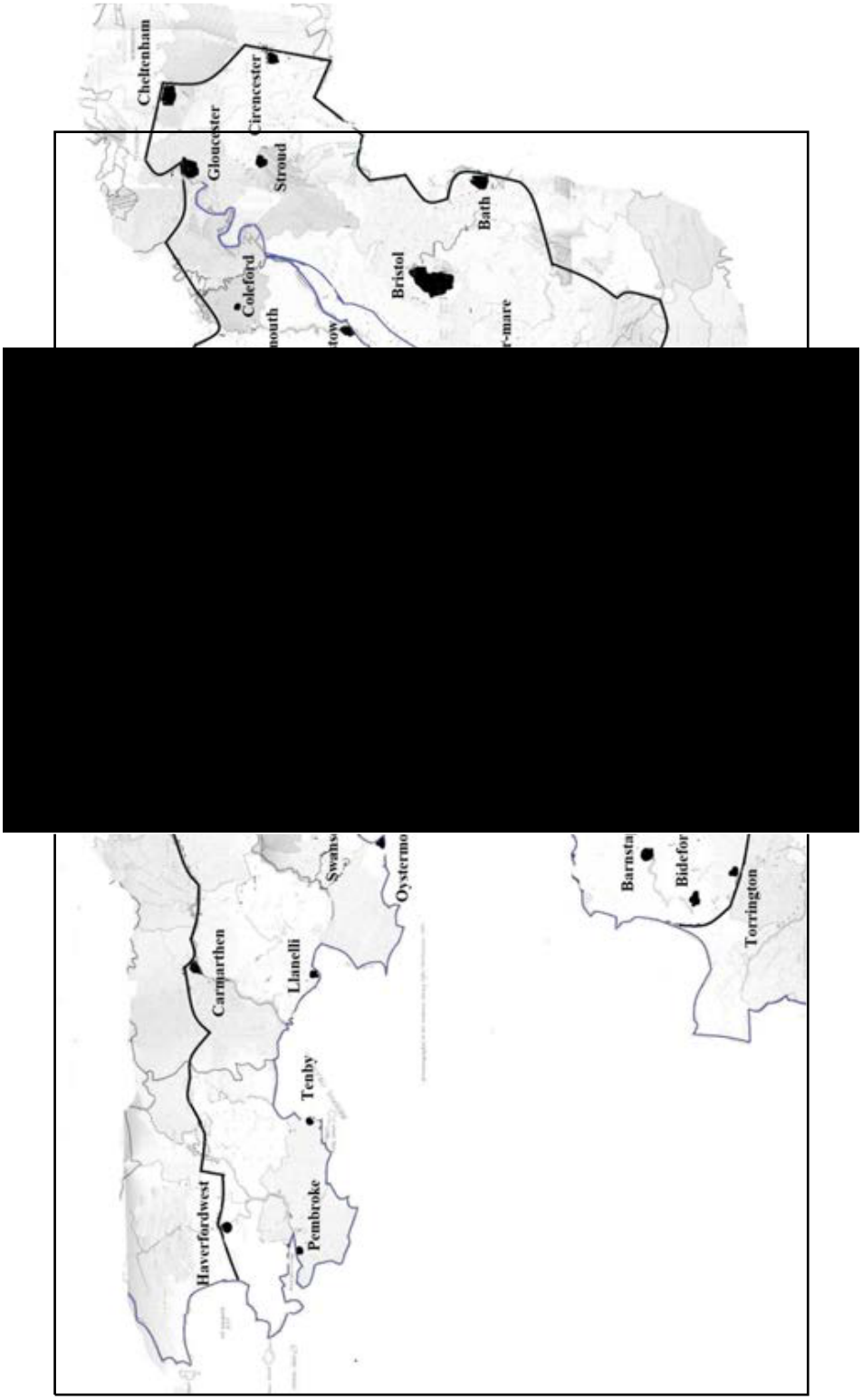
and iron and coal production in the Cardiff and Newport hinterlands can be described as the first industrial revolution in Wales.[74] The second phase of industrialization was signalled by the opening of the Taff Vale Railway in 1841 that linked Merthyr with Cardiff followed by the South Wales Railway in 1850 which connected the south Wales ports from Swansea to Newport to the railway network in England. The railway ensured the rapid transit of iron and coal to the ports of Cardiff and Newport and established south-east Wales as one of the leading areas for iron production and the export of coal in the world. Cardiff became the largest port in the region through its coal exports and one of the largest in the world.[75]

The region relied heavily upon coastal trading by sea through the Bristol Channel in the eighteenth century in the main due to difficulties faced in road transport. Despite improvements in land communications following the advent of the railway, the sea continued to exercise a major influence in the life of the region because of the expansion in international trade during the nineteenth century. Bristol and Swansea were trading internationally from the eighteenth century and Bristol's Atlantic trade dated to medieval times. The industrialization of the region considerably expanded the use of Bristol Channel ports in providing access to global markets and its importance as a seaway increased as industry and trade expanded. Natural resources and the sea combined with human agency in transforming the economy and society of the Bristol Channel during this time. Bristol, as a major port of the eighteenth century, lacked the industrialized hinterlands of Cardiff, Newport and Swansea but continued to expand its trade and manufacture through a mix of industry and as an important entrepôt for the region in north Atlantic trade.[76] Gloucester determined to rival Bristol as an international port with the completion of its ship canal in 1827. Gloucester and Bristol had connected to the rail networks emanating from London by 1840 and the region as a whole connected to the

[74] R. Rees, *King Copper: South Wales and the Copper Trade, 1584-1895* (Cardiff: University of Wales Press, 2000); L. Miskell, *Intelligent Town: an urban history of Swansea, 1780-1855* (Cardiff: University of Wales Press, 2006); Miskell, *Industrial Region*.
[75] A. H. John, *The Industrial Development of South Wales* (Cardiff: University of Wales Press, 1950); M. J. Daunton, *Coal Metropolis: Cardiff 1870-1914* (Leicester: Leicester University Press, 1977).
[76] F. J. Nichols and J. Taylor, *Bristol Past and Present*, vol 3, *Civil and Modern History* (Bristol: Arrowsmith, 1882); David Harris Sacks, *The Widening Gate: Bristol and the Atlantic Economy, 1450-1700* (Berkeley; Oxford: University of California Press, 1991); J. Latimer, *Annals of Bristol in the Eighteenth Century* (Bristol: Butler and Tanner, 1893); J. Latimer, *Annals of Bristol in the Nineteenth Century* (Bristol: Butler and Tanner, 1893).

telegraphic network by 1851. Rail and telegraphic communications were of importance for trade and industry as well as for personal and commercial travel.

Figure 1 Principal cities and towns in the Bristol Channel region c.1871[77]



[77] *Census of England and Wales.1871,* Cd. 381. Preliminary report and tables of population and houses enumerated in England and Wales, and Islands in British Seas; tables v and xi.

Expanding trade and industry exercised a powerful influence upon dock development in the later nineteenth century. Major new docks opened in Bristol (Portishead – 1879) and Newport (Alexandra - 1875) ahead of a significant expansion for Cardiff (Roath - 1887) and Swansea (Prince of Wales - 1881). Both Bristol and Cardiff found themselves pressured by independent docks established as rivals to the civic docks with the opening of docks at Penarth (1865), Avonmouth (1877) and Barry (1889). Responding to trade pressures and competition from other ports, dock development continued into the 1890s and beyond with major dock projects being completed at Bristol (Royal Edward Dock – 1908), Cardiff (Queen Alexandra Dock – 1907), Swansea (King's Dock – 1909 and Queen's Dock – 1920) and Newport (South Dock – 1893) with further dock extensions in 1907 and 1914. The expansion of dock facilities served to emphasize the importance of the international dimension to life in the Bristol Channel made possible by the waterway.

Like most regions in the British Isles, the Bristol Channel experienced a major expansion in its population during this period. The population was estimated as just over 750,000 in 1750 which rose to 2.75 million by 1901.[78] Glamorgan and Monmouthshire constituted almost half the population of the region but Bristol was by far the greatest urban area at 328,842, more than half of Gloucestershire's population. Devon's population is reduced by two-thirds in estimating the region's population because the bulk of Devon's population lay outside the region. There was a major demographic shift within the region during this period towards industrialized south Wales, the most significant changes occurring after 1801 when the Welsh population more than doubled by 1841, continued to rise rapidly and exceeded the English population by 1901.

The region's urbanization which accelerated after 1841 was largely attributable to the growth of the industrialized towns in south Wales. Although the populations in the English counties increased, there was something of a population explosion in Glamorgan and to a lesser extent in Monmouthshire. By 1901, no English town apart from Bristol exceeded 100,000 and most English towns had populations of less than 50,000. By contrast, in south Wales, Cardiff and Pontypridd (which included the Rhondda valleys) were the largest districts with populations of

[78] John Williams, *Digest of Welsh Historical Statistics*, (London: HMSO, 1985), vol. 1, p. 6*; Census of England and Wales1841,* Cd. 381, Enumeration Abstract, pp. 34-37; *Census of England and Wales 1901,* Cd 1826, Preliminary Report, table xv, pp. 58-70.

over 200,000 and there were three other urban districts with populations in excess of 100,000. On a lower scale of towns around 50,000, Neath was comparable with Bath but larger than Gloucester and Cheltenham while Llanelli was comparable with Gloucester. Apart from the general increase in population, the demographic character of the English counties was broadly similar in 1901 to 1750. The towns that were prominent in 1750 remained so in 1901 - Bideford, Barnstaple, Taunton, Bridgewater, Bristol, Bath, Gloucester, Cheltenham and Stroud. Only Weston-super-Mare, Ilfracombe and Minehead could be considered to be 'new' towns, reflecting new horizons in working-class leisure as a consequence of greater mobility.[79] Late in the nineteenth century, the waterway increased the interchange between the Welsh and English counties through the popularity of paddle steamers providing day trips along and between the coastlines, as well as providing easy access to working-class holidays in Minehead, Ilfracombe and Weston-super-Mare.

The experience of Welsh demographic change was, however, very different. South Wales in 1750 was overwhelmingly an agricultural, rural society with limited industrialized urban areas outside of Swansea. By 1901, south Wales had a substantial urban population and a series of new urban districts that dominated a previously rural landscape. The Welsh counties in the region, including Monmouthshire, totalled over 1.4 million out of a national total of 1.7 million and thereby changed the character of what it meant to be 'Welsh'. See Figure 2. The industrial power and the urban characteristics of much of south Wales gave rise to new landscapes of national identity and of self-confidence as Welsh industry and manufactures traded in global markets.[80] Demographic change in Wales was significantly affected by inward migration from inland Wales and England. Glamorgan's population, for example, increased from 317,752 in 1861 to 859,931 by 1901 under the impact of industrialization, principally the coal industry.[81] Brinley Thomas has argued that the influx invigorated Welsh society and the vitality of the

[79] John K. Walton, *The English Seaside Resort: a social history, 1750-1914* (Leicester: Leicester University Press, 1983).
[80] D. W. Howell and C. Baber, 'Wales', in *The Cambridge Social History of Britain, 1750-1950*, vol 1, *Regions and Communities*, ed. by F. M. L. Thompson, (Cambridge: Cambridge University Press, 1990), pp. 281-354.
[81] Philip N. Jones, 'Population Migration into Glamorgan 1861-1911: a Reassessment', in Prys Morgan, ed., *Glamorgan Society*, p. 174.

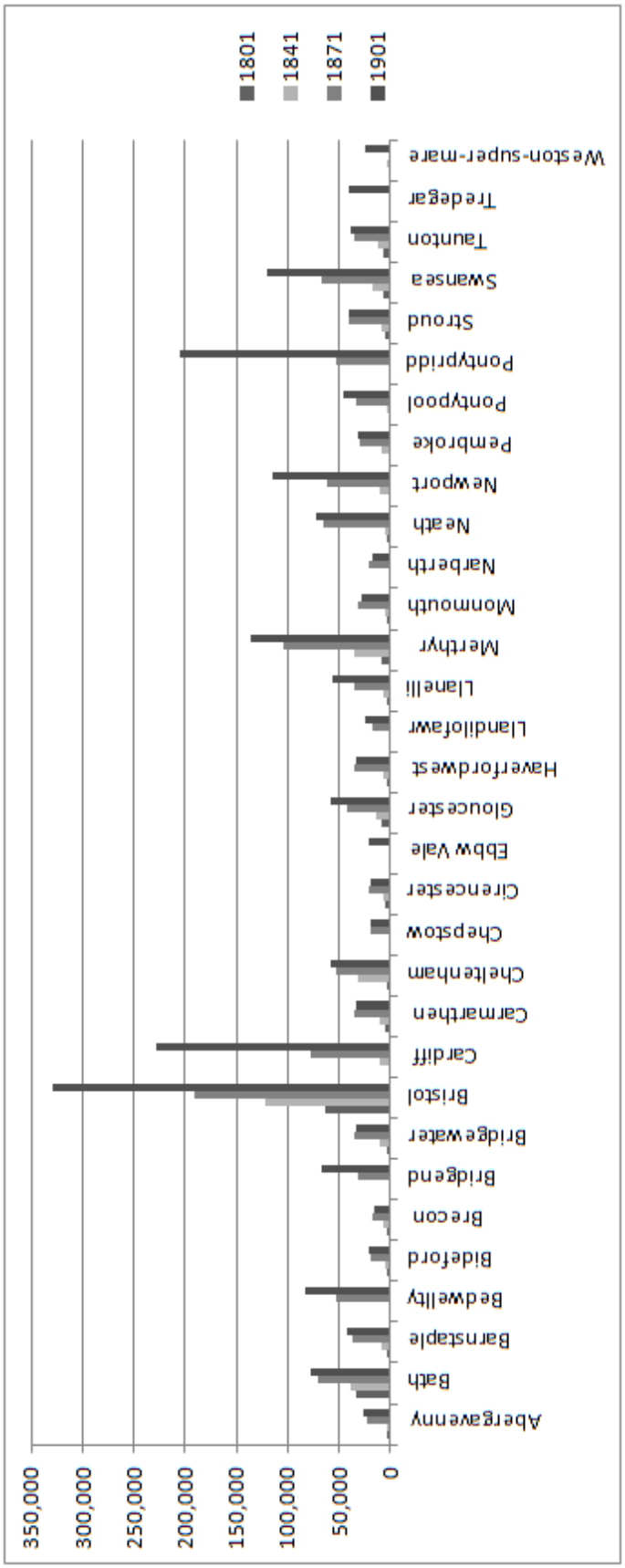
Welsh language with 70 per cent of Welsh-speakers living in the five most industrialised counties in Wales.[82]

There was no single identity within the Bristol Channel. The Channel was marked by diversity, including two distinct national sentiments, marked by culture, language and the past and there were substantial changes to concepts of identity and status during this period. Rivalry between the ports was intensified partly because of the proximity of four international ports in the Severn Estuary, with Swansea to the west. The port towns were conscious of their status as trading ports on a global scale as the three Welsh ports expanded to the perceived detriment of Bristol which declined in the hierarchy of ports. This contributed to a sense of the growing importance of south Wales as a trading and manufacturing area as industrial power and rapid transport and communications drew south Wales into an increasing sense of identity with Great Britain. Conversely, Bristol often interpreted this change as underlining Bristol's relative decline.

The railway network which largely replaced long-distance travel by stage coach followed traditional road routes (albeit fewer routes) which emanated from London in an arterial system and this probably reflected a developed sense of belonging across the region. The closer the region was to London, the closer it was to the nation. Rail timetables in the region only showed routes to and from the metropolis. Travellers who wished to deviate to the industrial areas of the Midlands and the North needed to fathom the complexities of Bradshaw's railway timetable. Rapid transit for goods, newspapers and people seemed to bring the region closer to the mainstream, and a spirit of self-confidence was engendered by access to the electric telegraph which brought news and 'intelligence' direct to the region while the ports and their docks provided direct access to global trading which was not dependent upon the capital.

[82] Brinley Thomas, 'A Cauldron of Rebirth: Population and the Welsh Language in the Nineteenth Century', *Welsh History Review*, 87 (1986), 418-437.

Figure 2 Population growth in key towns in the Bristol Channel region 1801-1901[83]



[83] Population reports from the Censuses of 1841, Cd. 409, 1871 Cd. 381 and 1901 Cd. 1826.

Sources and Methodology

In an attempt to gain insights into everyday life during this period, local and regional newspapers are used as the principal primary source for the study complemented by other sources where appropriate. In *The Waning of the Middle Ages*, Johan Huizinga argued that 'the spirit of an age' was more clearly shown in 'expressing trivial and commonplace things than in high manifestation of philosophy and science... in everyday life the spirit of a race or an epoch expresses itself naively and spontaneously.'[84] Newspapers were the most common medium of information and expression within the region and broadly shared certain characteristics in not only reflecting local interests, but also in leading and educating as editors and proprietors saw fit. They therefore presented what they considered to be news and opinions that were relevant to their local public, however narrowly this was defined, and as such both reflected and participated in changing perceptions. The 'commonplace' is not always trivial and great events and new horizons were reported, discussed and commented upon extensively in weekly and, later in the nineteenth century, daily newspapers. They both reflected and helped shape local opinion.

Access to most of the newspapers used in this study was online, complemented by the use of micro film for newspapers which are not digitized like *Swansea Journal* and the *Carmarthenshire Journal*, or where important years were not digitized as with *The Cambrian*. Searches in non-digitized sources were restricted to dates. Although online access considerably reduced the time spent in research, compared to micro film or original newspapers and documents, the success in using key words in newspapers, for example, was partly dependent upon the selected key word but also upon the accuracy of the scanning. Very often, scanning software was unable to identify words precisely and, for example, 'tram' was often scanned as 'train', or 'clocks' as 'docks'. The inability of scanning software to read original texts accurately could result in the researcher missing sources which was partly overcome by the use of different key words. The use of alternative key words used in combination was a useful check. 'Docks' was used in combination with 'quays' and 'warehousing' for example, and 'migrant' alongside 'emigrant' and 'emigration'. Tramroads could also be described as 'tramways', 'railroads' and 'railways' and the use of these key words within set time periods when tramroads

[84] Johan Huizinga, *The Waning of the Middle Ages* (Harmondsworth: Penguin, 1955), p. 228.

were constructed helped focus the search. The use of key words in conjunction with time periods often eliminated irrelevant information as did the search for names or titles. Research on tramroads, railways and oceanic docks was simplified by their use of specific names. The information culled from searches was so extensive that sometimes searches were restricted to specific newspapers which had previously presented editorial opinions on a range of issues relevant to the thesis. The political or religious stand-points of proprietors did not seem to unduly influence editorial positions on transport and communications. While they debated, sometimes vociferously, the relative benefits of which was the best railway line to the locality, or where the new dock should be located, there was virtual unanimity on the need for the railway, the electric telegraph and for the dock. Correspondence columns were particularly useful in revealing the views of individuals. Often, local controversies were played out in the correspondence columns of newspapers giving insight into issues which were important to local people.

There are a number of difficulties involved in using newspapers as historical sources: some are related to the nature of newspapers and the motivation of owners and editors, while a further difficulty is common to all primary sources - the nature of historical evidence and the use of the historical imagination to illuminate the past.[85] Newspapers selected what to print according to the political outlook of their editors.[86] Newspaper proprietors had a number of different motives in their ownership of newspapers which were usually to promote a political or religious ideology, or sectional interest. The *Western Daily Press*, for example, was established in 1858 as Bristol's first daily newspaper. Its editor, Walter Reid, espoused the Liberal cause in politics and saw the duty of the newspaper 'to be tolerant of no wrong or injury to the lowest or the highest of the community' and would 'act upon conviction and therefore guide opinion'.[87] Reid's acknowledgement that one of the objectives of the *Western Daily Press* was to 'guide opinion' was a sentiment probably shared by most editors. The act of informing may also be an act of persuasion and newspapers

[85] *Newspaper History: from the seventeenth century to the present day* (London: Constable, 1978) ed. by George Boyce, James Curran and Pauline Wingate; Stephen Vella, 'Newspapers', in *Reading Primary Sources: The Interpretation of Texts from Nineteenth- and Twentieth-Century History*, ed. by Miriam Dobson and Benjamin Zieman (London & New York: Routledge, 2009), pp. 192-208.
[86] Ivon Asquith, 'The structure, ownership and control of the press, 1780-1855', in Boyce, *Newspaper History*, pp. 98-116*;* Alan Lee, 'The structure, ownership and control of the press, 1855-1914' in Boyce, *Newspaper History*, pp. 117-129.
[87] Bristol Newspaper Archive, < https://www.britishnewspaperarchive.co.uk/titles/western-daily-press> [accessed on 25 March 2021].

regularly expressed partial views and often opposed each other in dealing with contentious issues whether it was dock development or the line of a railway. Since this thesis is concerned with perceptions as well as experiences, these differences between newspapers raise a question of whose perspectives are being expressed. However, it is probable that newspapers expressed sentiments, ambitions, hopes and fears that were, at least in part, shared. Newspapers, as historical sources about the past, are traces, nothing more.[88]

The roles of newspapers in informing and persuading on topics of local and regional interest were clearly present by the 1830s with the debates over the lines of railways. All newspapers in urban areas took up positions regarding the importance of connecting to the main lines of railways and often engaged in controversies with other newspapers over contentious issues. Their engagement in these debates or conflicts were usually phrased in terms of the interests of the town or city as a whole, rather than being simply of interest to industrial and commercial elites. The *Western Daily Press* in 1864 remarked favourably on the role of newspapers in Bristol in improving the city. Commenting that seven years previously, Bristol had one local newspaper and now had ten, 'the continued ventilation of public questions, by correspondence and otherwise, has no doubt tended greatly to produce that activity of thought which has resulted in so many local improvements...'[89]

The expansion of newspaper readership from the 1840s onwards and the rivalries between newspapers over sales give strong indication that working classes, and particularly the 'artisan class', were seen as potential and actual readers of newspapers. Until 1855, newspapers regularly published details of their circulation based upon stamp duty returns.[90] While it is difficult to assess actual readership of newspapers because newspapers were circulated amongst family and peers, readership may have been as much as six times the figures shown in stamp duty returns and possibly more.[91] The figures published by the *Bristol Mercury* for 1851-1853 on newspaper circulation gave an average weekly circulation of the three main newspapers in Bristol as over 10,000 in 1853. The actual readership of Bristol newspapers alone, not counting other newspapers circulating in Bristol at the time,

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[88] Peter Burke, *Eyewitnessing: The Use of Images as Historical Evidence* (London: Reaktion Books, 2001), p. 13.
[89] *Western Daily Press*, 25 June 1864.
[90] C. D. Collett, *History of Taxes on Knowledge,* 2 vols. (London: T. F. Unwin, 1899).
[91] *Bristol Mercury,* 15 October 1859.

may have been in excess of 60,000. The figures also showed how circulation had increased over the three-year period by over 75,000.

Table 1 The circulation of three largest Bristol newspapers, 1851-1853[92]

	1851	1852	1853	Weekly average
Bristol Mercury	263,000	277,000	290,000	5,577
Bristol Mirror	136,500	159,000	160,075	3,078
Bristol Times, Felix Farley	90,000	107,000	116,000	2,231
Totals	489,500	543,000	566,075	10,886

The *Monmouthshire Merlin* published a similar pattern for circulation in Wales of Welsh newspapers for the same period.

Table 2 The circulation of principal newspapers in south Wales, 1851-1853[93]

	1851	1852	1853	Weekly average
Monmouthshire Merlin	82,000	94,000	98,000	1,885
Monmouthshire Herald		22,000	54,475	1,048
Monmouthshire Beacon	29,500	30,525	34,000	654
Merthyr Guardian	66,000	66,000	63,000	1,212
Silurian	22,325	32,500	36,000	692
Cambrian	59,000	66,000	69,000	1,327
Swansea Herald	56,000	55,000	50,000	962
Carmarthen Journal	34,000	44,000	32,000	615
Welshman	44,500	47,000	44,000	846
Totals	393,325	457,025	480,475	9,240

In south Wales, readership had increased by almost 90,000 over three years while the sales of the *Merthyr Guardian* which were similar to those of *The Cambrian* give a strong indication of significant working-class readership. A letter published in the *North Wales Chronicle* in 1853 from 'a resident of Dowlais' described the recently

[92] *Bristol Mercury*, 8 April 1854.
[93] *Monmouthshire Merlin*, 21 July 1854.

established Reading Rooms at Dowlais Iron Works by Lady Guest. It had an average daily attendance of 80, containing daily and weekly newspapers, and periodicals in English and Welsh. It was open from 7am to 11pm. The library contained 1400 volumes and in the same complex were smoking and refreshment rooms.[94] At a public meeting of the Bridgend Mechanics Institute, the Reading Room was reported as holding *The Times, Morning Herald, Express, Illustrated London News, Examiner, Punch, Critic, Cardiff and Merthyr Guardian, Cambrian, Swansea Herald* and 'several monthly periodicals'.[95] Towards the end of the century, it was clear that newspaper readership was widespread and the principal source of information and comment. By 1875, the *Western Mail* was reporting an average daily readership of 14,000 and in 1906 the daily circulation of the *South Wales Echo* was reported as 'exceeding 209,000'.[96] They played an important role in stimulating readers' perceptions of the outside world as well as providing insights into what issues engaged them. As Martin Johnes put it, by studying 'how newspapers told their stories, we can glean something of how people read and received the world beyond their immediate horizons. The media may not tell people what to think, but they are integral in informing what they think about'.[97]

Although newspapers are the main primary source for the thesis, other primary sources are used to complement newspapers such as contemporary books, pamphlets and trade directories. There are a number of invaluable online libraries that have digitized original works.[98] These books and pamphlets often have excellent illustrations, as do newspapers.[99] They were useful in complementing and supplementing the newspaper sources by covering in greater depth some of the issues which were current at the time. Pamphlets were usually focused upon a single issue such as the stamp duty on newspapers, or a railway route and were targeted towards change. Contemporary books were often more general histories and topographical tours which give an insight into the perspectives of the authors – what they valued

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[94] *North Wales Chronicle and Advertiser for the Principality*, 5 August 1853.
[95] *Cardiff and Merthyr Guardian*, 9 October 1852.
[96] *Western Mail*, 7 April 1875; *Cardiff Times*, 16 September 1906.
[97] Martin Johnes, *Soccer and Society: South Wales 1900-1939* (Cardiff: University of Wales Press, 2002), p. 10.
[98] Hathi Trust Digital Library, <https://www.hathitrust.org>, Internet Archive, <https://archive.org,>, Kindle, <https://www.amazon.co.uk/kindle> and ProQuest ebooks, <https://eBookcentral.proquest.com> were particularly useful. The British Newspaper Archive, <https://www.britishnewspaperarchive.co.uk> was the main source for newspapers.
[99] The main source for pamphlets was JSTOR (ITHAKA) <https://www.jstor.org>.

and considered to be important – as well as providing contemporary descriptions of societies as well as accounts of their past. Trade directories were an important source for factual details on trade, retailing, naming, transport and communications including, for example, dock dimensions.[100] The primary sources for the research on canals and tramroads were unpublished minutes and accounts of Committee and General Assembly meetings of subscribers which were held in The National Archives and Gloucester Archives.

The principal difficulty in using any textual evidence about the past is the problem of interpretation of evidence which has engaged historians and others in considerable debate and controversy.[101] It is not the intention here to rehearse these debates which range from one end of the spectrum of opinion which can be described as 'traditional' history to the other 'postmodern' critique.[102] The latter has had the greater influence on the methodology used in the thesis in its emphasis upon perspective and interpretation which will vary according to the historian's framework. While history is essentially interpretative and personal, these interpretations will vary even if they use the same historical traces. These traces do say something sensible, however, about the past that can be understood in the present, even if it is impossible to 'reconstruct' the past in the present, or understand fully the context in which these traces were located and thereby became meaningful. It is this methodology that makes history a science, albeit an historical science with similarities to historical sciences like geology, evolutionary biology, physics and astronomy which each require a historical imagination allied to the use of evidence.[103]

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[100] The source for trade directories was Historical Directories of England and Wales, <http://specialcollections.le.ac.uk>.

[101] *Writing History: Theory and Practice* ed. by Stefan Berger, Kevin Passmore and Heiko Feldner (London: Bloomsbury Academic, 2009); Hayden V. White, 'The Burden of History', *History and Theory*, 5.2 (1966), 111-134.

[102] A. R. Marwick,, *The New Nature of History: Knowledge, Evidence, Language* (Basingstoke: Palgrave, 2001); A. R. Marwick, 'Two Approaches to Historical Study: The Metaphysical (including "Post-Modernism") and the Historical', *Journal of Contemporary History*, 30.1 (1995), 5-35; Hayden V. White, ''Response to Arthur Marwick', *Journal of Contemporary History*, 30.2 (1995), 233-246; Lawrence Stone and Gabrielle M. Spiegel, 'History and Post-Modernism', *Past and Present*, 135 (1992), 189-208.

[103] John Lewis Gaddis, *The Landscape of History: How Historians Map the Past* (Oxford: Oxford University Press, 2004); Lowenthal, *Foreign Country*; Collingwood, *History*, p. 9.

Structure of the thesis

This thesis investigates how changing technologies of transport and communications between 1780 and 1914 stimulated new landscapes of time-space, which was one of the defining characteristics of a new period in human history and markedly different from the 'Distant Past'. The individual chapters examine different aspects of these changes which were driven by new technologies in trade, industry, communications and travel and which, in their different ways, breached much of the constriction on human endeavour imposed by the 'friction of distance' which had limited human activity over many thousands of years. Michael Robbins, in his discussion of electrical traction, has shown how the science of electro-magnetism was translated into practical technologies.[104] The successful application of technology, and the associated problems of implementation, together with the capital financing of these new technologies, are recurring themes in the thesis. Science was not sufficient in itself. It required the practical application in the form of successful technologies and the resources to meet the costs of implementation and achieve sustainability.

Chapter Two considers how canals and tramroads altered perceptions of what was possible for trade and industry by opening up new lines of transport, in addition to roads, navigable rivers and sea-ways. These transport systems challenged geography, but also used opportunities presented by geography in creating routes to the sea, as well as using the sea as a transport system. The chapter examines two different canal and tramroad systems in Gloucestershire and Monmouthshire. These canal systems in their different ways underlined the conviction that space was not given, but could be altered and managed in the interests of trade, commerce and manufactures. The canal and tramroad networks in Monmouthshire were made possible by the conjunction of two separate technologies. Carts were placed on cast iron rails, manufactured for the first time in Coalbrookdale in 1777, powered by horses which connected mines and furnaces with canals. Canals, in turn, were made possible in the mountainous districts of mineral-rich south Wales by two innovations – the pound lock enclosed by mitre gates. In contrast, Gloucester challenged the natural world in a highly ambitious project, for which there was no precedence, of constructing a ship canal to by-pass the Severn which made possible an inland port at Gloucester that was intended to rival Bristol as an international port. These systems

[104] Michael Robbins, 'The Early Years of Electric Traction: Invention, Development, Exploitation', *The Journal of Transport History*, 21 (2000), 92-101.

demonstrated that space – the friction of distance – could be challenged by technology.

Chapter Three considers changes in time and place under the impact of the steam locomotive in diminishing space by speeding up the transport of minerals, commodities and people. It examines the role of the steam locomotive in promoting prosperity for towns and cities along railway routes and the potential threats to those areas outside the railway. The steam railway brought into prominence the importance of distance and time and the measurements of both pre-occupied civic and industrial élites in planning and lobbying for different railway routes. The narrowing of space through speed created new concepts of time and space and linked the two. Distance became measured by time. Measured distance was secondary to travelling time and was measured in hours and minutes.

Chapter Four considers how speed affected distance through a new form of communication which was not dependent upon transport – the electric telegraph. The telegraph brought issues of time and space starkly into focus and made the railway possible. The telegraph challenged existing concepts of time and space by appearing to circumvent both. The speed of electro-magnetism appeared to defy distance and was met with astonishment by contemporaries. The telegraph was credited along with the railway and the steamship for the 'annihilation' of space in constructing a 'nervous system' of transport and communications. The telegraph was considered the 'twin' of the railway and as the railway shortened distances, the electric telegraph stimulated the measurement of time which enabled 'time' to be managed as 'railway time' and train timetables. The Observatory at Greenwich determined what time it was in the 1840s and the electric telegraph 'told' all other clocks, at least in theory.

The telegraph created a new sense of time measured by clocks, which is the subject of Chapter Five. The adoption of 'Greenwich Time' throughout the British Isles demonstrated that time was a human construct and could be manipulated, not only within the British Isles but internationally with time zones dependent upon the prime meridian at Greenwich. It was possible to have two 'times', local and Greenwich, demonstrating that the measurement of 'time' was a human construct. The proliferation in the sale of clocks and watches in the late nineteenth century indicated how time management had intruded into everyday life. Clock towers on town halls, railway stations and public libraries became features of urban and rural life.

Chapter Six considers the impact of the horse tram and the electric tram on mobility in urban areas in the late nineteenth century. These trams established a system of mass public transport that had implications for urban and suburban development, how urban life was conducted, patterns of consumption and leisure and influenced new forms of social class and gender relationships. Mechanical mobility in the form of public transport in urban areas complemented railway travel and brought mechanized travel into everyday life as speed shrank distance in mainly urban areas.

Chapter Seven considers how the global trading connections of the Bristol Channel, enhanced with the advent of the steamship, docks and ports, helped define perceptions of the outside world over large distances. Global trade became endemic to everyday life in the region and this global dimension redefined identities with 'others' across the globe and reinforced the ceremony of empire and dominion. Consciousness of the outside world was stimulated by both trade and empire, but substantial emigration in the second half of the nineteenth century and the populating of the dominions had a significant impact upon perceptions of the outside world and consequently distorted space. A sense of kinship with dominions brought Canada and Australia, for example, into an orbit of a 'Greater Britain' while the region's principal trading partners in Europe were more 'distant' and outside this orbit. The outside world was divided into zones determined by kinship and identity and reversed aspects of the 'decay of distance'. Distance was not proportionate to a sense of what was near and what was far. Australia and Canada were 'closer' to the United Kingdom than France.

Chapter Eight investigates the rhetoric of supremacy over the natural world that was associated with a sense of progress which marked 'Yesterday' with a spirit of optimism previously unknown in recorded history. As Robert Heilbroner has pointed out, 'progress' was a new concept in a new world of 'Yesterday' which asserted that the present was superior to the past and the future was expected to be superior to the present. The new world asserted the power of science in understanding and manipulating the natural world in the pursuit of human progress which encompassed the ability to defeat time and space. 'Progress' redefined human history in its past, present and anticipated future but was not even-handed, and was experienced differently across the region. The new world built upon the old resulting in a combination of technologies from horses and manpower to steamships and

locomotives. This diversity in transport and mobility is often missing in historiography along with how space was imagined and experienced. It was a period of continuity as well as change. The chapter considers how far élitist rhetoric on progress, dominion and the 'conquest' of time and distance was reflected in everyday life in the region.

The role of élites in technological change was an important factor in how the world changed during this period, but the term is generic and covers a diversity of élite groups. Although there was no strict division between élites and there was considerable merging between élites, they were also distinctive in their objectives. The thesis considers three main forms of élite groups. The proprietors and editors of newspapers represented a relatively cohesive group in the sense that they were not industrialists, nor had they particular interests in companies promoting change. Their principal interest appeared to be a desire to influence change and promote particular aspects of change amongst their readership. Industrialists formed a second distinct grouping as a pressure group for technological change and innovation and these often combined to create the companies that raised the capital to implement the changes they sought. The companies which they often dominated were not however heterogeneous in composition, as the third group. Companies attracted a range of investors many of whom were probably motivated by the return they earned on their investment, but there was also evidence that other investors were motivated by a sense of a 'public interest' by supporting their locality in the improvements that technological change wrought.

The thesis does not attempt to cover all aspects of changes in the perception of experience of time and space but selected those aspects considered to be most important to this change. The focus is upon those changes that had the greatest impact upon the perceived diminishing of distance and contributed to a sense of dominion over the physical world. As a result, some important aspects are not considered. The bicycle expanded personal mobility from the 1880s onwards, but it was probably not until the early twentieth century that cycling could be considered a mass activity, being largely restricted by social class and income. It was also restricted as a leisure activity to the summer months, which did not lend itself to a sense of dominion over the physical world. Trips on paddle steamers along the Channel were immensely popular by the late nineteenth century and gave a sense of power over the Atlantic Ocean which was feared because of its destructive

unpredictability. However, as with cycling, excursions were restricted by weather which weakened the sense of dominion although this did not diminish the sense of power and freedom over weather and distance felt by the participants. Although both bicycles and paddle steamers made important contributions to a sense of domination over the physical world in their different ways, they could not claim to have the impact of the tram or the steamship, for example. The main impact of wireless telegraphy and the telephone in communications came in the twentieth century, as did motorized transport which signalled the virtual end of the horse in urban mobility. The balloon, along with the seaside tower and the bi-plane, signalled an intention to challenge the skies, but this challenge had its greatest impact in the twentieth century. Mapping was an important method of navigating space on regional, national and global dimensions and increasing knowledge of space brought with it a sense of power over distance and what was previously unknown. Geological mapping exercised a sense of power over an unseen world but one which was important for engineering and mining and defining a new sense of geological time.

Changes in transport and communications as aspects of wider industrial change marked a radical departure from the past in how people perceived their relationships with the natural world. Human agency had produced technologies that mined and processed minerals into commodities and created transport and communications systems that defied previous limitations imposed by distance. Time was connected to space as a way of defining distance and the shorter the time span in travel or transport, the nearer the destination became. This apparent compression of space through the speed of travel or communications which was made possible by technological innovation stimulated a sense of human dominion over the natural world. The potential limits of this dominion were unknown within an ideology of linear ‘progress’ which conceived the present as being superior to the past and the anticipation that the future would be better than the present. This may have been an élitist, urban view which was not necessarily shared across all social classes or in rural communities, but it was instrumental in shaping the ‘modern’ world.

Chapter 2 Challenge and Opportunity: canals and tramroads in the Severn Estuary 1790-1830

> 'Men can never entirely rid themselves, whatever they do, of the hold their environment has on them... they utilize their geographical circumstances, more or less, according to what they are, and take advantage more or less completely of their geographical possibilities. But here, as elsewhere, there is no action of necessity.'[1]

According to Febvre's thesis, geography presents both challenge and opportunity to human agency. Geographical position is given, but people can alter how they interact with that environment by taking opportunities that the environment offers. In Febvre's view, this was particularly true of transport systems that enhanced trade. In establishing trade routes, it was of 'secondary importance' whether the geography was favourable or not. 'The necessary condition is the need for communication, and if that exists, no obstacles or difficulties will prevent men from making them... the wildest mountains, the desert itself will be braved and conquered.'[2] In the late eighteenth century, port towns and industrialists in the Bristol Channel region forged new forms of transport to exploit opportunities in trade and industry by using technological improvements in canals and tramroads to challenge geography. The connection between geography and technology was not, however, simply confrontational. These technologies also exploited the opportunities that local geographies presented.

The chapter examines two major canal projects in the region from the perspective of how distance was challenged using technology in the interests of trade and industry. Three aspects of these ambitious projects are examined which were also relevant to most projects into the nineteenth century where technology challenged distance. Firstly, how the strategic visions which inspired these systems challenged traditional ways of thinking about distance; secondly, the difficulties faced by the canal companies in implementing their objectives in the way of terrain, capital finance and skilled engineers and finally assessing how effective technologies were in achieving their objectives. These canal systems were unique at the time and demonstrated how a canal system could be adapted to achieve different objectives. Gloucester constructed the world's first ship canal to create an inland port at Gloucester. It was a civil project designed to create a new future for the city

[1] Febvre and Bataillon, *Geographical Introduction*, p. 315.
[2] Febvre and Bataillon, *Geographical Introduction*, p. 330.

as a port in contrast to the Monmouthshire Canal which was an industrial project designed to create access to the sea in order to reach consumer markets by ship. The Monmouthshire Canal prompted civic leaders in Brecon and Abergavenny to devise their own scheme for a canal system which was orientated towards consumers rather than producers, which eventually extended to Hereford. It began as a rival to the Monmouthshire Canal, but in time, the two canals connected as a single canal in 1812. Unlike in Gloucester, the impact of the Monmouthshire and Brecon and Abergavenny Canals upon Newport as port was incidental in their project. By combining tramroads and canals within an integrated transport system, this network crossed a mountainous terrain which rose over 1,000 feet above sea level in places to provide access to the sea. The system may have inspired Charles Hadfield's analogy of canals as arteries and tramroads as veins.[3] Both initiatives broke new ground in transport systems and as such represented advances on the existing canal networks in England, with the possible exception of Tyneside's canal and tramroad network.[4] They demonstrated in different ways how technology could mitigate adverse geographies and effectively curtail distances. They also fostered the first stages in dock development in Gloucester and Newport and contributed to the science of civil engineering.

Canal networks

The 'canal age' from the 1760s in England was driven by technological advances in the design of canals, tramroads and manufacturing processes and by1790 the canal system in England stretching from Yorkshire to London was well advanced, combining canals with tramroads and navigable rivers. There was no direct canal connection with London, but attempts had been made to make the Thames navigable to Oxford and Newbury. In the region, a major canal was constructed between the Thames and Severn from Stroudwater near the Severn to Lechlade where it connected to the Thames navigation which was completed in 1789.[5]

Canal construction from the 1760s in England had been inspired by the work of an early canal engineer, James Brindley, who constructed the Bridgewater Canal to carry coal from Worsley to Manchester which opened in 1761 and which was later

[3] Hadfield, *Canals of South Wales*, p. 22.
[4] Rolt, *Navigable Waterways*, p. 84.
[5] 'The Arteries of the Revolution' in Charles Hadfield, *British Canals: An Illustrated History* (London: Phoenix House, 1950), pp. 71-82.

extended to Runcorn. Brindley's vision was to use some of the great English rivers – the Thames, Mersey, Trent, Humber and Severn – to establish a canal network that would connect the developing industrial regions and their associated ports in central England linking Liverpool, Manchester, Hull, Stoke, Birmingham, Bristol and London.[6] In the view of John Phillips, canals 'converted the internal parts of our island into coasts'.[7] Canals, however, were not simply innovative, they represented new ways of 'seeing'. When asked what the purpose of navigable rivers was by a Committee of the House of Commons, Brindley responded, "To make canal navigations to be sure."[8] Brindley could equally have responded that rivers also cut channels through mountainous regions which created pathways for canals and tramroads, which was particularly significant in south Wales. As John Randall recognised in his history of the Severn Valley Railway, 'The Severn, like other English rivers, may be said to have been the pioneers of railway along its banks.'[9] Brindley and his contemporaries in the emerging science of civil engineering had little interest in navigable rivers, except as a water supply, and reversed the natural order of inland navigation.[10] In Randall's version of Brindley's response, Brindley was dismissive of natural rivers which were 'made to become feeders to canals'.[11] According to John Phillips, Brindley 'seemed to treat all sorts of rivers with great contempt'.[12] In the future of inland navigation from the 1760s, rivers would provide the volumes of water required to run canal networks – a triumph of human agency which manipulated the natural world in the interests of the economy and fed an entirely new network of inland communications.[13]

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[6] Minor Victorian Writers <https://minorvictorianwriters.org.uk/smiles/c_brindley_4.htm> [accessed 3 May 2021]; Hugh Malet, 'Brindley and Canals, 1716-1772', *History Today*, 23.4 (1973), 266-273, (p. 273).
[7] Phillips, *Inland Navigation,* p. viii.
[8] Samuel Smiles, *Lives of the Engineers: Smeaton-Rennie* (London: John Murray, 1904), cited on p. 358; Phillips, *Inland Navigation,*, p. 114.
[9] John Randall, *Handbook to the Severn Valley Railway* (London: Virtue Bros. and Co., 1863), p. 2.
[10] David Hussey, *Coastal and river trade in pre-industrial England: Bristol and its Region, 1680*-1730 (Exeter: University of Exeter Press, 2000); T. S. Willan, 'The River Navigation and Trade of the Severn Valley, 1600-1750', *The Economic History Review*, 8 (1937), 68-79; T. S. Willan, *The English Coasting Trade 1600-1750* (Manchester: Manchester University Press, 1938); T. S. Willan, *River Navigation in England 1600-1750* (London: Cass, 1964); Peter Alexander Wakelin, 'Pre-Industrial Trade on the River Severn: A Computer-Aided Study of the Gloucester Port Books c.1640-c.1770' (unpublished doctoral thesis, Wolverhampton Polytechnic, 1991).
[11] Randall, *Severn Valley Railway*, p. 213.
[12] Phillips, *Inland Navigation*, p. 114.
[13] Joseph Priestley, *Historical Account of the Navigable Rivers, Canals and Railways of Great Britain* (London: Longman, Rees, Orme, Brown and Greene, 1831).

The major Welsh canals were constructed in the 1790s, later than the English system which was in the main due to technical difficulties in the smelting process and the mountainous terrain in east Glamorgan and Monmouthshire. A shortage of skilled engineers may have been a contributory factor. Although Abraham Darby in 1735 had demonstrated how coke could be substituted for wood as an industrial fuel, it was not until Henry Cort's use of coking coal in the 'puddling process' in 1784 which revolutionized the production of malleable iron and led to pressures from industrialists in Glamorgan and Monmouthshire to develop a transport system that could connect to the coast.[14] The pound lock and mitred gates in canals made it possible for canal boats to travel across mountainous regions, but always on a level body of water through a series of steps or locks. The combination of the gates and lock reduced the loss of water when raising or lowering canal boats which, at least in theory, meant that a canal could be built virtually across any terrain with a sufficient supply of water. However, these technical improvements in canal technologies were insufficient in themselves to solve the problems of transit in south-east Wales. Rivers were not navigable apart from the Usk to Newport which was some distance from the iron works and quarries along the Clydach Gorge to the north. These factories could not be reached by the conventional canals which were used in Cardiff (1794), Swansea (1798) and Neath (1795) which was extended to the Tennant Canal in 1799.[15]

The technological solution for Welsh industrialists in both Glamorgan and Monmouthshire was in linking their works to canals using tramroads. Tramroads using wheeled traffic on wooden rails have a long history but the wooden technology was unreliable in carrying the weights of heavy commodities like coal, limestone and iron. Cast iron rails were first manufactured by Richard Reynolds in Coalbrookdale in 1767, and although they were subject to wear, they could support far greater volumes of minerals and commodities than was possible on wooden rails.[16] A combination of technological improvements liberated the manufacture of iron and the transit of heavy commodities across geographies that were hostile to transit and this resulted in a fundamental change in how the natural world presented by

[14] K. T. Rowland, *Eighteenth Century Inventions* (Newton Abbot: David and Charles, 1974); Edwin A. Pratt, *A History of Inland Transport and Communication in England* (London: Kegan Paul, 1912), pp. 189-193.
[15] Charles Hadfield, *Canals of South Wales and the Border* (Cardiff: University of Wales Press, 1960).
[16] J. B. Calvert <http://mysite.du.edu/~jcalvert/tech/woodtred.htm> [accessed 16 June 2020]; Thomas Tredgold, *A Practical Treatise on Railroads and Carriages* (London: J. Taylor, 1825).

geography and geology was perceived. The physical world was no longer given or immutable but could be exploited in the interests of manufacturing using new technologies.

An integrated tramroad and canal network revolutionized industrial transport, not so much through speed, but by being able to transport heavy materials in volumes which were beyond horse-drawn road transport. According to Philip Bagwell, a pack horse could carry around one-third of a ton, a heavy waggon one ton which increased to two tons on macadamized road. In contrast, on a tramroad a horse could pull eight tons and between 30 and 50 tons on a canal with a towpath.[17] In most cases, canal transport was 25-33 per cent cheaper than road transport which affected the price of coal.[18] Canals and tramroads meant that industrialists could transport four times the volume on tramroads and up to 25 times the volume on canals, although this volume appeared unusual. The Monmouthshire Canal imposed a 3½ ton limit on tram roads and a 26 ton limit on canal boats. Nonetheless, the canal boats which were 62'6" long, and 8'10" wide in Monmouthshire, could carry loads at least 10 times the volume of the heaviest waggons.[19] For industrialists, the nearer the canal the better but even tramroad links were a significant improvement on road transport. For contemporaries, a canal and tramroad network compressed distance by circumventing barriers in the natural world which allowed transit where previously it had been impossible or laborious. Improved access brought destinations nearer.[20]

Historiography

In the historiography of transport and industrial change, canal-building and the construction of tramroads tend to occupy a secondary place to the steam railway. Canals and their tramroads are often portrayed anachronistically as a prelude to the 'railway age'. The significance of the horse as an essential complement to the

[17] Philip S. Bagwell, *The Transport Revolution* (London: Routledge, 1974) p.1; Tredgold, *Railroads and Carriages.*
[18] Bagwell, *Transport Revolution*, p. 449.
[19]The National Archives (TNA), London, RAIL 500/5 Monmouthshire Railway and Canal Company. Minutes of the Committee, 1792-1812, 2 August 1796.
[20] Trevor G. Hill, 'From packhorse to railway: changing transport systems from the seventeenth to the nineteenth centuries and their impact upon trade and industry in the Shropshire area' (unpublished doctoral thesis, Leicester University, 1998).

tramroad cart and the canal boat is understated.[21] H. J. Dyos and D. H. Aldcroft did include canals and tramroads within the 'industrial revolution' in their history of transport.[22] However, tramroads merited a single paragraph in their discussion of the Welsh canal system and the integration of canal and tramroad in Monmouthshire is not recognised.[23] Much of the discussion on tramroads was within the context of 'the early railways'.[24] Some historians elect to start transport history with the steam railway.[25] As the English historian Sir Lewis Namier once remarked, historians can 'imagine the past, and remember the future' by which he meant that historians can see the future and sometimes construct their histories within that context.[26] Tramroads, in particular, are often categorized as a stage in the development of railways and both canals and tramroads are not sufficiently considered as authentic technologies in their own right.[27] Philip Bagwell does not discuss tramroads in the section on canals in his history of transport, which are consigned to 'The Foundation of the Railway System'.[28] J. H. Clapham, arguably the founder of academic economic history in the United Kingdom, may have exercised an undue influence in his categorization of the period 1820-1850 as 'The Early Railway Age', proclaiming the 'victory' of the railway (over the canal).[29]

The canal and tramroad networks led to major advances in civil engineering and contributed to the emerging science of geology in the late eighteenth century, but canals and tramroads are usually confined to sections within transport histories.[30] With the exception of Charles Hadfield and L. T. C. Rolt, canal and tramroad histories occupy a relatively peripheral place in the historiography of transport.[31]

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[21] F. M. L. Thompson, *Victorian England: the horse-drawn society* (London: University of London, 1970); F. M. L. Thompson, 'Nineteenth-Century Horse Sense', *Economic History Review*, 29.1 (1976), 60-81.
[22] H. J. Dyos and D. H. Aldcroft, *British Transport: An Economic Survey from the Seventeenth Century to the Twentieth* (Harmondsworth: Pelican, 1974).
[23] Dyos and Aldcroft, *Transport*, p. 102.
[24] Dyos and Aldcroft, *Transport*, pp. 117-125.
[25] C. E. R. Sherrington, *A Hundred Years of Inland Transport 1830-1933* (London: Frank Cass, 1969).
[26] Cited in Lowenthal, *Foreign Country*, p. 234.
[27] 'Evolution of the Railway' in Pratt, *Inland Transport*, pp. 195-221.
[28] Bagwell, *Transport Revolution*, p. 76.
[29] J. H. Clapham, *An Economic History of Modern Britain: The Early Railway Age 1820-1850*, 2nd edn (Cambridge: Cambridge University Press, 1967), p. 381.
[30] Simon Winchester, *The Map That Changed the World: The Tale of William Smith and the Birth of a Science* (London: Viking, 2001).
[31] L. T. C. Rolt, *Navigable Waterways* (London and Harlow: Longmans, 1969)*;* Hadfield, *British Canals;* Hadfield, *Canals of South Wales*; Charles Hadfield, *The Canal Age* (Newton Abbott: David and Charles, 1968); Mark Baldwin and Anthony Burton, *Canal: A New Look: Studies in honour of Charles Hadfield* (Chichester: Phillimore, 1984).

Most accounts of canal and tramroad construction informing this chapter have been provided by enthusiasts' web sites and publications, which is an indication of how canal-tramroad networks have been marginalized in academic history.[32] The thesis by John van Laun and the work of Gordon Rattenbury, for example, are exceptions.[33] Hadfield organized his substantial body of work into regional accounts of canal systems, rather than discrete studies on individual canals.[34] Canal-builders with their associated tramroads faced immense problems in altering the physical environment with limited technologies by modern standards, despite the significant advances in engineering techniques which made the canal-tramroad networks possible. See Figure 3 on the cutting of an eighteenth-century canal. With the benefit of the historian's memory, this technology could be regarded as 'primitive' but to contemporaries canal-building and tramroads constructed of cast iron rails were advanced technologies which changed their world. The historical marginalizing of the canal and tramroad systems, along with the essential horse, from the late eighteenth century to the coming of the railway in the 1830s distorts not only transport history, but also economic, industrial and social history.

[32] Hugh Conway-Jones, *The Gloucester and Sharpness Canal: An Illustrated History* (Stroud: Tempus, 2003); Aubrey Byles, *The History of the Monmouthshire Railway and Canal Company* (Cwmbran: Village Publishing, 1982); Chris Barber, *Exploring Hill's Tramroad: A Remarkable Feat of Engineering* (Abergavenny: Blorenge Books, 2012); W. W. Tasker, *The Sirhowy Tramroad and Railway in Monmouthshire* (Shrewsbury: Tasker, 1972); J. B. Calvert <http://mysite.du.edu/~jcalvert/tech/woodtred.htm> [accessed 16 June 2020]; Phil Jenkins <http://industrialgwent.co.uk/wales.htm> [accessed 27 May 2021].

[33] John van Laun, 'Early Limestone Railways of south-east Wales' (unpublished doctoral thesis, University of Hull, 1999); Gordon Rattenbury, *Tramroads of the Brecknock and Abergavenny Canal* (Oakham: Railway and Canal Historical Society, 1980); Gordon Rattenbury and M. J. T. Lewis, *Merthyr Tydfil Tramroads and their Locomotives* (Oxford: Railway and Canal Historical Society, 2004).

[34] Charles Hadfield, 'An Approach to Canal Research', *Journal of the Railway and Canal Historical Society*, 1.3 (1955), 23-26.

Figure 3 The construction of an eighteenth-century canal: the Fourteen Locks (Newport)[35]

Gloucester: the world's first ship canal 1793-1827[36]

The English canal network had struck a chord in the ambitions of Gloucester's élites who imagined that Gloucester, as a port, could provide the link between industrialized England and world trade if they could make the lower Severn south of Gloucester navigable. Gloucester's canal was the world's first ship canal which opened seventy years before the renowned Manchester Ship Canal and which established Gloucester as probably the first inland canal port in the British Isles.[37] In the late eighteenth century, Gloucester was a traditional county town serving as the administrative centre of the county and as a central focus for marketing agricultural produce in Gloucestershire.[38] It was also an important arterial centre for land communications between London and the west, including Wales and Ireland. Land

[35] The Fourteen Locks Centre <https://mbact.org.uk/fourteen-locks-history> [accessed 12 March 2017].
[36] C. Bartholomew, 'The Earliest Modern Ship Canal', *Scientific American*, 90 (1904), 8.
[37] J. D. Porteous, *Canal Ports: The Urban Achievement of the Canal Age* (London: Academic Press, 1977).
[38] N. M. Herbert, *A History of the County of Gloucester*, vol. IV, *The City of Gloucester* (Oxford: Published for the Institute for Historical Research by Oxford University Press, 1988).

routes to the west went through Gloucester rather than Bristol in order to avoid having to cross the Severn using the dangerous New Passage.[39] The concept of an inland port was new in Gloucester's landscape.

Difficulties in navigating the Severn had restricted Gloucester's potential expansion as an inland port and its sea trade. The region's trade was dominated by Bristol, an inland port but made accessible by the tidal range of the Severn Estuary which raised river levels in the Avon as well as in the Severn. The Avon, however, at spring tides was more navigable that the lower Severn on the approach to Gloucester. Despite its disadvantages in land communications compared with Gloucester, the importance of sea communications for both global and coastal trade enabled Bristol to act as an entrepôt for the Bristol Channel region. Gloucester was dependent upon Bristol's sea trade both inwards and outwards as small sailing ships and barges ferried commodities between Bristol and Lydney, a harbour on the Severn, and from there, to and from Gloucester. In both status and in commerce, Gloucester lay in the shadow of Bristol despite its advantageous land position in respect of London, the Midlands and central England. The developing canal system in England posed threats to Gloucester as it strengthened the position of other towns on the Severn. In her doctoral thesis, Evelyn Christmas has described the situation that faced Gloucester in 1820.

> the age-old limitations affecting Gloucester's long distance trade on the Severn had not been overcome, so that Bristol, to the south, with Worcester to the north, dominated the shipment of cargo up and down the river... the balance of advantage was changing everywhere with improved means of communication. Canal development had enabled Stourport to eclipse Bewdley and had emphasised the weakness of Gloucester's position. It was therefore vital that the Gloucester Berkeley Canal should be completed to redress the balance and open up new prospects.[40]

The strategic vision

By the 1790s there was a potential solution to the problem of the lower Severn. If it was not navigable, it could be by-passed with an artificial waterway fed by the Severn. This solution was new and required a different way of looking at the world. The technical improvements in canal construction in the way of locks and gates were not needed in Gloucester canal because the terrain was flat. The technology used in

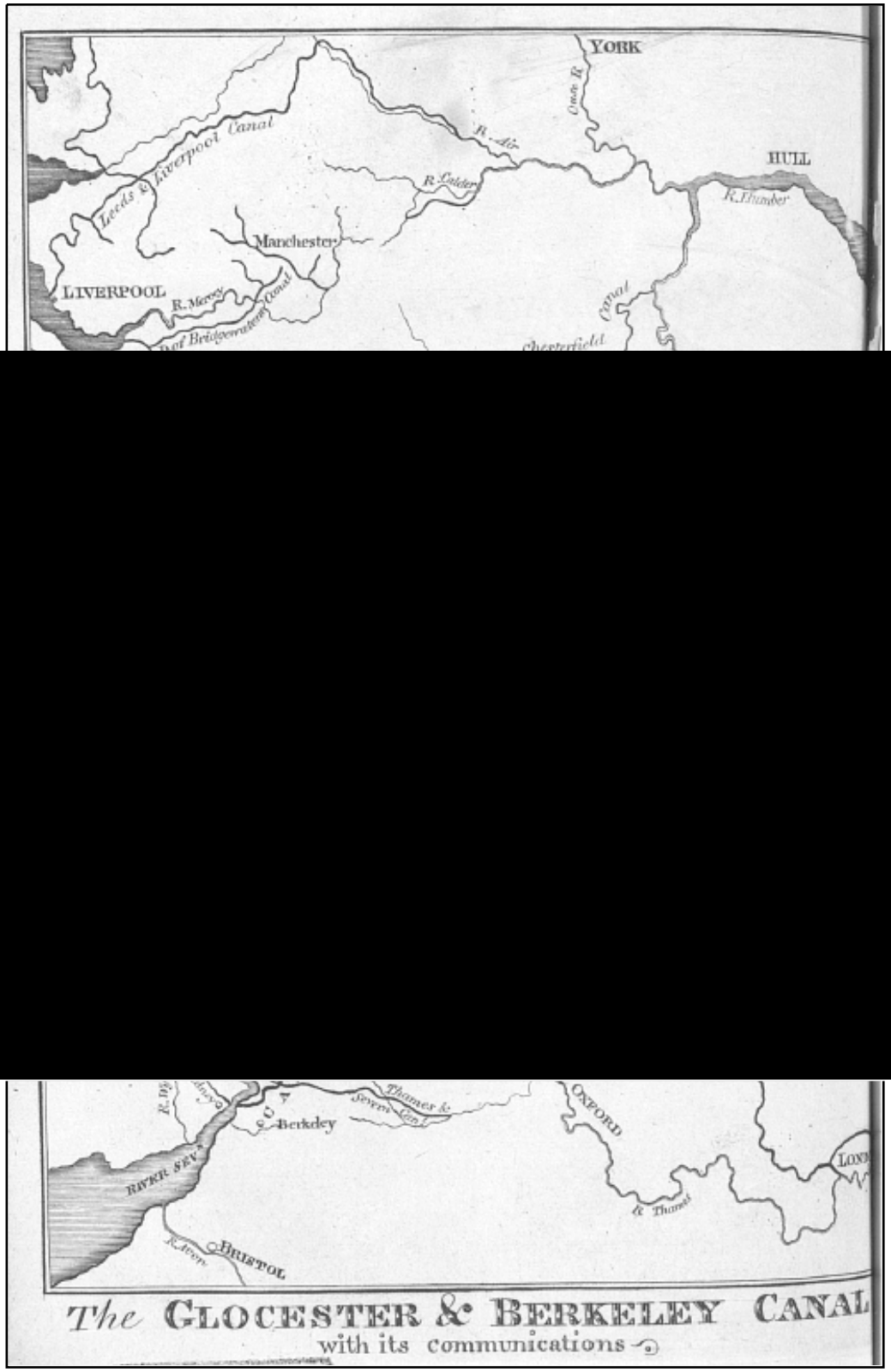
[39] Charles G. Harper, *The Oxford, Gloucester and Milford Haven Road*: *The Ready Way to South Wales*, 2 vols (London: Chapman and Hall, 1905).
[40] Evelyn A, Christmas, 'The Growth of Gloucester 1820-1851: Tradition and Innovation in a County Town' (unpublished doctoral thesis, Leicester University, 1989), p. 36.

Gloucester's canal was not significantly different from traditional flat canals. What was different was the idea that the Severn immediately south of Gloucester could be circumvented using a canal that could take ships, thus creating a port at Gloucester, 'bringing the coast inland', to use Phillips's expression. The English canal system had used the complex of rivers as a source of water and river valleys for canal routes. In parts, the system had used navigable rivers to complement canals. Gloucester proposed to do the same by by-passing the unnavigable Severn and connecting the canal to the navigable part of the river further south near Berkeley, giving access to the sea.

Shortly before the eventual opening of the canal in 1827, the Canal Company published a pamphlet giving a history of the canal which included an account of the objectives which lay behind the canal. The pamphlet included a map indicating the strategic context of the port's development (see Figure 4). By the late 1780s, England's canal system had opened up opportunities for Gloucester as well as being a threat. The city's projected port could potentially provide an import-export facility for the heartland of industrial England to rival Liverpool and free itself from Bristol. The 1826 pamphlet emphasized the strategic position of Gloucester which would be enhanced by the ship canal and focused attention upon the 'Canal Cross' which placed Birmingham at the centre of the canal system. The 'Canal Cross' has been attributed to Brindley's vision of a canal network that connected Liverpool with London and the Trent with the Severn with Birmingham at the crossroads.[41] The pamphlet published a 'Table of Distances' to demonstrate the advantages Gloucester would hold over rivals once the canal was completed. The table reflected a growing awareness of the importance of distance and how artificial communications could exploit 'near' and 'far'. See Table 3.

[41] C. J. Gilson, 'The Wyrley and Essington Canal', *Journal of the Railway and Canal Historical Society*, 6.4 (1960), 70-74, (p. 72).

Figure 4 The strategic context of the Gloucester and Berkeley Canal[42]



[42] *The Gloucester & Berkeley Canal* (London: Hume Tracts, 1826).

Table 3 Table of Distances[43]

Canal Route	Distance (miles)
London-Birmingham via Warwick	154
London-Birmingham via Coventry	180
Liverpool-Birmingham	116
Hull-Birmingham	152
Gloucester-Birmingham via the Severn and the Worcester and Birmingham Canal	60

The architects of the plan for a ship canal had taken a different look at Gloucester's geographical position compared to the past. Industrialization in England and its canal system changed Gloucester's landscape. According to the pamphlet, Birmingham was 'the centre of this important commercial and manufacturing district of the country' and the Table of Distances 'shews an important saving of distance in favour of Gloucester, and seems to point it out as the natural Port of Birmingham and the district around it, and communicating with it, both for imports and exports.'[44] Gloucester was better suited to trade with Ireland and the West Indies and for trade in wine and timber than Bristol and the pamphlet published anticipated comparative rates of duty between the two ports to Bristol's disadvantage. When the bill to authorize the creation of a ship canal to Gloucester was presented to Parliament in 1793, Bristol was perfectly aware of the threat posed by the port of Gloucester. On 25 February 1793, Bristol presented a petition to Parliament opposing the Gloucester and Berkeley Canal: 'they are exceedingly apprehensive should such a bill pass into law; it will prove essentially injurious to their interests, and to the welfare of the city of Bristol."[45] Bristol's landscape had also changed.

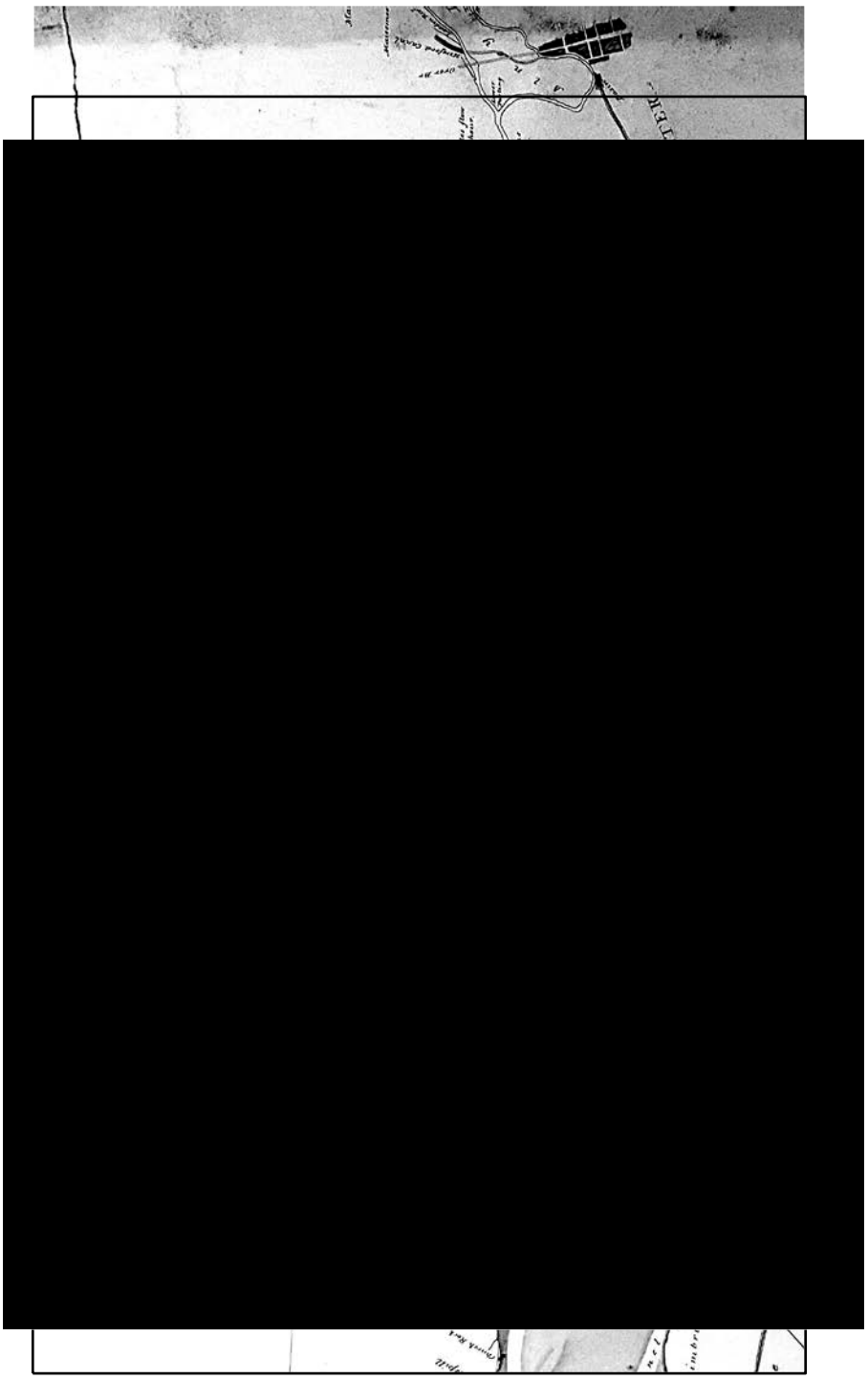
Challenge and opportunity

The principal obstacle to the creation of Gloucester as an international port to rival Bristol was the lower Severn, where navigation was particularly difficult and hazardous in the passage from Lydney to Gloucester. Access to Gloucester quays was impossible for any sailing ship of any significant size beyond Lydney. William

[43] *Gloucester & Berkeley Canal*, p. 9.
[44] *Gloucester and Berkeley Canal*, p. 9.
[45] W. E. Minchinton, 'Politics and the Port of Bristol in the Eighteenth Century', *Bristol Record Society*, 23 (1963), cited on p. 181.

Clegram's chart of the Severn in 1830 showed clearly the navigation difficulties (see Figure 5). The river, however, also presented an opportunity. Further south towards the estuary, the river was navigable for larger ships. Although the river presented a problem for Gloucester, it also suggested a solution.

Figure 5 The Lower Severn[46]



[46] Gloucester Archives (GA), D2460/3/6/4, William Clegram, *The Chart of the Severn*, 1830.

In 1816 Richard Thomas from Falmouth published a pamphlet suggesting improvements to the Severn's navigation.[47] He had conducted a similar exercise in Falmouth. The pamphlet may not have been welcomed by the canal proprietors whose interests were served by keeping the lower Severn unnavigable.[48] His commentary on the lower Severn did, however, indicate the problems of navigation in this part of the river which could only be resolved by by-passing the lower Severn entirely with a canal. As with Brindley's principle, the Severn would provide the water.

According to Thomas, the navigation of the Severn had been neglected to such an extent that 'my astonishment is not, that so many vessels from time to time, have been lost; but that from the neglected state of the river, and from the ignorance of many of those who navigate it, their number should have been so few.'[49] The sands in the bend of the river at Frampton near Berkeley Pill were 'caused by the extraordinary rapidity of the tides, constantly tearing up the surface of the shoals'.[50] The ebb and flow of the river created two channels in Frampton Sands which 'is a source of danger, because the flood channels are generally imperfect, ending on shoals, over which vessels, upward bound are carried by the tide ... they become liable to roll over and be lost.'[51]

The tidal range of the lower Severn meant that on the ebb tide, the river was almost drained. Like other parts of the river, Newnham had a bed of rocks which ran across the channel which were 'so even as to be often forded at low water by carts and waggons' when the water level dropped to around two feet.[52] The rocky beds that crossed the river 'impede laden vessels from passing, unless on spring tides, or when there is plenty of back water.'[53] Although the tidal range flooded the lower Severn as far as Gloucester making it navigable for brief periods for trows and barges on the spring tide, the force of the tides created 'extensive shoals' which were 'always increasing and new shoals are continually forming which will in time rise so

[47] GA, C12 6GS J14.1GS, Richard Thomas, *Hints for the Improvement of the Navigation of the Severn, comprising information which may be applicable to other navigations* (Falmouth, Brougham, 1816).
[48] Hadfield, *British Canals*, p. 131.
[49] Thomas, *Navigation*, p. 6.
[50] Thomas, *Navigation*, p. 10.
[51] Thomas, *Navigation*, p. 11.
[52] Thomas, *Navigation*, p. 8.
[53] Thomas, Navigation, p. 6.

high as to create new dangers.'[54] The tortuous path of the lower Severn combined with the ferocity of the tide was also liable to flooding which, as described in 1904, 'was hardly used at all for navigation on account of the dangerous shifting sands and great strength of the tide.' Navigation was limited to trows to avoid the canal tolls, which was similar to the description reported to the Canal Assembly in 1816.[55]

In 1793, the problems presented by the lower Severn and their solution in the form of a ship canal may have been clear, but implementing the vision of the initial subscribers proved to be a tortured process afflicted by a series of delays. There were problems in raising the money for the canal, acquiring sufficient expertise and availability of canal engineers, technical issues regarding the unprecedented size of the proposed canal, problems with the purchase of land and the war with France (1803-1815). The canal's original route was outlined in a chart produced by a Mr. T. Pinnell in 1792, which was 17¾ miles long (see Figure 6). According to the Act, the canal was intended to be 70' wide and 18' deep making it the largest in the world designed to accommodate ships of 300 tons. The land was flat and did not require locks, except for the basins at Berkeley and Gloucester docks and the Act authorized the construction of reservoirs to provide sufficient water for this immense canal.

Issues with finances and engineers

There were over 100 subscribers listed in the Bill that was passed in 1793 authorising the construction of a canal from Gloucester to Berkeley Pill who represented interests from both Gloucester and the Midlands with capital outlay of £200,000.[56] The subscribers were a diverse group, representing a range of interests across Gloucester and Shropshire, and not dominated by any specific interest group. Robert Raikes, Gloucester philanthropist and owner of the *Gloucester Journal*, and two Aldermen and former mayors of Gloucester, Thomas Weaver and Thomas Mee, were among the subscribers together with Willam Price, timber merchant, John Coles, ironmonger, the Shropshire ironmasters, William Reynolds and John Wilkinson and the Skey family of merchants and bankers from Bewdley.[57] Weaver was also a leading pin manufacturer in Gloucester and had interests in copper smelting.

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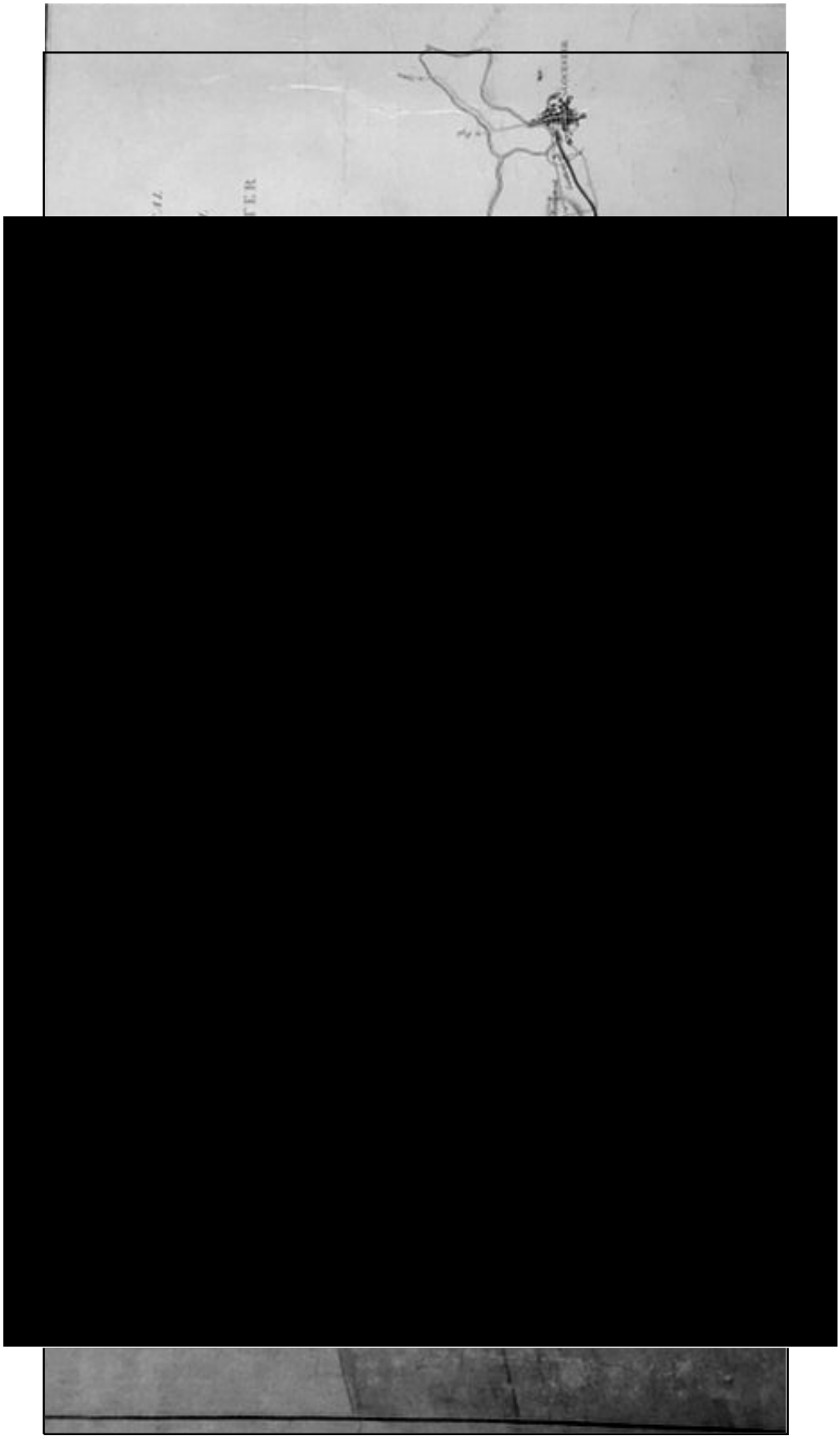
[54] Thomas, Navigation, p. 22.
[55] Henry Rodolph de Salis, *Bradshaw's Canals and Navigable Rivers of England and Wales* (London: Henry Blacklock, 1904), p. 322.
[56] Canal and River Trust, <https://canalrivertrust.org.uk> [accessed 8 June 2021].
[57] Herbert, *City of Gloucester*.

Figure 6 The proposed route of the Gloucester and Berkeley Ship Canal (1792)[58]



[58] GA, D1278/P4, T. Pinnell, *Gloucester and Berkeley Canal from Berkeley Pill to Gloucester* (1792).

Raising sufficient capital to complete the canal was a continuing problem for the company. The Canal Committee experienced continuing problems with subscribers defaulting on their responsibilities. In an early report to the General Assembly, the Committee anticipated some of the problems with some subscribers.

> It is not within their apprehension ... either to offer apologies for, or bring accusations against, any of the original subscribers to this undertaking... one principal cause of the delay, that has obtained in their proceedings, arises from the tardiness that has marked the conduct of some of those persons to fulfil their engagements.[59]

There were regular reports to the Committee on defaulting subscribers with instructions to pursue legal proceeding against proprietors.[60] By the turn of the century, there were a number of reports of the bankruptcies of subscribers, including that of the treasurer, Sir James Self and of the need to re-allocate shares.[61] Shortly after the passing of the Act in 1793, war broke out in Europe and a statement made to the Assembly in March 1807 indicated the negative impact the war had on raising capital as 'the value of the shares in common with all other kinds of public ventures being considerably diminished, the landowners in general declined taking the shares reserved for them'.[62] The company's capital had been expended before half the work was completed, and it proved difficult to raise the additional sums required. By 1798, work had effectively stopped on the canal due to a combination of lack of capital and rising costs and would not resume until the end of the war with France in 1815.

The proprietors also faced problems with recruiting skilled engineers. One of the immediate problems which would continue until the intervention of Thomas Telford and the Loan Commissioners in 1818 was the availability of the technical skills required to construct a canal of this magnitude given the great demand for skilled engineers during the 'canal mania' of the 1790s. Although Pinnell's chart showed the proposed line of the canal which had accompanied the bill of 1793, the first meeting of the General Assembly of the proprietors chaired by the Mayor of Gloucester following the passing of the Act, was clearly unimpressed by the

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[59] TNA, RAIL 829/1 Gloucester and Berkeley Canal Company. Minutes of the General Assembly, 1793-1823, 31 March 1794.
[60] TNA, RAIL 829/3, Gloucester and Berkeley Canal Company. Minutes of Proceedings of the Company, 1793-1796, 22 May 1796; TNA, RAIL 829/1, 22 May 1797, TNA, RAIL 829/1, 31 March 1800.
[61] TNA, RAIL 829/1, 22 May 1797, 26 March 1798, 24 September 1798.
[62] TNA, RAIL 829/1, 11 March 1807.

technical abilities available to them. These reservations may not have applied to Pinnell who was regularly used as a cartographer. The Assembly required the Canal Committee

> to make no engagement in any business of importance until the whole line of the canal shall have been surveyed by the most experienced person they can employ and they shall have engaged as superintendent of the works some person whom they deem well qualified for such a situation ... by this resolution they do not mean to insinuate any distrust whatever of the abilities of the Gentlemen who have been already employed...[63]

At the time, civil engineering was in its infancy.[64] There were relatively few engineers who could demonstrate competence in the skills required, particularly when tramroads were included in canal networks. Canal-building involved a range of skills in negotiating the terrain engineers faced. There were usually locks to construct, along with aqueducts, tunnels and tramroads and engineers were also responsible for the work of subcontractors, surveyors, the costing of projects and budget management. Many of the successful engineers began as apprentices in other crafts and learnt their skills in canal and tramroad construction by working on projects led by more experienced engineers. Although not formally trained in civil engineering, they benefited from the connection between science and engineering.[65] Engineering, however, also attracted recruits from privileged, educated backgrounds like Robert Mylne, who became the principal engineer on the Gloucester and Berkeley Canal.[66]

It was common practice for canal proprietors to engage a principal engineer who then oversaw the work of a less experienced or accomplished resident engineer. As Hadfield has pointed out the arrangement was fraught with difficulty. Skilled and experienced engineers were at a premium during the canal mania who took on more than they could 'carefully deal with. It resulted therefore that they seldom visited the site unless a crisis occurred' and were dependent upon the reports of the resident engineer who was less skilled and 'if they were incompetent, the damage was done

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[63] TNA, RAIL 829/1, 4 June 1793.
[64] A. E. Musson and E. Robinson, 'The Origins of Engineering in Lancashire', *The Journal of Economic History*, 20, 2 (1960), 209-233.
[65] A. E. Musson, 'Science and Industry in the Late Eighteenth Century', *The Economic History Review*, New Series, 13 (1960), 222-244.
[66] Brian Harper, 'Civil engineering - a New Profession for Gentlemen in Nineteenth Century Britain?', *Icon*, 2 (1996), 59-82; R. A. Buchanan, 'Gentlemen Engineers: The making of a Profession?', *Victorian Studies*, 26, 4 (1983), 407-429 ; Roger Woodley, 'Robert Mylne (1733–1811)', *Oxford Dictionary of National Biography* <https://doi.org/10.1093/ref:odnb/19701> .

before the chief engineer hear about it.'[67] The Committee was clearly conscious of this. Gloucester did not have the range of industries or skills appropriate for canal construction and was inexperienced in the industrial and commercial changes and technologies that characterised central and northern England, or south Wales. The rationale behind the canal had been to address this relative isolation and the canal project suffered as a result. Completed canals often greatly exceeded their initial estimates which required additional Acts to authorize raising extra capital. The Kennet-Avon Canal was approved in 1794 linking Bristol with London at a projected cost of £420,000 but Bristol merchants had the wealth, supported by London interests, to purchase the skills and expertise they needed as well as meeting the capital costs of construction. However, it still took until 1810 to complete the canal at over double its estimated cost which was delayed due to problems with finance and engineering expertise.[68] Gloucester had a similar experience. The city was essentially a county town attempting to intervene in a changing world of trade based upon the ability to ship commodities through canals and ports, of which Gloucester had little experience.

The Canal Committee had been unsuccessful in recruiting the experienced engineers Robert Whitworth or William Jessop as their principal engineer. Robert Whitworth had been the engineer on the Thames-Severn Canal and had previously worked with Brindley on the Staffordshire and Worcester Canal and the Trent and Mersey Canal.[69] William Jessop's career was illustrative of how many canal engineers developed their expertise. The son of a quartermaster at Devonport, Jessop began his career apprenticed to Joseph Smeaton, who 'did more than anybody to lay the foundations of the British engineering profession', and served as an apprentice and then assistant to Smeaton. 'In these capacities he obtained wide experience in engineering work on river navigations, canals, harbour works, and land drainage projects.' Smeaton enrolled Jessop in the Society of Civil Engineers (1772) which served as an early avenue for the exchange of information and ideas between engineers. [70] Thomas Telford began his working life as an apprentice to a stonemason at Eskdale and later worked as an architect and stonemason in London

[67] Hadfield, *British Canals*, p. 127.
[68] Hadfield, *British Canals*, p. 79.
[69] R. J. Dean, 'Sir Richard Whitworth and Inland Navigation', *Journal of the Railway and Canal Historical Society*, 120 (1982), 42-46.
[70] Angus Buchanan, 'William Jessop (1746-1814)', *Oxford Dictionary of National Biography*, <https://doi.org/10.1093/ref:odnb/37604>.

and Shrewsbury, but without any formal qualifications. Jessop and Telford later worked together on the Caledonian Canal.[71] Thomas Dadford Sr. worked on a number of English and Welsh canals with his sons who became engineers in their own right, Thomas, John and James. He began his early career working under the direction of Brindley on the Staffordshire and Worcester Canal and the Birmingham Canal Navigation. His eldest son, Thomas Dadford Jr., (1761-1801) worked with his father on the Glamorganshire Canal, together with another engineering father and son, Thomas Sheasby Sr. and son who were also engineers on the Swansea Canal.[72] Thomas Dadford Jr. was the principal engineer for the Brecon-Abergavenny and Monmouth canals; his brother James was appointed to a similar position on the Gloucester-Berkeley Canal, succeeding Robert Mylne. The routes to canal engineering expertise were mostly informal and practical.

In a report to the General Assembly on 27 October 1794, the Committee was clear about the size of the engineering task facing them.

> The dimensions and magnitude of all parts to be constructed, adequate to the great purpose of its utility, are beyond all precedent in this or any other Country: your Committee therefore trust, as they have but faint and limited examples from the comparatively small canals of this Kingdom (which partake in no instance of the nature of harbours for large sea vessels)...'

The Committee embarked on their project with justified caution and a key relationship for the success of the project was that with their chief engineer. Although technical difficulties had been anticipated at the first General Assembly in 1793, probably the most challenging aspect of the early work of the Canal Committee was the relationship between the chief and resident engineers and the advice which the Committee received from their engineers. In September 1793, the Committee reported to the General Assembly that they had appointed Robert Mylne as their Superintendent Engineer who had worked for the canal committee previously in calculating the estimated costs of the canal.[73] Although William Jessop and Robert Whitworth had both declined invitations to become principal engineers for the project, they offered to provide advice if required. They were contacted, for

[71] Roland Paxton, 'Thomas Telford (1757-1834)', *Oxford Dictionary of National Biography* <https://doi.org/10.1093/ref:odnb/27107>.
[72] Engineering Timelines, <http://www.engineering-timelines.com/who/dadford_T/dadfordThomas.asp> [accessed 11 August 2020].
[73] TNA, RAIL 829/1, 30 September 1793.

example, in 1796 for their observations on Mylne's plan for erecting banks along the canal to contain the water.[74] The Committee's contact with Whitworth and Jessop probably indicated that it did not have complete confidence in Mylne, but had few options. The Committee had similar difficulties in appointing a resident engineer, but eventually settled for James Dadford in 1794 after two unsuccessful appointments with Dennis Edson and Robert Pinkerton.[75] Dadford appeared to gain the confidence of the Canal Committee and he attended Committee meetings regularly.

The Committee's relationships with their chief engineer were turbulent, as was Mylne's relationship with Dadford. Most chief engineers infrequently attended their canals in person and Mylne was no exception. In April 1794, the Committee wrote to Mylne following an Assembly meeting in March requesting his attendance to clarify some issues relating to variations in the canal's route. The Committee forwarded the report that was presented at the Assembly meeting, together with the subsequent resolutions in the wake of the report for his advice.[76] A month later, the Committee contacted Mylne again as frustrations rose. The letter 'reminded' Mylne that 'the Committee have long been anxiously expecting his attendance at Gloucester and are now, for many mighty reasons, impatient to see him there.'[77] At the same meeting, Mr. Pinnell who had surveyed the route in 1792 was ordered to undertake a further survey of the line. In May, the Committee wrote to the Bristol and Severn Canal Committee that they had delayed the projected Assembly meeting to discuss the potential connections between the two canals and made little attempt to hide their frustrations. The Committee had to delay the meeting 'in the daily expectation of learning from, or seeing, Mr. Mylne, who has proposed some alterations at Berkeley.'[78]

Relations between the Committee and Mylne deteriorated significantly during 1796. Mylne's lengthy report to the General Assembly in January 1796 gave a revised estimate of the cost of £169,440 8s 9½d., compared with his estimate in June 1794 of £121,500.[79] Mylne pointed out that labour accounted for half the cost and was scathing regarding the contracts that were awarded for cutting the canal and the

[74] TNA, RAIL 829/3, 13 April 1796.
[75] TNA, RAIL 829/3, 15 October 1793.
[76] TNA, RAIL 829/3, 4 April 1794.
[77] TNA, RAIL 829/3, 6 May 1794.
[78] TNA, RAIL 829/3, 29 May 1794.
[79] TNA, RAIL 829/1, 8 January 1796.

processes for payment which he considered to be incompetent. His comments were a barely veiled criticism of the Committee and of Dadford. 'You have had the great misfortune of placing a person to set out these ... works, in so slow ignorant and inaccurate a manner that it has had an inconceivable influence against reasonable prices.' He was also critical of the process of awarding contracts. 'I don't think there has been as yet sufficiently extended competition. Making contracts was at first postponed beyond proper time – and making additional contracts, after the first essay, was retarded from unaccountable delay, unknown but lamented by me...' The Committee was admonished for not following his advice. 'I advised a plain simple manner of proceeding and contracting from the beginning and have always lamented the contrary.'

By 1796, it was clear that the Committee had lost confidence in Mylne. In the April meeting of the Committee, for example, it was resolved to ask Jessop and Whitworth for their observations on Mylne's plan for a quay wall in Gloucester's basin.[80] The denouement with Robert Mylne came in March 1798. James Dadford reported on the basin at Gloucester which had been completed except for the collapse of the north wall.[81] Mylne had been unable to attend but had written to the Committee and attributed the collapse of the wall to Dadford:

> when the Committee were pleased, rather unkind to me, and perhaps unguardedly for themselves, to give and delegate a power to the executive Engineer, to alter the works of the Lock from my design and construction ... the Committee laid the foundation of error and I am afraid of misfortune.

Robert Lucas, a proprietor, expressed his exasperation at the costs of the project and the failure of engineering in a letter to the Committee. The original project was 'clearly beyond the reach and ability of the Company's resources' and he suggested an alternative terminal point for the canal at Hock Crib. In his opinion, the costs of engineering were significant in this failure: 'the sums paid on this score are enormous and far exceeding in the opinion of every body the services performed... little else than errors appear in return for them; and some of them fatal to the original design.' The basin at Gloucester was 'a mortifying sight.'[82] The meeting resolved that 'Mr. Mylne be no longer employed on the Business of this Company.'

[80] TNA, RAIL 829/3, 1 April 1796.
[81] TNA, RAIL 829/1, 26 March 1798.
[82] TNA, RAIL 829/1 5 August 1796.

However, in 1798 the company's capital was expended, Dadford left and the canal project was in hiatus over finances. Relationships between Mylne, Dadford and the canal proprietors, and the use of Whitworth and Jessop as consultants were indicative of the difficulties relating to engineering expertise and contributed to the escalating costs of the project.

The ending of the war with France in 1815 brought renewed optimism that the canal could be completed. John Upton, who was a clerk in the company, undertook a survey of the canal and before he left the company in 1816, having defrauded his employers, Upton presented his report in February 1815.[83] He proposed changing the entrance to the canal at Sharpness Point instead of Berkeley Pill or Hock Crib which had also been suggested. He criticized various aspects of the canal's construction and charged the company with 'the great negligence of some persons engaged.' The Committee acted 'incautiously' when replacing Mylne with Dadford, who, 'of all men, was the most unfit'.[84] Upton concluded on the canal's history that 'it is truly deplorable to observe that obstinacy, self interest and prejudice have formed a powerful coalition to render the completion of this noble Canal obnoxious in the public estimation!'[85] The following year, Upton published his revised route (see Figure 7).

Despite the criticisms made by Mylne and Upton, and the clear failure of the company to complete the canal by 1800, the proprietors were in an impossible position. Their two main problems in the canal project – money and engineering expertise – were largely outside their control. However, by 1815 the situation had changed in both respects. Armed with Upton's *Observations* and a revised plan and route, in their report to the proprietors at a Special Assembly meeting of the canal company in May 1816, the Committee re-stated the strategic position of Gloucester and the promise that the canal held for the future. The trade of the port of Gloucester was limited by 'the dangerous and uncertain navigation of the Severn to and from Bristol, South Wales and the Forest of Dean, to Gloucester.'[86]

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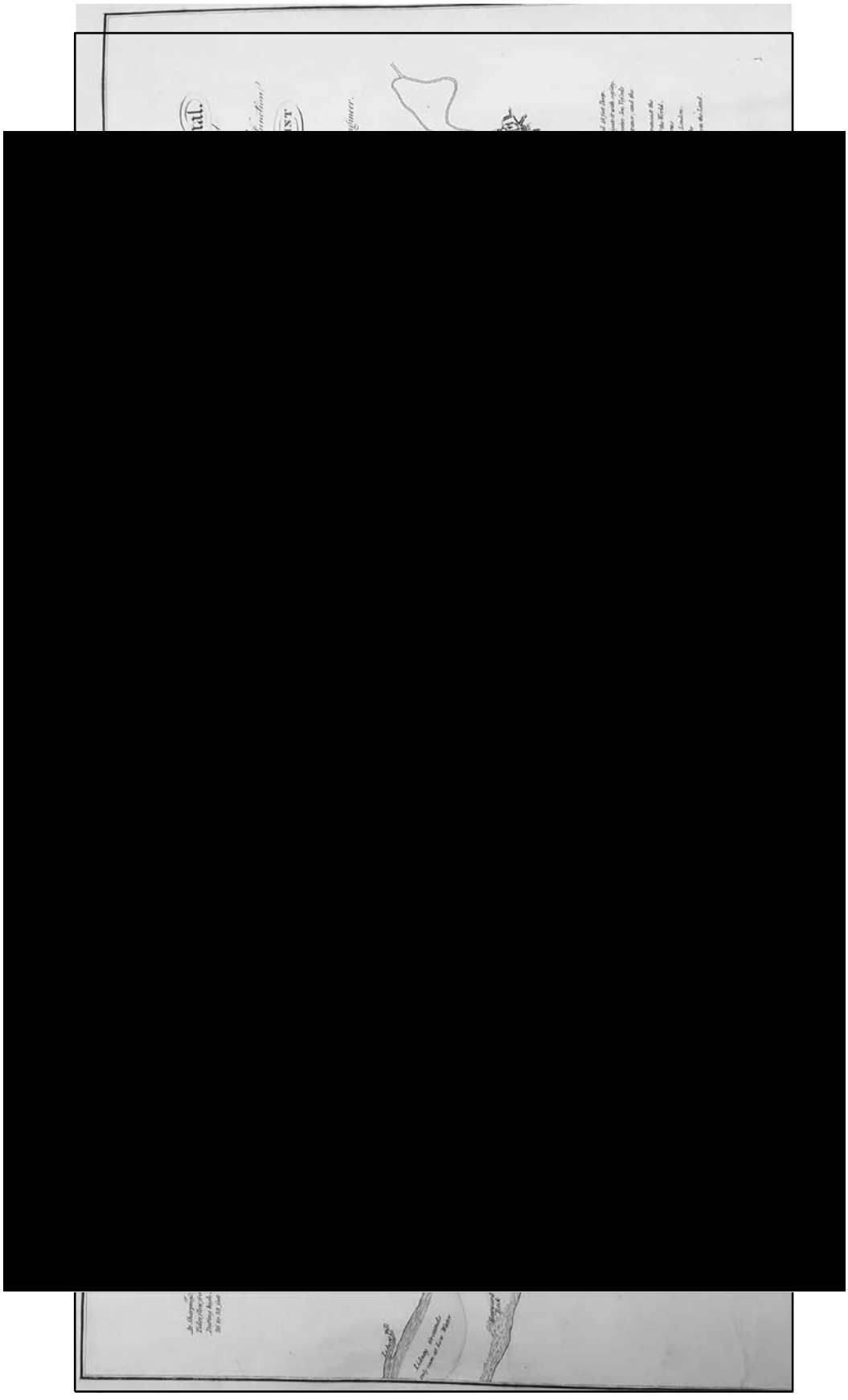
[83] GA, D149/E69, John Upton, *Observations on the Gloucester and Berkeley Canal, comprising remarks on the Past, Present and Future Management of that Important Undertaking* (Gloucester: *Gloucester Journal*, 1815).
[84] Upton, *Observations*, p. 13.
[85] Upton, *Observations*, p. 27.
[86] GA, C12 6GS J14.1GS, *Report of the Committee of the Gloucester and Berkeley Canal Company to the proprietor Special Assembly*, 7 May 1816, p. 11.

Figure 7 John Upton's route for the canal with the entrance at Sharpness Point[87]



[87] GA, D149/P13, John Upton, *Plan of the Gloucester and Berkeley Canal*, 1816.

The report however, in its appeal to raise an additional £150,000 to complete the canal, reminded subscribers of the solution which had motivated canal development in the early 1790s. The geographical position placed Gloucester closer to Birmingham and London than Liverpool or Bristol and therefore the city

> would have a most decisive advantage over every other port in the kingdom... as the most central port for the distribution of commerce through the important manufacturing and trading middle districts of the kingdom, of which Birmingham may be considered as the grand centre of motion.[88]

If the strategic difficulties facing the canal proprietors were largely outside their control up to 1817, their solutions were also external. Following the end of the war with France, the ensuing depression in trade, industry and agriculture prompted the government to pass the Poor Employment Act in 1817 which established the Exchequer Loan Commission, empowered to grant loans to projects that stimulated employment.[89] Thomas Telford was one of the advisers to the Commission which granted loans of £160,000 towards the completion of the canal. The canal ultimately cost in excess of £400,000.[90] The Exchequer Loan Commission met the two requirements which had bedevilled the work of the Canal Committee from the inception of the project. The Commission provided the loans which helped finance the completion of the project and Telford provided the technical expertise sometimes directly but also by recommending skilled engineers.

Nonetheless, it still took another decade before the canal opened on 26 April 1827 to be greeted with celebrations in the city of Gloucester. It was the greatest canal in the world - 70' wide and 18' deep and could accommodate vessels of 600 tons carrying 1,000 tons in cargo. It was 16½ miles long to Sharpness Point; the same distance by river was 28 miles and had taken 34 years to complete.[91] In its coverage of the opening, the *Gloucester Journal* recounted the trials that various canal committees had endured with a sense of triumph that despite all the difficulties, Gloucester had won through. According to the *Gloucester Journal*, the residents came out in force to celebrate the opening. It was clearly significant to the people of

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[88] GA, C12 6GS J14.1GS *Report at a Special Assembly*, p. 12.
[89] Graham Boyes, 'The Exchequer Loan Commission as a source of railway finance', *Journal of the Railway and Canal Historical Society*, 109 (1978), 85-92.
[90] Christmas, *Growth of Gloucester*, p. 193.
[91] Hadfield, *British Canals*, pp. 126-132; Priestley, *Navigable Rivers*, pp. 291-295.

the city. The schooner, *Meredith Brand* and the sailing ship *Anne* of 300 tons made the journey from Sharpness Point to the basin at Gloucester

> accompanied by numerous persons, both on foot and on horseback ... all the way from the Point, and the nearer they approached their destination, the crowds continued to increase ... and every yard in advance for the last few miles brought an increase to the number of spectators, till, on approaching the city, the crowd which lined the banks was almost too dense to move.

The basin was 'a grand attraction ... surrounded by an immense mass of people of all classes.' The presence of such a huge sailing ship *Anne* within the inland city of Gloucester was described as a

> noble and imposing spectacle decorated with a profuse display of colours, and streamers may naturally be supposed to have excited the admiration of the thousands who accompanied her throughout the whole line of the canal; and the opportunity of viewing such a fine structure within the limits of this city, invites the attention of multitudes of spectators to an object, which may very properly be classed as one of the most important and magnificent achievements of human art.'[92]

The spectacle of two ships, accompanied by some smaller vessels, sailing through the Gloucestershire countryside towards Gloucester must have been a unique spectacle that turned the natural world around. The Reverend W.E. Witts recorded in his diary that the opening was 'a great holiday in Gloucester' and the entry of the ships at Gloucester basin was greeted by 'many thousands of spectators.' The mooring of the ships *Meredith Brand* and *Anne* in Gloucester's urban area were 'surrounded by a gaping crowd.'[93]

The impact of the canal

The canal transformed Gloucester's landscape. It became a successful port in its own right with a dramatic impact upon trade following the opening with port receipts increasing from £12,711 in 1825 to £160,484 in 1835.[94] The canal builders of the Gloucester and Berkeley Canal were building for a future they could not predict; they wanted to ensure that Gloucester could compete as best it could in an increasingly competitive world. They could not anticipate the impact of the steam engine on land

[92] *Gloucester Journal*, 28 April 1827.
[93] David Very, ed., *The Diary of a Cotswold Parson: Reverend F. E. Witts 1783-1854* (Stroud: Sutton Publishing, 2003), p. 62.
[94] *Power's Illustrated Handbook for Gloucester* (Gloucester: 1848), p. 66, cited in Herbert, *City of Gloucester*, Table VI.

and sea transport but its canal and its location on the lower Severn stood the test of time for the remainder of the nineteenth century. As Hadfield pointed out, the steam railway would be welcomed by the canal committee, rather than seen as a rival, because more rapid internal transport would enhance the trade of the port and the purpose of the canal was to establish a port.[95] Although unintended, the advent of steam transport on land and at sea did not pose a threat to the port of Gloucester, but enhanced the port.

While Gloucester did not develop to rival Bristol as an international port, it was a key to the economic development of Gloucester during the nineteenth century. In 1825, H. S Storer predicted that the Gloucester and Berkeley canal would be the most important event in the city's history and the celebrations that accompanied its opening suggest that the populace had a similar view.[96] In N. M. Herbert's assessment, 'its effect on Gloucester's foreign trade was immediate and dramatic and a rapid growth in trade continued until the mid 1830s' and shipping increased from 4,272 in 1828 to 7,576 in 1832.[97]

Table 4 Customs receipts for the port of Gloucester 1825-1835

1825	£12,711	1829	£57,400	1833	£106,751
1826	£19,006	1830	£90,282	1834	£131,118
1827	£28,550	1831	£94,155	1835	£160,484
1828	£45,428	1832	£109,657		

The positive impact of the canal and its port endured throughout the century and in Herbert's view, the canal 'was of primary importance to the economy' and 'was the main stimulus to commercial activity in the city and encouraged the growth of industry, particularly engineering and manufacture which came to dominate the economy in the later 19th century.'[98] The tonnage carried on the canal increased from 321,853 in 1832 to 654,714 in 1847 which had increased to 776,497 tons in 1896 and could accommodate ships of 1,200 tons, more than quadruple the initial

[95] Hadfield, *British Canals*, p. 130.
[96] H. S Storer, *The Delineation of Gloucester* (London, 1824), cited in Herbert, City of *Gloucester*, p.17.
[97] Herbert, City of *Gloucester*: 'Economic development 1792-1835', Table 6, pp. 135-141.
[98] Herbert, City of *Gloucester*, 'Economic Development 1835-1914', pp. 170-183.

projection. While the canal transformed economic life in the city, it was unexpected factors that contributed to this – the expansion of trade through the import of grain and timber for railways, rather than 'a mercantilist capturing of trade from other ports, mainly Bristol'.[99]

Along with the other great ports in the Bristol Channel, increasing trade and the size of steamships prompted Gloucester to construct ocean docks at Sharpness Point in 1874, ahead of Bristol's ocean docks at Avonmouth (1877) and Portishead (1880), which justified Upton's arguments in favour of Sharpness published in 1815. The dock construction at Sharpness was a testament to the importance of the docks in Gloucester's economy and its determination to sustain its position as an international trading port. The completion of the docks gave commentators the opportunity to restate the advantages that geography had bestowed upon Gloucester enhanced by new canal and railway links including the projected Severn Bridge railway. At a lecture in Colston Hall, a Dr. Carpenter commended the opening of the railway links by the Midland Railway and the Great Western Railway and the purchase of the Worcester and Birmingham Canal which opened a continuous water link between Gloucester and Birmingham.

> The two systems of railways open up to the port very large manufacturing and agricultural districts, and the Severn Bridge Railway, now in course of construction, would open to Gloucester ... the coal and mineral districts of the Forest of Dean, and, what was of more consequence to Gloucester, the coalfields of South Wales.

Following Gloucester's 'control' of the water way from the docks to Birmingham, Carpenter restated Gloucester's strategic theme: 'with these advantages, combined with its geographical position (the port being many miles nearer to Birmingham than any other in the kingdom), it was believed that a large trade would in a short time be centred at the place.'[100]

Geography had presented Gloucester with a challenge as well as an opportunity. It occupied a key position in land transport but potentially could also provide the industrial Midlands with access to the sea. The challenge was to overcome the un-navigable lower Severn which was achieved with an artificial waterway which, like the English canal system, looked at river systems with a new eye. Instead of trying to make rivers navigable, the valleys cut by rivers were used to

[99] Christmas, 'Growth of Gloucester', p. 260.
[100] *Stroud Journal*, 4 September 1875.

locate canals while the rivers provided were sources of water. It was a new way of looking at the world and brought the Severn Estuary nearer to Gloucester and Birmingham. The physical geography had not changed. Gloucester was the same distance from Birmingham and from the Severn as it had been for centuries. What had changed was Gloucester's landscape, of how it saw itself relative to others and technology had enabled Gloucester to diminish the distance between the city, the estuary and Birmingham.

The tramroad and canal network in Monmouthshire and Brecon

Across the Severn Estuary, the iron masters and colliery owners in northern Monmouthshire faced a different set of challenges in reaching the sea. The mountainous regions at the heads of the river valleys in south-east Wales were rich in minerals which were the foundation of manufacturing – iron, coal and limestone in the main – but the mines, factories and foundries were isolated from the markets for these heavy commodities. Although the rivers in Monmouthshire flowed in a south-easterly direction towards the sea, they were not navigable for the transit of these commodities and transport by road was slow and laborious using pack horses and waggons. Even on turnpike roads, the carriage limit for waggons was around two tons.[101] The iron masters in the neighbouring valley of the Taff had faced a similar problem and pioneered a solution in 1790 when they undertook to construct the Glamorganshire Canal connecting iron works and collieries to the port of Cardiff with tramroads providing access from the factories to the canal. [102]

Strategic vision

In Monmouthshire, the iron works, mines and quarries were spread across the heads of the valleys of the Rhymney, Sirhowy, Ebbw and Llwyd and not concentrated as they were around Merthyr Tydfil (see Figure 8). A canal system therefore faced

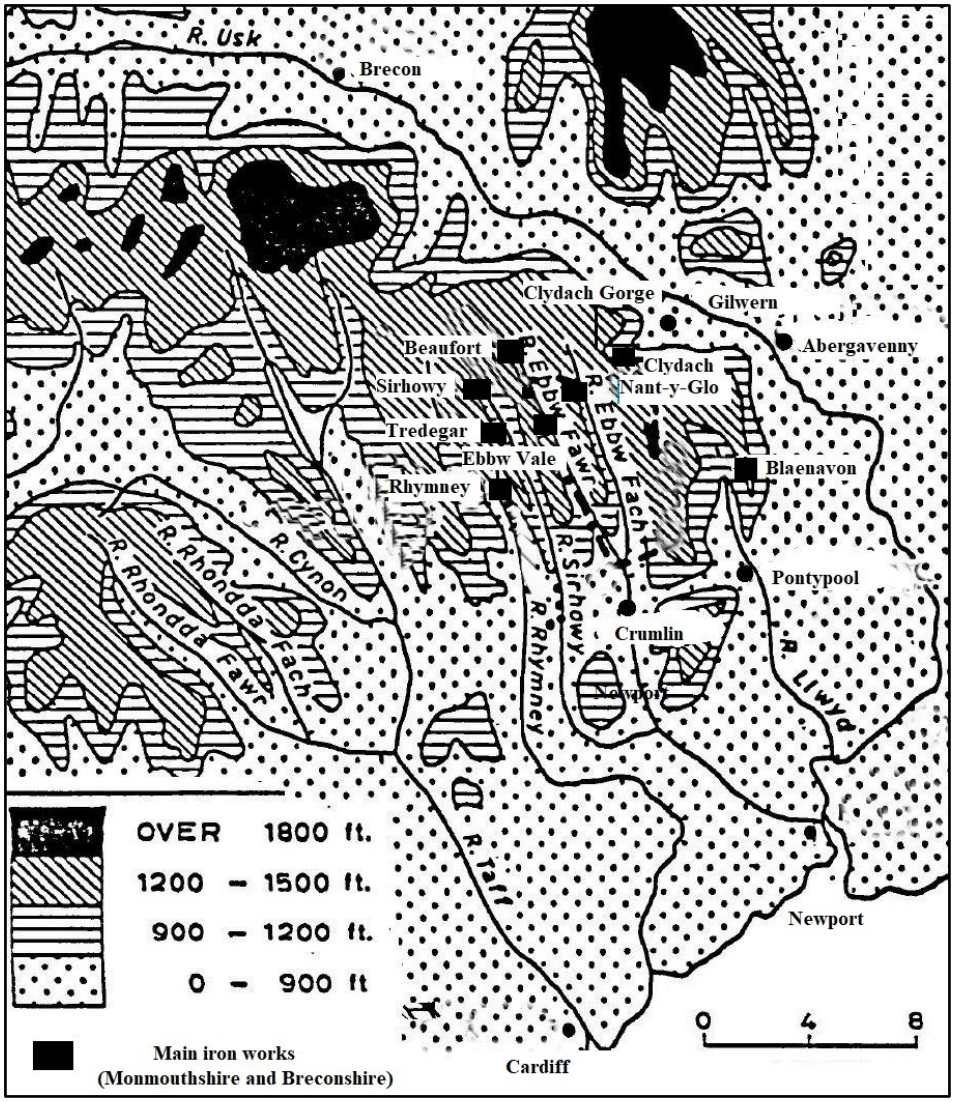
[101] Hadfield, *Canals of South Wales*, p. 90; Monmouthshire, Brecon and Abergavenny Canals Trust <https://mbact.org.uk/history-of-the-canals-overview/>[accessed 19 March 2019]; Canal Routes <https://www.canalroutes.net/Monmouthshire-and-Brecon-Canal.html#history> [accessed 3 June 2021].

[102] D. D. Gladwin and J. M. Gladwin, *The Canals of the Welsh Valleys and their Tramroads* (Oxford: Oakwood Press, 1974); Stephen Rowson and Ian L. Wright, *The Glamorganshire and Aberdare Canals: Two Welsh Waterways and their Industries*, vol 1, *Methyr Tydfil and Aberdare to Pontypridd* (Lydney: Black Dwarf Publications, 2001); Stephen Rowson and Ian L. Wright, *The Glamorganshire and Aberdare Canals: Two Welsh Waterways and their Industries*, vol 2, *Pontypridd to Cardiff* (Lydney: Black Dwarf Publications, 2004).

major difficulties in connecting the iron works to the sea at Newport. A single canal could not connect to the spread of iron works and due to the terrain and the lack of water which could only be resolved by constructing tramroads from the works to a canal that joined the Severn Estuary at Newport. The additional difficulty was that a tramroad could not connect all the iron works to a single canal because of the mountainous terrain. A canal that followed the Ebbw to Crumlin could not connect by tramroad to the Blaenavon works and other works and quarries to the east. The proposed solution in 1792 was to construct the Monmouth Canal with two branches, one to Crumlin following the Ebbw River (the Western Valley) and the other to Pontypool following the Clwyd (the Eastern Valley), each with a connecting tramroad network to the iron works and factories in both areas. This meant that the projected Monmouthshire canal and tramroad network would be far more extensive than any comparable network in the British Isles and in the most difficult terrain.[103]

[103] F. C. Warren, *The Monmouthshire and Brecon and Abergavenny Canals* (Newport: Joyce and Sons, 191?).

Figure 8 The iron works and topography of south-east Wales[104]



The proprietors of these schemes saw the opportunities that technology provided, at least in theory, to challenge distance through a combination of canals and tramroads that exploited potential pathways cut by rivers. The Monmouthshire Canal was motivated by industrialists seeking access to the sea for their commodities, while for Abergavenny, Brecon and Hereford their interests were those of consumers, rather than producers, although they did see opportunities for the sale of agricultural produce. The two canals contrasted in their backgrounds and ambitions but they shared the challenge that canal and tramroad construction faced.

The Act that authorized the Monmouthshire Canal in 1792 made clear both the objectives of the canal and the strategy for implementation.[105] The canal would

[104] Adapted from John Gwyn Davies, 'Industrial Society in North-West Monmouthshire 1750-1851' (unpublished doctoral thesis, University of Wales, Aberystwyth, 1980), p. 9.

have two branches along the western and eastern valleys to Crumlin and Pontnewynydd near Pontypool respectively and a series of tramroad and stone roads would connect the canal to iron works, mines and quarries. This would

> not only open an easy and commodious Communication with divers Iron Works, Lime Stone Quarries, Woods of Timber Trees, and Collieries in the Neighbourhood of *Pontnewynydd* and *Crumlin Bridge* aforesaid, and with large and extensive Tracts of Land abounding with Iron and Coal, whereby the conveyance of Iron, Lime, Timber and Coal from those places to the *Bristol Channel* will be greatly facilitated, and rendered less expensive, but will also in other Respects, be of great publick Utility.'[106]

The Act specifically authorized the construction of five tramroads: from Pontnewynydd to Blaenavon iron works, from Ponty-Moile (near Pontypool) to iron works at Blaen Dir (Blaendare) and the Trosnant furnace, from Crumlin Bridge to Beaufort iron works in Brecknockshire via Abergeeg, from Abergeeg to Nant-y-Glo iron works and from Ebbw Bridge to Sorwy (Sirhowy) furnace.[107] The Act also enabled the proprietors to construct additional railways or stone roads up to eight miles from the canal and to capture waterways within 2,000 yards of the canal.[108] Both arms of the canal were eleven miles long with a projected 73 locks and numerous bridges, tunnels and aqueducts. The proprietors could raise £120,000 in £100 shares and a further £60,000 if necessary against an initial estimate of £108,477. Ultimately, the canal cost £220,000 and further £119,330 for tramroads.'[109]

There were two techniques in tramroad technology common at the time – the plate rail and the edge rail. Thomas Dadford favoured the edge rail, as did Thomas Tredgold, where the wheel had flanges which sat astride the smooth rail. Benjamin Outram, a leading tramroad engineer, favour the plate rail where the flange was part of the rail and the smooth wheel sat outside the flanges. Most of the tramroads in Wales were edge rails until Outram succeeded Dadford as the tramroad engineer for Brecon and Abergavenny and the Monmouthshire canals and changed many of Dadford's edge railways into plate railways (see Figure 9). According to Tredgold,

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[105] *An Act for making a navigable Cur or Canal ...* <https://data.historicaltexts.jisc.ac.uk/view?pubId=ecco-1298501100> [accessed 11 June 2021].
[106] *Monmouthshire Act*, p. 6.
[107] *Monmouthshire Act*, p. 9; C. Baber, 'The Construction and Operation of the Monmouthshire Canal and Its Tramroads', *Journal of the Railway and Canal Historical Society*, 19 (1973), 9-15.
[108] *Monmouthshire Act*, p. 10.
[109] Trevor Boyns, 'Communications and Commerce', in *Gwent County History*, vol. 4, *Industrial Monmouthshire, 1780-1914* ed. by Chris Williams and Siân Rhiannon Williams (Cardiff: University of Wales Press, 2011), pp. 53-72 (p. 69).

the edge rail had less friction and could carry greater loads than the plate rail, but whatever system was favoured by engineers, it revolutionized road transport. An iron rail laid on existing roads could carry ten times the volume carried by carts.[110]

Figure 9 An Outram plate railway at Denby[111]

From the outset, the transport system was envisaged as a combined artificial land and water network using relatively new technologies. However, while the system remained a human construct, it also depended upon the geography of the area for its success. The canal followed the lines of the rivers, not only as a resource for water, but as channels for both canals and tramroads. Dadford's drawing of the proposed Monmouthshire Canal shown in Figure 11 clearly demonstrated how the artificial system used the river systems.

Work had started on the Monmouthshire tramroads which would connect to the canal when a notice appeared in *Pugh's Hereford Journal* in August 1792 announcing an intention to seek Parliamentary permission for a canal which would connect Abergavenny to Newbridge - a navigable place on the Usk within reach of Newport (see Figure 10). It is not clear from the notice how important the coal market in Abergavenny was, but there was clearly an intention to transport iron from

[110] J. B. Calvert, 'Tramway Engineering', <http://mysite.du.edu/~jcalvert/tech/woodtred.htm> [accessed 10 July 2021]; Tredgold, *Railroads and Carriages*.
[111] Burton, *Canal Builders*, p. 134.

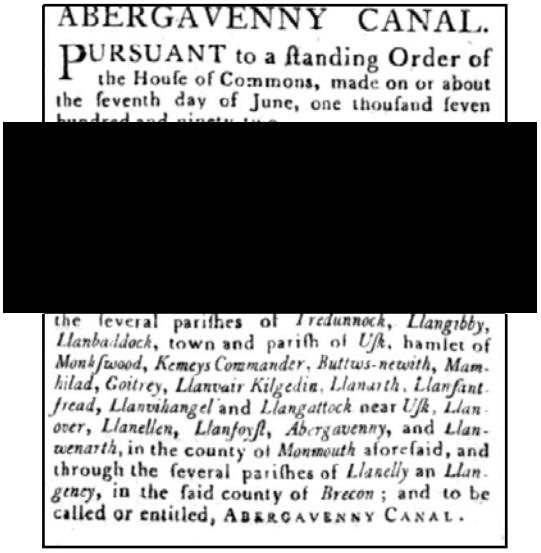
the Llangroiney iron works in the Gorge to Newport.[112] The architects of the Monmouthshire Canal had faced an unexpected difficulty due to a quirk in the geography of the area which presented Abergavenny with an opportunity. Instead of following a south-east path to the Severn Estuary, the River Clydach flowed in the opposite direction, cutting a pathway through the mountainous region into the River Usk near Abergavenny. The flow of the Clydach made it suitable for the construction of a tramroad through the Clydach Gorge which could connect with a canal from Abergavenny to Newbridge on the navigable Usk just north of Newport. Industrialists near the Gorge could transport coal and iron to Abergavenny and Brecon as well as to the south to Newport. The proposed Abergavenny Canal and Clydach tramroad threatened to rival the Monmouthshire Canal in providing access to Newport.

The Monmouthshire Canal Company was alarmed at the prospect of a rival canal by-passing their canal on its way to Newport and arranged to meet the Abergavenny Canal Company which took place on 15 October 1792 in Abergavenny. However, by the time the meeting took place, Brecon had intervened, seeing its opportunity to access coal from the Clydach Gorge and the Abergavenny Canal had become the Brecon and Abergavenny Canal, although its end point at Newbridge remained. Following Brecon, civic authorities in Hereford later saw an opportunity in the Brecon and Abergavenny transport system. A tramroad could connect Brecon with Hereford which would then benefit from coal and iron products from the Clydach Gorge.[113] The proposed canal and tramroad system in Brecon looked both ways - towards Brecon via Abergavenny from the Clydach Gorge but also towards Newport and for different reasons. For Walter Davies, a contemporary historian, the canal originated with the consumers 'with the laudable view of lowering the price of coals, lime etc.'[114] It was certainly important. On 14 November interest groups from

[112] Brynmawr Historical Society <https://www.brynmawrhistoricalsociety.org.uk> [accessed 23 April 2021]. Phil Jenkins <http://industrialgwent.co.uk/e12-clydachrail/index.htm> [accessed 27 May 2021].
[113] H. Pollins, 'Brecknock and the Industrialization of South Wales, v. Canals and Railways', *Brycheiniog*, 7 (1961), 47-55; W. E. Minchinton, 'The Place of Brecknock in the Industrialization of South Wales', *Brycheiniog*, 7 (1961), I-IV, 7-46; Thomas Eric Davies, The ironmasters, ironworks and people of the North West Monmouthshire area, 1780-1850'. (unpublished Masters thesis, Swansea University, 2008); Davies, *Industrial Society*.
[114] Walter Davies in John Richard Norris, *The Brecon and Abergavenny Canal*, cited on p.1 <http://www.jrnorris.co.uk/canalhist.html> [accessed 11 September 2020].

Brecon threatened to oppose the canal legislation and build their own from Brecon if Brecon did not have a rail road and canal connection from Clydach.[115]

Figure 10 Notice of the Abergavenny Canal, August 1792[116]



ABERGAVENNY CANAL.

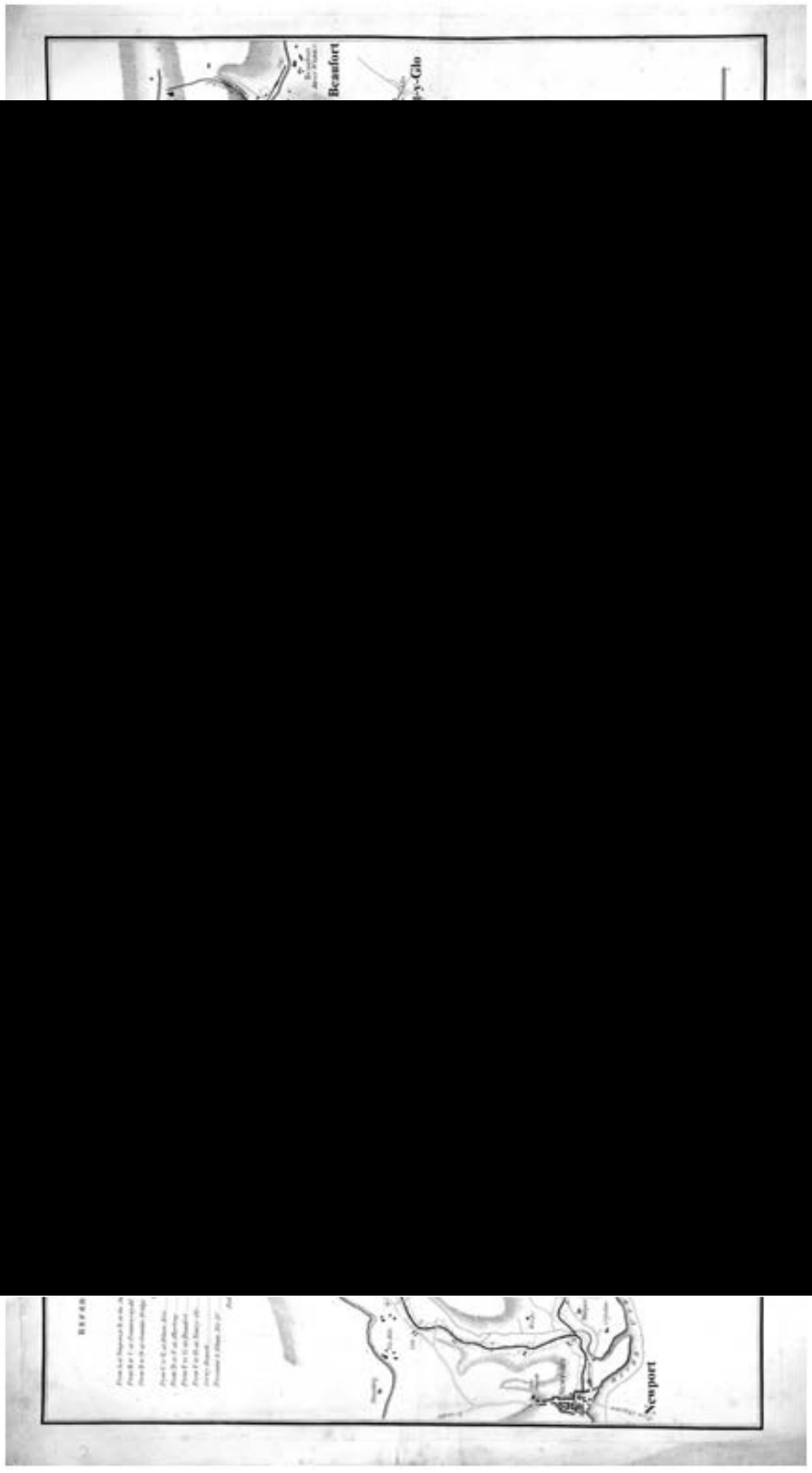
PURSUANT to a ſtanding Order of the Houſe of Commons, made on or about the ſeventh day of June, one thouſand ſeven

[redacted]

the ſeveral pariſhes of *Tredunnock*, *Llangibby*, *Llanbaldoch*, town and pariſh of *Uſk*, hamlet of *Monkſwood*, *Kemeys Commander*, *Buttws-newith*, *Mamhilad*, *Goitrey*, *Llanvair Kilgedin*, *Llanarth*, *Llanſantfread*, *Llanvihangel* and *Llangattock* near *Uſk*, *Llanover*, *Llanellen*, *Llanfoyſt*, *Abergavenny*, and *Llanwenarth*, in the county of *Monmouth* aforeſaid, and through the ſeveral pariſhes of *Llanelly* an *Llangency*, in the ſaid county of *Brecon*; and to be called or entitled, ABERGAVENNY CANAL.

[115] Norris, *Brecon and Abergavenny Canal*, p. 4; Brynmawr Historical Society <https://www.brynmawrhistoricalsociety.org.uk> {accessed on 23 April 2021].
[116] *Pugh's Hereford Journal*, 29 August 1792.

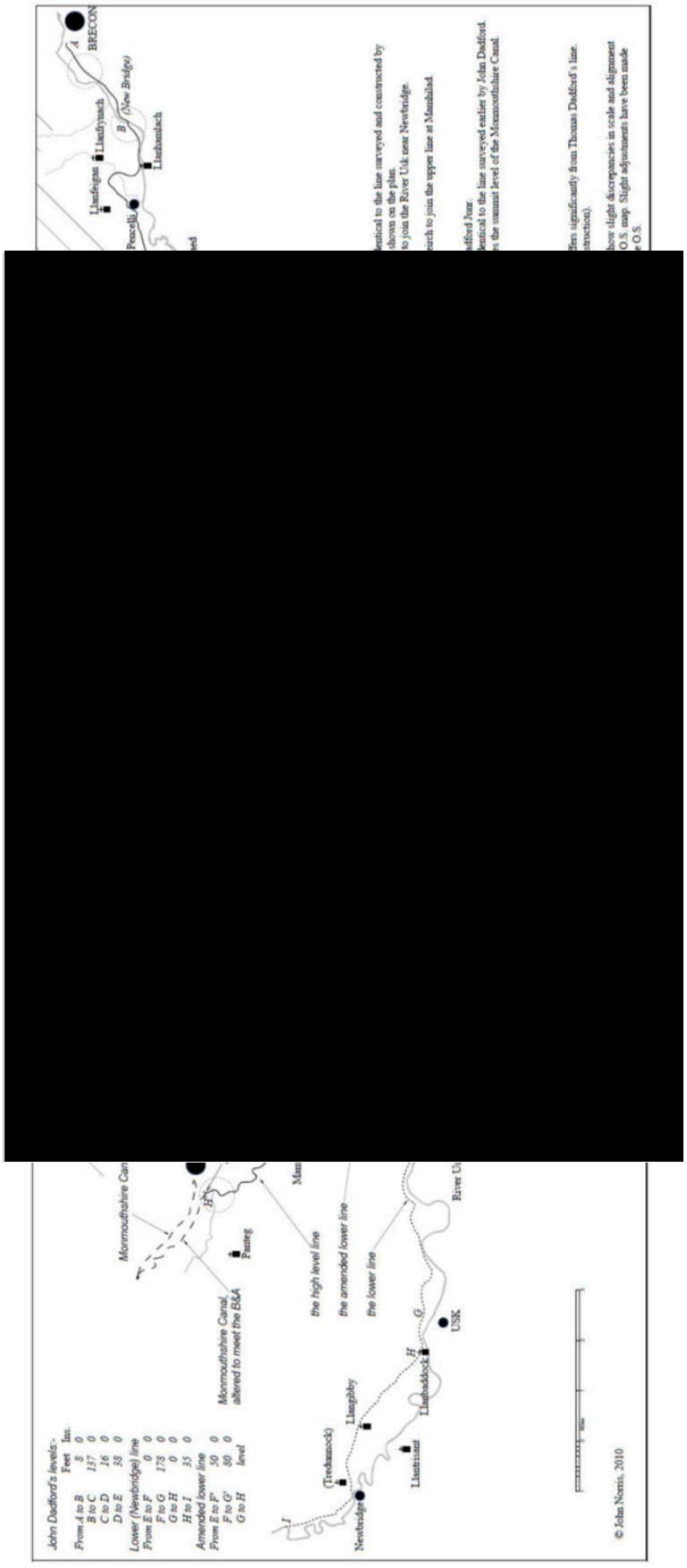
Figure 11 A Plan of the Monmouthshire Canal, Thomas Dadford Jr., 1792[117]



[117] National Library of Wales, Map 4011.

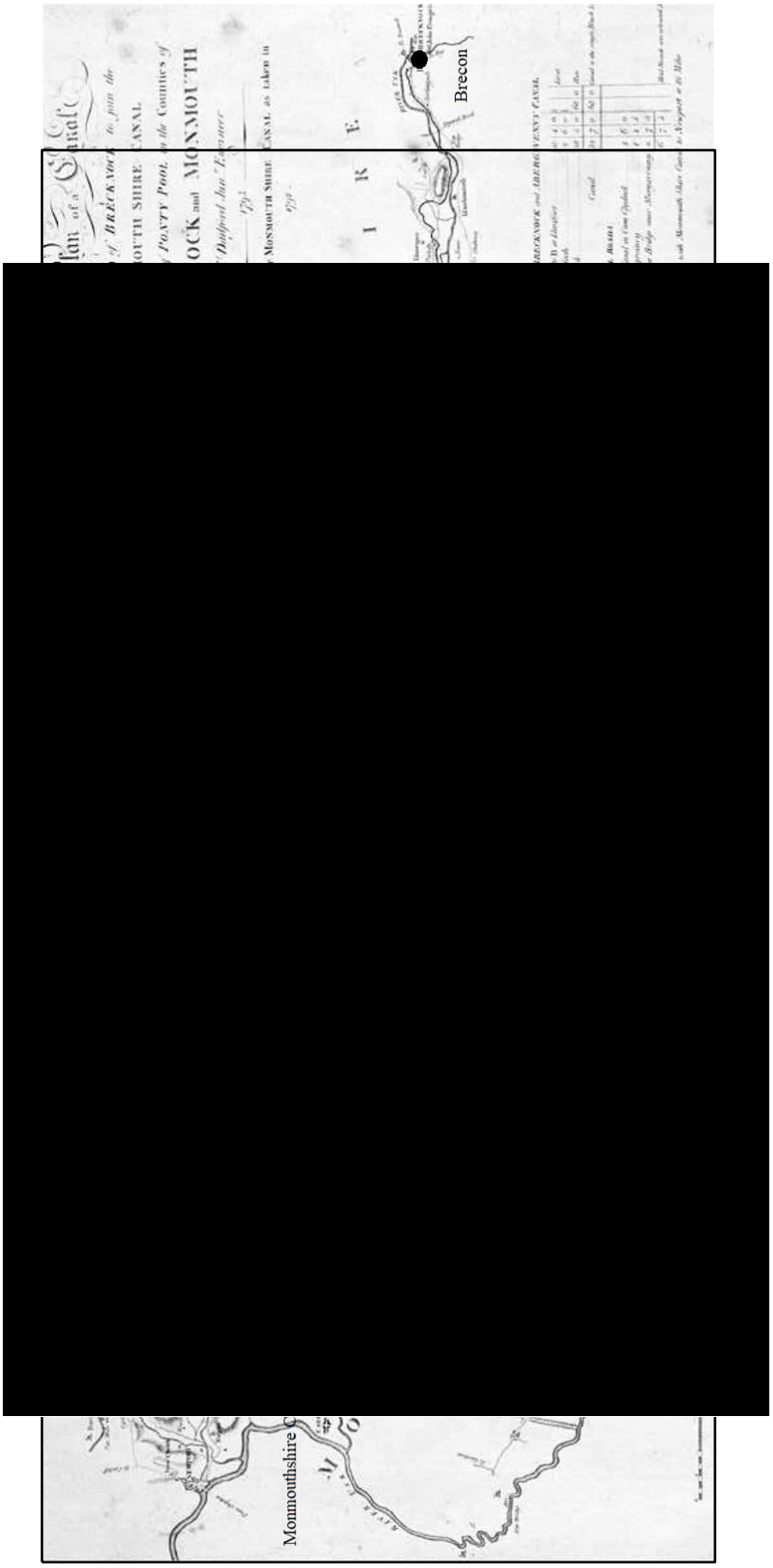
A meeting the following day approved a revised plan from Thomas Dadford which would connect the two canals at Pontymoile, south of Pontypool. The Monmouthshire Committee agreed to pay Brecon and Abergavenny £3,000 to allow for the alteration in the line and made undertakings regarding the supply of water to Brecon and Abergavenny at the junction. The canal committees agreed joint management arrangements for Brecon and Abergavenny with Monmouth Canal having equal representation on Brecon's committee. (See Figure 12 for the two routes drawn by John Dadford to Newbridge and Thomas Dadford to Pontymoile.) In Thomas Dadford's plan, the Clydach Gorge occupied a central position because whatever the mix of motives for the canal - iron to Newport or coal to Abergavenny and Brecon – a tramroad along the Gorge was an essential requirement for both. The plan also showed how the geography of the area, particularly the river system, influenced the transport system. The rivers cut routes for tramroads and canals (see Figure 13).

Figure 12 The two routes of the proposed Brecon and Abergavenny Canal[118]



[118] Norris, *Canal*, p. 2.

Figure 13 Thomas Dadford's plan for the Brecon and Abergavenny Canal 1792[119]



[119] Thomas Dadford, 'Plan for the Brecon and Abergavenny Canal (1792)' <https//www.peoplescollection.wales> [accessed 9 April 2021].

The canal-tramroad network redefined 'remote' and 'near' by the proximity of place to canal and tramroad terminal points. In the Brecon and Abergavenny Canal, for example, the tramroad connection to Abergavenny along the Clydach Gorge, carrying coal, iron and limestone also presented an opportunity to Hereford. The construction of the Llanvihangel Railway (1814) and the Grosmont Railway (1819) to Hereford was intended to provide the city with cheap coal from the Clydach Gorge. The *Hereford Journal* welcomed the project anticipating that 'the exhorbitant price of coal would then be reduced to one half of what has been paid for that necessary article in this city, and we shall have a regular supply... we cannot help expressing some surprise, it was not executed twenty years ago.'[120] The *Hereford Journal* expressed similar sentiments two years later. The newspaper stated that the consumption of coal in Hereford and within four miles was 20,000 tons p.a. 'That the proposed Railway will open up such a communication with extensive Collieries along the Brecon and Abergavenny Canal, that there is every reason to suppose that the competition will prevent the price from rising.'[121] The effect of these tramroads and canal were to make Abergavenny, Brecon and Hereford 'nearer' to the Clydach Gorge. In the same way, the Beaufort iron works north of Tredegar would be rendered 'nearer' to Newport and sea by the Monmouth Canal and the Beaufort Tramroad. The perceptions of 'near' and 'far' were independent of speed and the Monmouthshire Canal system brought towns from Newport to Hereford closer together.

Financing the canals

The principal shareholders for both canal projects tended to be iron masters, bankers and landowners who stood to gain most from increased trade, although the bulk of shareholders were traders and citizens who probably were investing to secure an income. For Brecon and Abergavenny, the main investors were the landowners the Duke of Beaufort and Thyme Howe Gwynne and industrialists from the Clydach Valley – Edward Kendall with interests in the Beaufort and Clydach ironworks and the Gelli Felen collieries, Walter Watkins (Llangrwyney Forge) and John Powell (Clydach ironworks). Walter and Jeffrey Wilkins from Brecon Old Bank were major investors as were John Powell, John Lloyd and Jeffrey Wilkins who formed the

[120] *Hereford Journal*, 7 November 1810.
[121] *Hereford Journal*, 3 April 1812.

Brecon Boat Company in 1798.[122] Samuel Homfray was also an investor, possibly interested in supplying iron for the tramroads system and who has been described as the 'father' of the canal. Amongst the smaller investors could be counted Theophilus Jones, historian of Brecknockshire and deputy-registrar of the arch-deaconry, and Theophilius Jones, a Brecon watchmaker.[123] It is possible that Jones, the historian, invested as a means of supporting the public interest, while Jones, the watchmaker, may have been seeking a secure investment. The number of small investors may indicate a wider public awareness of the impact of the canal in Brecon, outside of the major investors. It is also possible that some investors saw their investment as a contribution to a 'public utility' that would enhance the health and prosperity of their local area, town or village.

Although iron masters, colliery owners and landowners were prominent amongst the early proprietors and shareholders for the Monmouthshire Canal, there was also probably a mix of motives across the early shareholders for the canal project. The largest shareholders tended to be iron masters who stood to gain most from the innovative transport system - Thomas Hill (Blaenavon), James Harford (Ebbw Vale and Nant-y-Glo), Edward Kendall (Beaufort and Clydach) – along with John Bowsher (coal importer) and Josiah Wedgewood (colliery owner). As well as contributing to the cost of construction which would benefit their industries, they were also investors hoping for a return on their investments as were other interested parties such as Dr. Richard Griffiths (canal owner) and the bankers Sir James and William Esdaile. These investors brought with them substantial financial resources which were lacking in Brecon and Abergavenny.

The principal landowners, Sir Edward Morgan, the Duke of Beaufort and William Kemeys benefited from the sale of land for canals and tramroads and the increasing revenues from the anticipated expansion in trade where they had mineral rights on their lands, or rental agreements with mines and factories. Other shareholders included Edward Kendall who had interests in both canals, Thomas Dadford Sr. held £300 in shares and James Cockshutt, a partner of Crawshay, £500. There were a number of smaller shareholders which included a number of women who held shares of £500 or less - Esther Apperly (£500), Miss Bassets (£200), Emilia

[122] Gordon Rattenbury, 'The Brecknock Boat Company', *Journal of the Railway and Canal Historical Society,* 134 (1986), 378-393.
[123] Norris, *Canal,* p. 6.

Gwinnett (£200) and Meliora Gorges (£400) amongst others. They were not industrialists or bankers, but may have invested on the assumption that canal and tramroads were a safe form of investment and would earn a reasonable return.

Table 5 Principal shareholders in the Monmouthshire Canal Navigation Company[124]

Shareholders	Shares Value £	Shareholders	Shares Value £
John Butler	2,800	Charles Herbert	1,000
William Barrow	1,000	J. Hanbury	1,000
Messrs. Biddulph and Cox	1,400	William Kemeys	1,500
Thomas Bourne	1,000	Thomas Lewis	2,000
Thomas Bridges	1,000	Rev. Thomas Leyson	1,000
Duke of Beaufort	4,700	Thomas Langton	1,400
Rowland Burdon	3,000	Sir Charles Morgan	5,200
John Bowsher	4,100	Benjamin Pratt	2,000
Rev. John Caine	1,000	Henry Parry	1,200
William Collins	1,200	Samuel Rosson	1,000
William Esdaile	3,600	Samuel Rudder	1,000
Sir James Esdaile	1,000	Richard Rudder	1,000
Richard Griffiths	3,400	Sir Charles Steer	2,000
Thomas Goodall	1,400	John Wood	1,100
James Harford	4,500	J. and C.J. Wedgwoodd	11,000
Thomas Hill	4,500		
Total share value £108,400			

Whatever the reasons for the investments that were made, the canal and tramroad system needed to raise over £100,000 in Monmouthshire and apparently did so without any great difficulty. The Monmouthshire Canal Company raised additional funds when they were needed and did not experience the financial difficulties that beset the Gloucester and Berkeley Canal Company and the Brecon and Abergavenny Canal, which may be indicative of changing fortunes in wealth-creation with the onset of industrialization. Monmouthshire had an existing industrial base in the iron, coal and limestone trades and the prospect of greater profitability as transit costs reduced and volumes increased. Gloucester's ambition was rather more speculative. Brecon and Abergavenny were essentially rural areas lacking the industrial wealth of northern Monmouthshire.

[124] TNA, RAIL 500/1, Monmouthshire Railway and Canal Company. Minutes of Proceedings of the General Assembly, 1794-1843, 20 October 1794.

Industrialists and traders had an added incentive to invest through the expectation that their companies would provide many of the materials and commodities required in canal and railroad construction, particularly in the iron industry. In July 1793, the company paid Willam Barrow £300, Richard Hill £550, Edward Kendall £250 and Harford and Homfray £450 for supplies of iron.[125] There were further payments in August to Richard Griffiths totalling £552.5.0. for timber supplies and to the Kendall company (£853.15s.5d), Thomas Hill (£1698.5s.10d), Harford and Homfray (£1,541) and William Barrow (£415) for supplies of iron.[126] In September, Richard Griffiths was paid £500 for timber supplies and the following month, Harford and Homfray were paid £2,067.8.11, Hill £1,099.19.5, Homfray £963.3.11 and Kendall £541.11.2. William Barrow was also contracted to deliver rails for the Sirhowy-Beaufort tramroad and for part of the road from Trevil to Beaufort.[127] These industrialists received an early return on their investment.

Despite some of the logistical difficulties in canal construction, progress on the project appeared to be swift and Dadford was authorized, and paid by the company, for completing the survey on the Brecon and Abergavenny Canal which was published in 1792.[128] At his first report to the General Assembly, Dadford outlined the progress that had been made in the two branches of the canal.[129] Tramroad construction was prominent in the early development of the canal system and Dadford's report listed the physical challenges presented by the topography of the proposed routes and how they were addressed. The report was divided into two sections dealing with the two branches to Crumlin and Pontypool. His report was in stark contrast to the reports received by the Gloucester canal committee and demonstrated the importance of engineering competence and the consistent presence of the leading engineer.

For the Crumlin branch, the railroad from Beaufort to Crumlin with a branch to Sirhowy had been completed and a weighing machine installed. There were several other branches linking iron works and quarries to the rail road. There was a connection from Ebbw Fawr to the canal for the supply of water. The canal from Crumlin to the junction of the Sirhowy and Ebbw rivers was navigable which had

[125] TNA, RAIL 500/5, 2 July 1793.
[126] TNA, RAIL 500/5, 7 August 1793.
[127] TNA, RAIL 500/5, 9 September and 22 October 1793.
[128] TNA, RAIL 500/5, 28 November 1793.
[129] TNA, RAIL 500/1, *Thomas Dadford report to Monmouthshire Assembly*, 28 April 1794.

been cut along ‘very steep and rocky hills’ and ‘been very expensive to make water tight’. Twelve locks, two aqueducts 30’ high, eight road bridges and various feeders to the canal had been constructed. On the Pontypool branch, the Blaenavon rail road to Pontymoile had been completed with three large bridges and a weighing machine at Pontnewynydd and access to the Avon completed for a water supply. The rail road was under construction from Pontymoile to Trosnant mines and furnace and two bridges. The railroad from Blaendare furnace to the canal had been completed. The canal was navigable for 3½ miles through rocky terrain from Pontnewynydd, going around Pontypool, with two embankments of 30’ and 40’, ‘attended with great expense to make it watertight’. Eleven locks, ten road bridges, three aqueducts and a number of courses to bring water to the canal had also been completed and a further fifteen locks covering a fall of 160’ were under construction. Dadford produced a revised estimate for the completion of the canal and its tramroads of £160,000 (see Table 6). Unlike the Gloucester Canal, there were formidable obstacles in the way of the Monmouth system, but the canal company had sufficient engineering expertise and the money to overcome them.

The Pontypool line was completed in 1796 and the more difficult Crumlin line in 1799. The canal system was also extended in 1797 to Pillgwenlly, south of Newport, with a further extensions in1802 to construct the Sirhowy tramroad to Tredegar iron works. The Sirhowy tramroad was in part designed to relieve traffic on the Crumlin line, although most of the line was constructed by the Sirhowy Tramroad Company.[130]

[130] William J. Skillern, ‘The Railways of Newport’, *The Railway Magazine*, 711.107 (1960).

Table 6 Revised estimate for the cost of completion of the network

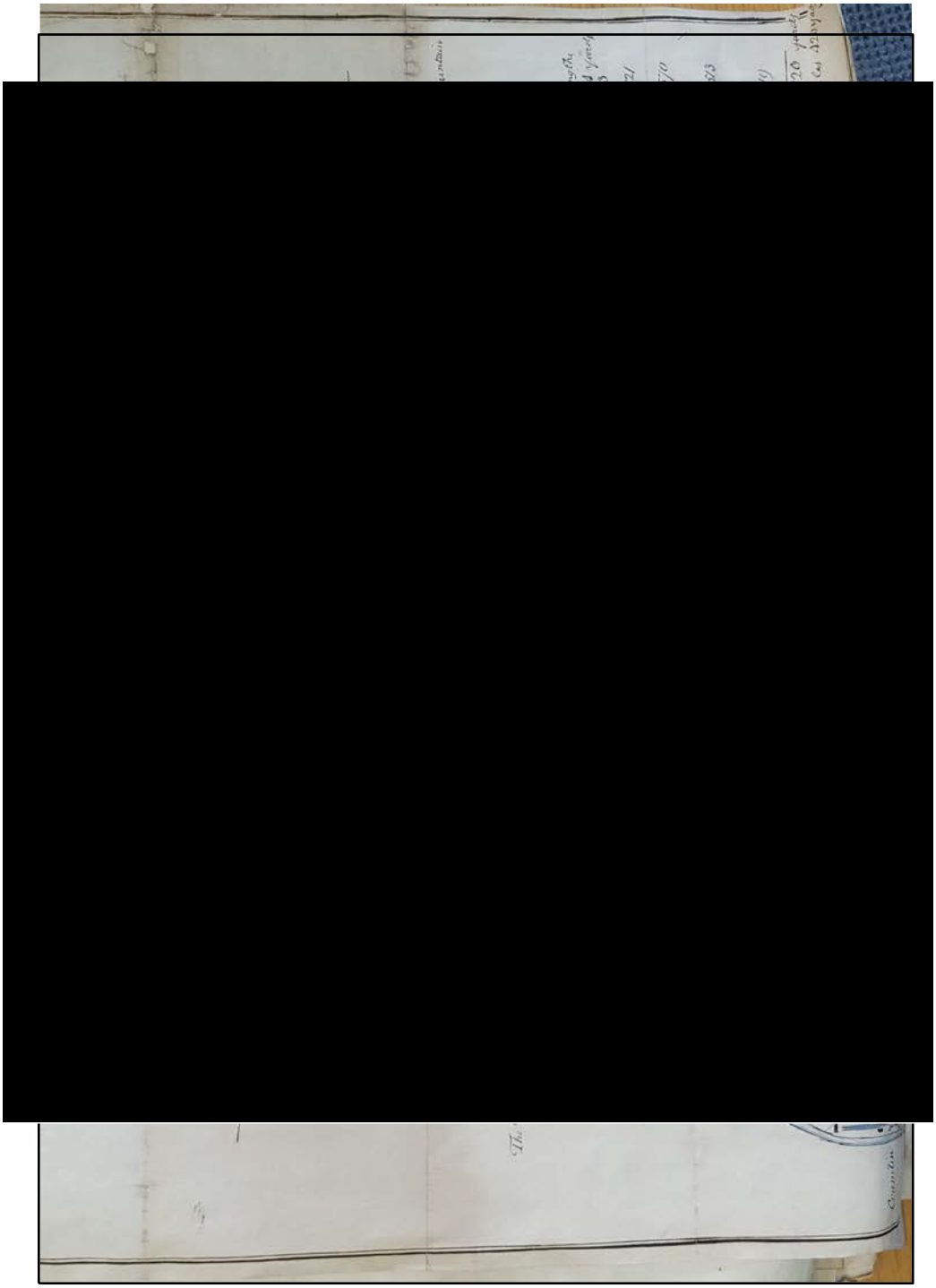
Item of expenditure	Cost (£)
Already expended	98,200
Estimated expenditure to complete the canal	49,800
Interest	12,000
Total	160,000
Original subscription	120,000
Total to be raised by mortgage or additional calls	40,000
Revised total	160,000
Additional expenditure required	
To use iron sleepers and stronger rails on the tramroads	8,800
Payment to the Brecon and Abergavenny Canal	3,000
Surveying expences for altering the line	2,000
Additional expence at Pontypool due to rocky ground	2,000
Additional reservoirs	2,000
Toll houses and machines	700
Boats and waggons	500
Advance of labour	11,000
Total	30,000

The Act authorized the construction of five named tramroads, but the company also had the option of allowing additional tramroads not included in the Act. In 1798, the company approved an application from Sir Robert Salusbury to construct a tramroad from his colliery at Llanhilleth to the Crumlin branch of the canal. The terms and conditions laid down were that the road would be constructed under supervision of the canal company. The company would meet the costs which would not exceed £1,000 which the colliery would maintain for 21 years, at a payment of £100 p.a., 'free of tonnage of the canal'.[131] These seemed to be the arrangements for additional tramroad construction – the company would meet the costs, paid back over 21 years, the colliery would maintain the road and the canal company would gain the income from the transit of commodities on the canal. A drawing for an application for the Blaen Cuffin tramroad in Llanhilleth may have

[131] TNA, RAIL 500/5, 7th February 1798.

been fairly typical of a tramroad application. It traces a line from a colliery to the basin at Crumlin, requiring the permissions of numerous landowners, and with a connection to a foundry using a brook in line with Hadfield's artery and vein analogy (see Figure 14).

Figure 14 Drawing for the proposed Blaen Cuffin tramroad[132]



[132] GA, D678/1/Z1/3/1-6, Canals and Tramroads (1791-1809).

Opportunities presented by geography only took the proprietors of the Brecon and Abergavenny Canal so far. They also needed the finance to meet the costs of technology and the engineering expertise to apply technological solutions to geography. The experience of the Brecon and Abergavenny proprietors mirrored that of the Gloucester proprietors in that they struggled to pay for the canal and relied upon the Monmouthshire Canal for engineering expertise. The weaknesses in their position in respect of the Monmouthshire Canal led to a compromise in their proposed route to Newport. They acceded to the Monmouthshire request to connect the canals near Pontypool, creating a single canal, for which they received some compensation and agreed to the Monmouthshire engineer, Thomas Dadford Jr., acting as engineer for their canal. The priority of that the Brecon-Abergavenny Canal Company had been the construction of tramroads which included lines such as the one from Gelly Fellen collieries to the Clydach furnace at the behest of Edward and Jonathan Kendall, and to Llangroiney Forge before the cutting of the canal.[133] Financial difficulties had beset the Brecon canal project from the start and in April 1800, it was reported at the Assembly that the company had insufficient funds to complete the canal to Brecon from Clydach near Gilwern. The canal between Brecon and Llanfoist was opened in 1800, but no further progress was made much to the frustration of the Monmouth Company.

Parliamentary approval was secured in 1804 to raise additional funds for the canal, but it was not until 1807 that the canal committee 'Resolved that as soon as twenty thousand pounds be subscribed to carrying on the canal, the Committee be authorised to proceed to the Execution thereof beginning at the Junction with the Monmouthshire Canal at Pontymoile ...'[134] The Committee was contacted by the Monmouthshire Company which was clearly running out of patience with Brecon and Abergavenny. A letter from the Monmouth Committee requested to know when the connection would be made at Pontymoile and for compensation for 'the loss which the latter have sustained by the non-completion of the Brecknock and Abergavenny Canal" [135] The letter was signed by Richard Griffiths, Thomas Bourne and R, Rudder and the 'loss' referred to in their letter was presumably the potential iron traffic from Clydach Gorge to Newport. In the view of Theophilus Jones, the

[133] TNA, RAIL 812/1, Brecknock and Abergavenny Canal Navigation Company. Minutes of the proceedings of the General Assembly of Proprietors, 1793-1823, 17 October 1793.
[134] TNA, RAIL 812/1, 6 May 1807.
[135] TNA, RAIL 812/1, 15 October 1807.

lack of a canal to Newport meant that for much of the way, the iron was carried by packhorse and waggon – they 'lament the interruption in the cutting of the Brecon canal...'[136] Production at the Clydach iron works rose from 1,372 tons in 1810 to 2,174 in 1813 and from 1817 onwards consistently exceeded 3,000 tons which may explain the Monmouthshire Canal's frustration.[137]

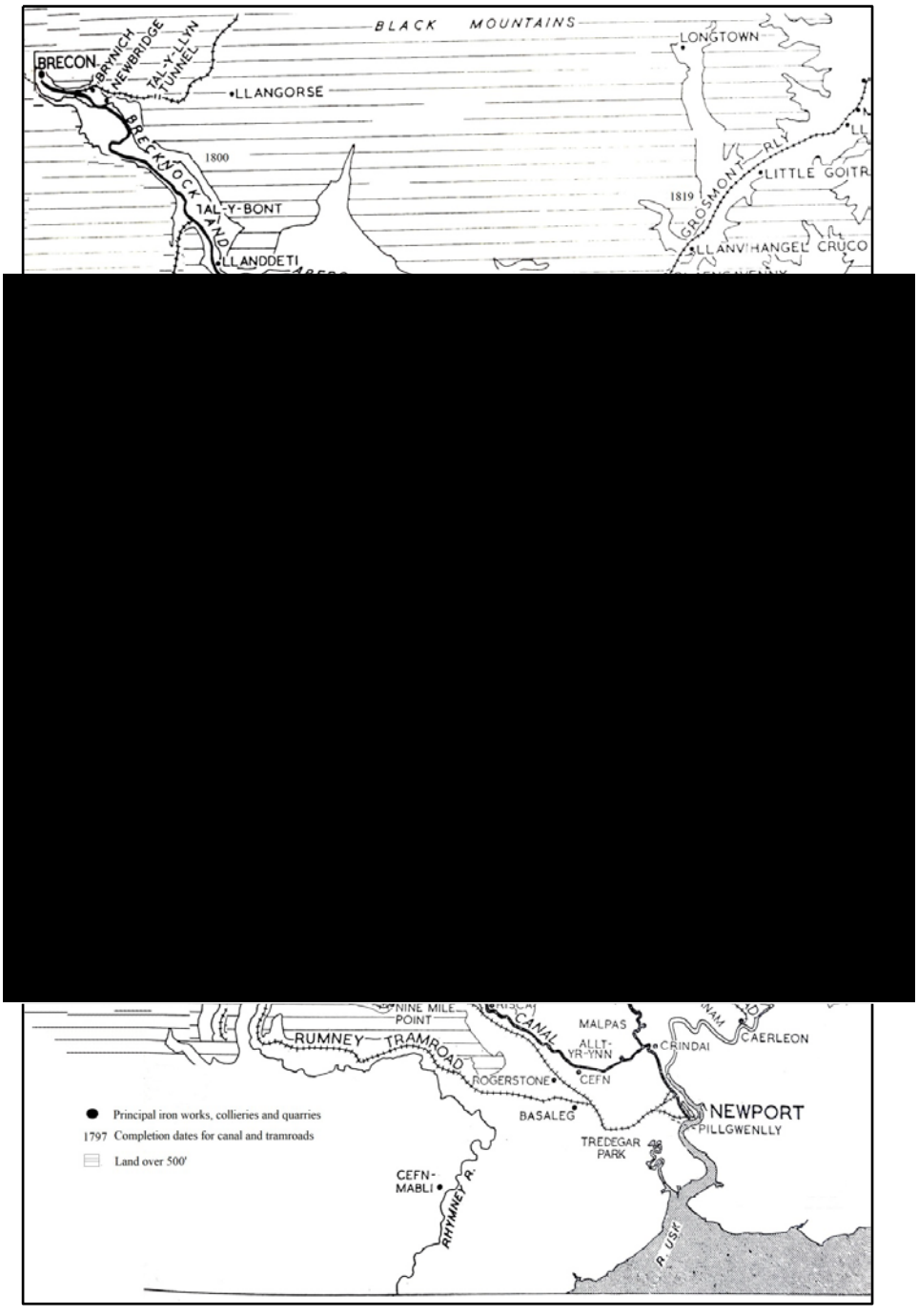
The resolution to their financial difficulties came from an unlikely source in 1809. Following an approach from representatives of Sir Richard Crawshay, the Cyfarthfa iron magnate in the Taff Valley, an agreement was reached that Crawshay would advance the canal committee a loan of £30,000, with potentially more if they needed it to complete the canal. The loan was for twenty years at 5 per cent interest.[138] The Pontymoile connection was opened in 1812. Although this completed the canal network, tramroad construction continued well in to the 1820s, partly to relieve congestion at Crumlin but also to connect mines and iron works to the canal. Hill's Tramroad (1818) connecting Blaenavon with the canal junction at Llanfoist and Bailey's tramroad (1821) from the Clydach Gorge to the same junction were notable examples.[139] The Abergeeg tramroad from Beaufort via Nant-y-Glo to Abergeeg was not completed until 1828 and the Rhymney tramroad which did not join the canal until it reached Tredegar Park in Newport opened in 1826.[140]

Unlike the Gloucester celebrations for the opening of the canal and its port in 1827, there were no similar celebrations when the Brecon and Abergavenny Canal made its connection to the Monmouthshire Canal at the junction between the two canals at Pontymoile in 1812. Both branches of the Monmouthshire Canal had opened by 1799 and the connection to the Brecon and Abergavenny Canal was not considered a major event for Newport. The contrast between the two openings reflected the different nature of the canals. The Gloucester Canal was a civic project which commercial and trading interests supported and were clearly seen by many of the residents of Gloucester as of importance to the future of Gloucester. The Monmouthshire Canal was an industrial project to locate an access to point to the sea which happened to be at Newport and its successful completion in 1799 of both branches raised very little interest in Newport. The connection of the two canals in

[136] Jones, *History of Brecknockshire*, p. 408.
[137] Davies, *Industrial Society*, p. 79.
[138] TNA, RAIL 812/1, 19 July 1809.
[139] Barber, *Hill's Tramroad*.
[140] Priestley, *Navigable Rivers*, pp. 86-88 and 453-455.

1812 meant a great deal to industrialists in Monmouthshire, but its significance was lost to Newport residents because they had little experience of industrial trade or the construction of docks. It was also of very little interest to Brecon and Abergavenny civic leaders because their interests lay in connecting to the Clydach Gorge to access coal and iron in the main which had been achieved by 1800.

Figure 15 The arterial network of canals and tramroads in Monmouthshire and Breconshire c.1830[141]



[141] A composite map from Hadfield, *Canals of South Wales*, pp. 133 and 169.

The impact of the canals

Despite the apparent lack of interest in Newport, the port town had a similar experience in the impact of the canal carriage upon the port and city to that of Gloucester. There was an immediate impact on the carriage of iron into Newport with over a 300 per cent increase from c.1800 to 1840 with coal more than doubling the carriage of iron by 1840 along the Pontypool branch. The expansion in the carriage of iron, as the more valuable commodity, after 1810 explains the urgency expressed by the Monmouthshire Canal in completing the Brecon and Abergavenny Canal to Pontymoile.

Table 7 Transit of Iron and Coal along the Monmouthshire Canal (Newport-Pontnewynydd) in tons[142]

	Iron	Coal
1802	1,091	
1804	20,474	
1810	34,070	
1830	112,647	533,408
1840	194,661	558,104

The canal and tramroad system played a major role in Newport's expansion as one of the world's largest coal exporting ports during the nineteenth century. Coal shipments from Newport rocketed between 1795 and 1800 and continued rising throughout the first half of the nineteenth century. Foreign trade expanded 10 times between 1820 and 1840.[143]

Table 8 Coal shipments from Newport 1795-1840 in tons[144]

	Coastwise	Foreign	Total
1794/95			65
1800			32,277
1820	174,104	711	174,815
1840	482,398	7,256	489,654

Ray Haydon, a historian with a particular interest in Dadford's 'Fourteen Locks' in Newport, did not exaggerate when he claimed that the transport system transformed Newport. The impact on Newport was staggering. Before 1800 the population was

[142] Boyns, 'Communications and Commerce', Table 3.1, p. 60.
[143] Gerard Turnbull, 'Canals, Coal and Regional Growth during the Industrial Revolution', *Economic History Review*, New Series, 40.4 (1987), 537-560.
[144] Boyns, 'Communications and Commerce', Table 3.2, p. 67.

less than one thousand people, but by 1850 it had reached about twenty thousand. 'It was an incredible period of time; indeed, the locks were so busy that gas lighting was installed so that their use could be extended at night.'[145] This, along with electric public lighting and the lighting on trams and bicycles later in the century, could be interpreted as manipulating time as a means of seeing in the dark by imposing technology upon the 'natural' times of the day and night (see Chapter 5 on how cyclists engaged with 'natural' time). Hugh Cunningham considered that improved lighting in the eighteenth century marked the time when 'The night began to be colonised'.[146] The canal and tramroad network thrust Newport into a new world of global trading and dock expansion at least a decade before the opening of the South Wales Railway in 1850.

Change as progress

A letter to *The Cambrian* published on 12 February 1812 which was not signed provided the same account of the connection between the Brecon and Abergavenny and the Monmouthshire Canals as that which was recorded in the Committee minutes of the Brecknock and Abergavenny Canal of 7 February 1812.[147] A similar account was published later in the *Taunton Courier*.[148] These accounts extolled the virtues of the canal and made claims about the public welcome that surrounded the opening which were probably exaggerated since they were written by the company secretary and reproduced without question by *The Cambrian* and the *Taunton Courier*. As John Norris has pointed out, the event passed without notice in the Gloucester and Hereford Journals, and in all probability, of the 'Grand Celebrations ... there were probably none.'[149] The correspondent did, however, comment about change and the future which would become something of an abiding theme for élites during the nineteenth century. The connection between the canals signalled 'progress' in a changing world and the significance of the change that forged a better future was that it was made by human action.[150]

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[145] Ray Haydon <https://mbact.org.uk/fourteen-locks-history> [accessed 12 March 2017].
[146] Hugh Cunningham, *Time, Work and Leisure: Life Changes in England since 1700* (Manchester: Manchester University Press, 2014), p. 9.
[147] John Richard Norris, 'The Grand Canal Celebrations of 1812' <http://www.jrnorris.co.uk> [accessed 14 January 2021], pp. 1-2.
[148] *Taunton Courier and Western Advertiser*, 27 February 1812.
[149] Norris, 'Grand Canal Celebrations', p. 4.
[150] Heilbroner, *Visions*.

> if, with a prospective eye, we look forward to posterity, it is impossible to say to what extent improvements may be carried in the various branches of arts, manufactures, agriculture and commerce – every thing is progressive, and we trust that future generations will not fail to profit by the great and patriotic example of the present day.'[151]

As Hadfield has argued, the engineers who designed these new networks, referring specifically to the canal engineers of the networks in south Wales, 'were rightly seen by contemporaries as the midwives of a new age'.[152] For the transport historian, W. T. Jackman, 'the benefits which were anticipated from the construction of canals were so great that to many they seemed to contain the possibility of transforming the world.'[153] Canals and tramroads are portrayed as contributors to an industrial revolution in historiography, but are not seen as fundamentally changing relationships in time and space, or those with the natural world. However, there is no question that they did so, not through changing the absolute speed of movement compared to road traffic, but by altering the relationship between time and distance. Despite improvements in the speeds of road traffic – travel times from London to Bristol had halved by 1821 to 24 hours compared with 1750 – there was little to suggest at the time that increased speeds would 'transform' the world.[154] The significant change in road transport for commodities came with the placing of rails on the road for the carriage of goods and merchandise which effectively narrowed distance. According to Thomas Tredgold writing in 1825, a horse on a railroad could carry eight times the volume compared to a road without rails. Although this had little impact upon personal travel, Tredgold did speculate that 'roads paved with iron' could be used in the future for passenger travel which would allow 'the velocity to be increased almost without limit.'[155] The ability to transport between 30 and 50 tons of iron by canal instead of two tons by cart accelerated the speed of transport to new dimensions, even though the absolute speed remained similar between cart and canal boat.[156]

This relationship between the acceleration of time and the narrowing of distance represented a fundamental change in relationships with the natural world

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[151] *The Cambrian*, 12 February 1812.
[152] Hadfield, *Canals of South Wales*, p. 18.
[153] W. T. Jackman, *The Development of Transportation in Modern England*, 2 vols (Cambridge: Cambridge University Press, 1916), p. 404.
[154] Langton and Morris, *Atlas*, p. 82.
[155] Tredgold, *Railroads and Carriages*, p. 3.
[156] Bagwell, *Transport Revolution*, p. 1.

which had essentially remained the same since the Roman world in the sense that improvements in navigation, sailing ships and the increasing speed of land transport had not stimulated any sense of dominion over the natural, inanimate world. Weather and climate continued to exercise a major influence over all forms of transport, communications and agriculture, for example.[157] As Keith Thomas has shown, human agency had effectively colonized the living world of plants and animals (within the parameters imposed by climate), but control of the inanimate world was a distant aspiration by the late eighteenth century.[158] Canal and tramroad technologies were associated within a similar time-period as the increasing speeds of land transport, and although canals did not compete with land transport in terms of speed, it was the canal and tramroad rather than the stagecoach that was associated with 'new'. Speed was not the issue. What was significant was whether new technologies represented a change in the relationship between human agency and the inanimate world in a struggle for dominion.

It was not simply the emergence of new technologies that signalled fundamental change. Underlying these changes was a new way of looking at the world. What Brindley, Jessop, Telford and the Dadfords amongst many others were stating in their work was that the natural world was not immutable. Rivers had 'always' been routes of inland travel and improving inland travel was dependent upon improving inland navigation by improving the river system. Not so, according to Brindley. Looked at with new perspectives, rivers had an entirely different function and it was this new way of 'seeing' that marked the movement from one world to another, or as 'a pause' between the two.[159]

The idea that relationships with the physical world could be changed fundamentally and human agency could achieve dominion over the physical world through science and technology became something of an ideology for élites as the nineteenth century unfolded and marked the change from one world to another. The diminishing of distance through the connection with time, even though the geography of the world remained unchanged, became a central and enduring theme in this ideology of 'progress' into the twentieth century and beyond. The notion that human agency could dominate the natural world and mitigate distance reached a new

[157] L. Boia, *The Weather in the Imagination* (London: Reaktion, 2005).
[158] Thomas, *Man and the Natural World.*
[159] Burton, *Canal Builders*, p. 4.

level in the 1840s. The canals had demonstrated that carriage of greater volumes diminished distance. The steam railway combined speed with volume to such an extent that it overshadowed the canal and tramroad system and led to enhanced concepts of time and space that had their origins in the late eighteenth century. The ability to carry unprecedented volumes of passengers and commodities at unprecedented speeds by the steam railway strengthened landscapes of dominion and the ‘conquest’ of distance.

Chapter 3 The steam locomotive and the demise of distance: opportunities and threats 1835-1855

> The invention of the Railway is probably the most important occurrence, with reference to its influence on the welfare of Great Britain, that has taken place in modern times... A mode of internal communication which may almost annihilate time and space, and bring the opposite extremities of the island, as it were into contact with each other which may enable a merchant or a man of business to commune with another resident a hundred miles off as if he were living in the next street.[1]

*The Cambrian'*s anticipation of a national railway network envisaged a mode of transport that would have a fundamental influence upon the prosperity of Great Britain. It anticipated that it would compress distance to such an extent that people hundreds of miles apart would be considered neighbours as the railway unified the nation. The steam railway network that took shape between 1835 and 1855 shook the perception that land speeds had reached their maximum and revealed previously unsuspected possibilities for the 'conquest' of distance through speed.[2] New relationships between time and space emerged as travel and communications speeds increased. It became commonplace to measure distance by time as well as by mileage and to imagine the shrinking of space as bringing distant places 'nearer'. In 1857 Samuel Smiles, for example, estimated that England was one-sixth of its former size because of the railway, making the link between time and distance. 'The iron rail has proved a magician's road...The locomotive gave a new celerity to time.'[3] Although increasing speed had been a factor in road development and competition between stage coaches since the 1780s and appeared to have reached its limit by 1830, the railway brought new dimensions to the experience and perception of speed.[4] It may be an exaggeration to say that people became obsessed with movement, speed and time, but from the 1840s onwards they become more prominent in everyday life in a comparatively short space of time.[5] In contrast with

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[1] *The Cambrian*, 9 April 1836.
[2] Jackman, *Transportation*, pp. 683-701.
[3] Samuel Smiles in F. D. Klingender, *Art and the Industrial Revolution* (London: Evelyn, Adams and McKay, 1968) cited on p. 119; Myron F. Brightfield, 'The Coming of the Railroad to Early Victorian England, as Viewed by Novels of the Period', *Technology and Culture*, 3.1 (1962), 45-72.
[4] Sherrington, *Inland Transport*, p. 50; Charles G. Harper, *Stage-Coach and Mail in days of Yore*, 2 vols (London: Chapman and Hall, 1903); R. Tombs, *Bristol Royal Mail: post, telegraph and telephone* (Bristol: Arrowsmith, 1899); R. Tombs, *The King's Post* (Bristol: Hemmons, 1906).
[5] Michael J. Freeman, *Railways and the Victorian Imagination* ((New Haven and London: Yale University Press, 1999), p. 21; *Transport in Victorian Britain*, ed. by Michael J. Freeman and Derek H. Aldcroft (Manchester: Manchester University Press, 1988), p. 2; Samuel Sydney, *Speed on Railways* ((London: Hume Tracts, 1847).

the prevailing perceptions of speed and distance, these were now seen to be subject to human agency. Human interaction with the natural world became more fluid and unpredictable as concepts of immutable laws were eroded to be replaced by notions of movement, pace and a new concept of life as a competitive race. The railway played an important part in this fundamental change.

Historiography

The impact of the railway upon perceptions of time and space are largely understated in British historiography. Changes in mental worlds in responding to the onset of the railway during this period have occupied some historians, rather than historians of railways.[6] There is an extensive literature on railways broadly divided into two groups of authors: the 'outsider' principally interested in the social and economic impact of the railway, and the 'insider' mainly interested in the railway construction and engineering. The quality of the literature on railways 'varies considerably. There are important topics that have hardly been touched...' in the views of Jack Simmons and Gordon Biddle in 2003.[7] The railway has been 'too much treated on its own, as a piece of mechanism, a device ... Railways did many things ... and no one has assigned them their place in the general life of the age'[8] Michael Freeman made a similar point citing 'British railway history's failure to connect its subject material with the wider cultural spectrum', arguing that the railway has been treated almost in isolation from the wider social context of a changing Britain.[9] With the exception of Michael Robbins, who had questioned the nature of railway history, railway historians have rarely pointed to the exclusive nature of the railway network and the 'decay' that faced those communities that lay outside the network.[10] There are frequent references to the 'social revolution' characterized by a 'levelling' between social classes wrought by railways and the apparent unifying of nation as distance appeared to diminish and regions were brought closer together. 'England

[6] Richard D. Altick, *Victorian People and Ideas* (New York: London: W. W. Norton, 1973); Brightfield, 'Railroad'; W. E. Houghton, *The Victorian Frame of Mind 1830-1870* (New Haven and London: Yale University Press, 1957).
[7] *The Oxford Companion to British Railway History: from 1603 to the 1990s,* ed. by Jack Simmons and Gordon Biddle (Oxford; New York: Oxford University Press, 2003), p. ix.
[8] Jack Simmons, *The Victorian Railway* (London: Thames and Hudson, 2009), p. 10.
[9] Michael Freeman, 'The railway as a cultural metaphor:"What kind of Railway History?" revisited', *The Journal of Transport History*, 20.2 (1999), 160-167.
[10] Michael Robbins, 'What Kind of Railway History do we Want?', *The Journal of Transport History*, 3.2 (1957), 65-75; Michael Robbins, *The Railway Age* (Manchester: Mandolin, 1998), p. 45.

ceased to be simply a collection of isolated communities, and attained to a greater degree of national life.'[11] The impact of the railway on the economy has not been developed in economic histories and while its visual impact upon rural landscapes often appears in railway histories, its impact upon urban space, in particular, has received little attention.[12] As J. R. Kellett has observed, much of the writing on Victorian railways in the twentieth century have been exercises in nostalgia.[13] However, the cultural impact of the railway on work, the growth of mass leisure, including sport, and the development of the 'seaside' which are partly attributed to the railway have been investigated by historians such as Hugh Cunningham, Ian Carter and John Walton.[14] In 2002, a special edition of *The Journal of Transport History* examined cultural aspects of women's mobility, and more recent areas of railway research have considered the mass movement of women travellers, informed by the post-modern critique. In the view of Margaret Walsh, transport history 'had a predominantly, if not exclusively, masculine appearance. Written primarily by men for a male audience and focusing upon machinery, technology and the operation of transport companies, it had become ghettoised.'[15] The special edition was followed in 2007 by a conference which explored women's mobility across a range of transport.[16]

There are few histories that focus upon how speed was imagined and experienced on railways and how it affected movement and mobility across social classes. The railway did not invent mobility; travel had been increasing substantially

[11] Pratt, *Inland Transport*, p. 397; Simon Bradley. 'The Classes in Motion', in Simon Bradley, *The Railways: Nation, Network and People* (London: Profile Books, 2016), pp. 54-102; Perkin, *Age of the Railway*, p. 101.

[12]Exceptions to this would include J. R. Kellett, *The Impact of Railways on Victorian Cities* (London: Routledge & K. Paul 1969); D. W. Howell, 'The Impact of Railways on Agricultural Development in Nineteenth Century Wales', *Welsh Historical Review*, 7.1 (1974-1975), 40-62; Steven Parissien, *The English Railway Station* (Swindon: Historic England, 2014); M. C. Reed, *Railways in the Victorian Economy* (Newton Abbot: David and Charles, 1969); G. R. Hawke, *Railways and Economic Growth in England and Wales 1840-1870* (Oxford: Clarendon Press, 1970).

[13] J. R. Kellett, 'Review: Writing on Victorian Railways: An Essay in Nostalgia', *Victorian Studies*, 13.1 (1969), 90-96.

[14] Mike Huggins and John Toulson, 'The railways and sport in Victorian Britain: A critical assessment', *The Journal of Transport History*, 22.2 (2001), 99-115; Walton, *The English Seaside Resort*; Cunningham, *Time, Work and Leisure*; Ian Carter, *Railways and Culture in Britain: the epitome of modernity* (Manchester: Manchester University Press, 2001).

[15] Margaret Walsh, 'Gendering Transport History: Retrospect and prospect', *The Journal of Transport History*, 23.1 (2002), 1-8, (p. 1); Jack Simmons, 'The Liberation of Women', in Simmons, *Victorian Railway*, pp. 332-336; Anna Despotopoulou, *Women and the Railway, 1850-1915* (Edinburgh: Edinburgh University Press, 2015).

[16] Jo Stanley, 'Gender, Emotion, Work and Travel: Women Transport Workers and Travellers, Past and Present', *History Workshop Journal*, 65 (2008), 277-279.

between 1773 (183,000 passenger miles) and 1840 (2,369,000 passenger miles), but the railway took travel and mobility to levels that could not have been conceived prior to the railway.[17] By 1898 over one billion railway journeys were recorded, of which over 90 per cent were by third-class passengers.[18] Most railway histories offer little insight into the social implications of such mass movement and understate the importance of movement, mobility and pace within a changing society. 'Speed' on a number of levels became an influential feature as civic and commercial elites viewed their future prospects. Connecting to markets was just one aspect of a pre-occupation with speed; élites placed a premium on access to the rapid communications through the electric telegraph, the mail and newspapers, all of which were dependent upon the routes of the railway network.

Jack Simmons and Michael Freeman have attempted an assessment of how the railway was imagined, the social impact of rapid movement and how it was experienced across different social classes.[19] *The Victorian Railway* was divided into two sections: the first dealt with the impact of the railway upon the senses, particularly the visual impact and the second considered the impact on the imagination. Simmons discussed the Victorian concept of mobility which he saw as 'a passion for movement' as being not simply the experience of movement but as a desire for movement and this extended across different aspects of social life.[20] He took the view that the railways contributed significantly to the mobility of labour and the volume of 'Parliamentary' and third class travel was due, at least in part, to travelling for work; some of the Welsh railways actively promoted the mobility of labour.[21] On the other hand, David Norman Smith, while addressing the issues of mobility and its extent, was less certain about the mobility of labour because of the lack of data.[22] While he regarded the expansion in third class traffic as 'spectacular' in the 1840s and 1850s, he doubted whether the Railway Act of 1844, which required that each railway provide at least one train that travelled for an average of not less than 12 m.p.h. for 1d. per mile and was covered ('Parliamentary' trains),

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[17] John A, Chartres and Gerald A. Turnbull, 'Road Transport', in *Transport in the Industrial Revolution* (Manchester: Manchester University Press, 1983), ed. by Derek Aldcroft and Michael Freeman, pp. 64-99.
[18] Joseph Whitaker, *An Almanack for the Year of Our Lord 1900* (London: 1899), p. 737.
[19] Freeman, *Victorian Imagination*; Simmons, *Victorian Railway*.
[20] Simmons, *Victorian Railway*, p. 309.
[21] Simmons, 'Mobility', in *Victorian Railway*, pp. 309-344.
[22] David Norman Smith, *The Railway and its Passengers: A Social History* (Newton Abbot: David and Charles, 1988).

significantly extended participation because of the cost. He pointed to the resistance by at least some élites to extending rapid travel to the 'lower orders' or the 'labouring classes'.[23] However, while having doubts regarding the affordability of railway travel for working classes and the poor, he felt unable to account for the expansion in third class travel and for similar reasons could not explain the impact in the countryside because of the lack of evidence on travel patterns.[24]

There is no clear evidence which can resolve this apparent contradiction between affordability and rates of participation in railway travel. These historians have attempted to illuminate some of the cultural implications of railways in changing perceptions of time and space and Simmons, in particular, has stressed the importance of 'mobility' in the Victorian imagination as a self-evident virtue. 'Speed' and 'mobility' were prized in themselves; they were essential elements in a social and economic framework characterized by movement, change and uncertainty, but there were also dissenting voices on the nature of 'progress'.[25] T. F. Taylor was one of the dissenters as he reflected upon human confrontation with the natural world of distance: 'we have looked upon distance as an enemy to be conquered, but whether the well-being of the world is on the whole advanced by its improved travelling facilities may be reasonably questioned.'[26] Charles Dickens and the British Medical Association were fierce critics of the speed of railways and of the consequent dangers to passengers through the impact of speed on the body and in railway accidents. Wolfgang Schivelbusch and Ian Carter have explored the tensions between the railway which swept away the old but which was often perceived as a power which was threatening.[27] This tension underpinned the sense of progress that was evident in the 'conquest of distance'. However, despite this tension, millions of travellers braved fears of accidents, ill-health and assaults in confined railway carriages in order to travel on railways.

The chapter considers three themes raised by *The Cambrian* in 1836: the power of the railway in defining new lines of communication which could include as well as exclude and which were largely influenced by financial sustainability, its effect upon the relationship between the region and the nation and how it affected

[23] Smith, *Railway*, p. 20, p. 21, p. 23.
[24] Smith, *Railway*, p. 72.
[25] Houghton, 'The Character of the Age' in *The Victorian Frame of Mind 1830-1870*, pp. 1-23.
[26] T. F. Taylor, *The Fallacy of Speed* (1907) cited in Simmons, *Victorian Railway* on p. 372.
[27] Schivelbusch, *Railway Journey;* Carter, *Railways and Culture*; Ian Carter, 'Rail, Steam and What?', *Oxford Art Journal*, 20.2, (1997), 3-12.

personal mobility, including the mobility of women. A thread that underpins these themes is the impact that railway speed had on perceptions of distance as it redefined what was meant by 'near' and 'far'. The faster the connection with place, the nearer it appeared to be. Rhetoric on the apparent 'annihilation' of space by the railway obscured the impact upon those communities that remained outside the railway network. As Alan Everitt has shown, by the end of the century, the businesses of county carriers who used horse transport were thriving and there were more than 3½ million horses in England.[28] Personal mobility and the transit of newspapers and mail were dependent upon horse-drawn transport where the railway was remote.

The impact of the railway upon economy and society was not even-handed. The promoters of railways sought to link mainly urban centres choosing routes that presented as few engineering challenges as possible. These burgeoning urban areas were often industrial centres which enabled the railway to exploit both passenger and goods traffic. These areas had the capital finances to fund the construction of lines and the consumer demand which would ensure the railway's sustainability. Railway companies were therefore attracted to certain routes and which selectively followed the existing road network which undermined the pattern of regional and county towns that had dominated an essentially rural society. The railway, while it presented opportunities for industrial centres, also presented a threat for those towns that were on the margins of industrial change.[29] This became a concern, if not a pre-occupation, with local civil and commercial elites as they witnessed the unfolding of the network and calculated how railway routes would affect them. As Peter Clark has noted, 'Railways both responded to regional and local economic trends and exaggerated them. Even well-established small towns had their marginality finalised by the absence of a railway link.'[30]

Connection to the railway network became a priority for many local communities in order to access markets for goods and services and the new communications network. The prospect of being isolated from this network was

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[28] Alan Everitt, 'Country Carriers in the Nineteenth Century', *The Journal of Transport History*, 3.3 (1976), 179-202, (p.179).
[29] P. J. Corfield, *The Impact of English Towns, 1700-1800* (Oxford: Oxford University Press, 1982); Joyce Ellis, 'Regional and County Centres 1700-1840', in Clark, *Urban History*, pp. 673-704; Alan Everitt, 'Country, County and Town: Patterns of Regional Evolution in England', in *The Eighteenth Century Town: A Reader in English Urban History, 1688-1820* ed, by Peter Borsay (London: Longman, 1990), pp. 83-115.
[30] Peter Clark, **'**Small Towns 1700-1840', in Clark, *Urban History*, pp. 733-774 (p. 760).

perceived as a threat to future prosperity as those outside the network became dislocated from the mainstream. The chapter examines the challenges to Cheltenham, Gloucester and Monmouth presented by the route of the Great Western Railway (GWR) and how these towns responded to this challenge in proposing alternative routes. The opening of the South Wales Railway (SWR) from Chepstow to Swansea in 1850 is viewed from the high expectations of towns like Swansea and Cardiff that connected to the national network along this line. These expectations were in sharp contrast to the fears expressed by the historic county towns of Carmarthen, Haverfordwest and Monmouth in the event that they would not be connected. There were strong similarities between the fears expressed by both Cheltenham and Monmouth as they evaluated the planned routes which demonstrated how the railway prompted a new awareness of time and space where relatively small margins assumed greater importance.

The network was perceived within the Bristol Channel region as offering opportunities to connect more closely with developing markets in England and a changing world. This was particularly true of south Wales which saw itself as having those industrial resources, as well as agricultural produce, which were in demand in Great Britain and globally. Much of south Wales - mainly the industrial centres in Glamorgan and Monmouthshire - saw themselves as being part of social and industrial change and the railway offered the prospect of participation as full contributors to change. The English counties in the region largely lacked the industrial resources that were evident in south Wales but nevertheless placed a premium upon connection to the network. Like others, they feared being excluded from a new communications system that involved not just the railway, but those media that the railway supported - the telegraph, the mail and newspapers - often expressed as 'civilization'. As a result, the pattern of railway development differed between the English and Welsh counties within the region. Even in its earliest years up to 1855, a complex of railways was in the process of completion within south Wales linking industrial centres to the national network, while, in contrast, in the English counties of Gloucestershire, and the northern parts of Somerset and Devon, the railway was essentially a single line connecting Bridgewater and Taunton with Bristol and Gloucester.

The opening of the SWR is considered within the context of Welsh mentalities and its impact upon Welsh identity in respect of the wider integration of

south Wales with England. Throughout the towns in south Wales that connected to the railway, the opening of the railway was heralded as a 'new age' for Wales and a force for inclusion so far as Wales was concerned in the wider economic and social life of the British nation. The railway was perceived, not simply in economic benefits, but within a wider cultural context that would enable Wales to show itself as a country of energy and enterprise, and of 'civilization' and to erode in this process negative stereotypes of Wales. This cultural aspect of the railway dynamic was largely absent in England and provided a contrast within the region of how the railway affected peoples' perceptions and national landscapes.

An important aspect of the sense of integration was delivery of newspapers and the mail. The railway facilitated increased speeds in the delivery of the mail and newspapers and this reflected an increasing sense of the importance of time and its ability to compress space. Debates over the delivery of the mail demonstrated a detailed interest in the measurement of distance and its relationship to travelling times as everyday life, at least for some, acquired pace and momentum. Delivery of the mail was taken as indicative of the degree to which recipients and communities were part of an information network that was essential to well-being. Delays in the delivery of mail were perceived as giving advantages to others - it became important to 'keep up'.

Finally, the chapter considers how the railway affected the movement of people within the region and the extent of this experience within the wider society. It considers the experience of travelling at speed and what prominence travellers gave to the risks involved. It shows that, as with the railway as a network, the benefits of railway travel were not universally experienced being devoted largely to trade, commerce and élite leisure between mainly urban areas where rural communities were marginalized. However, the chapter also considers the evidence of extensive travel on third class trains, particularly in the 'industrial' railways of south Wales, and assesses the extent to which the poor and 'labouring classes' experienced railway travel from travel to work to excursions and recreational travel on Sundays. The evidence of the extent of railway travel is not conclusive, but the position taken in this chapter is similar to that of Jack Simmons who concluded that labouring classes used railways extensively, although it is argued that this was more evident in the 'industrial' railways of south Wales, compared with the GWR passenger traffic in the

English counties in the region.[31] It also considers the impact of the railway upon women as they moved into the public sphere.

A feature of this new network was a redefining of distance. In all aspects of the network, the regularity of trains, their destinations and travel times pre-occupied élites and travellers, particularly in the routes of new lines. Geography was examined closely as towns and cities estimated how they were advantaged or disadvantaged in respect of potential rivals. Because railway speed brought destinations closer, the absence of a railway connection could enhance the sense of remoteness. Distance tended to be measured in time travelled. *The Welshman* anticipated that on the opening of the SWR, 'Carmarthen can easily be placed within nine hours distance of the great metropolis of the civilised world'.[32] The intended line between Bristol and Bath would 'lessen the distance between these cities' according to the *Cheltenham Chronicle*, while the *Taunton Courier* imagined that the proposed Exeter-Bristol railway would bring Devon and Somerset into 'comparative juxtaposition, not only with the Metropolis, but also with the several midland and northern counties.'[33]

The coming of the Great Western Railway

'Railways' have a specialized track for the public conveyance of goods and passengers driven by mechanical contraction. Michael Robbins has supplemented this definition by Charles E. Lee with 'a measure of public control'.[34] Tramroads used horses as the method of traction while railways used steam locomotives, although many of the early railways used combinations of steam engine, horse traction and stationary traction engines to power locomotives across difficult terrains. They required major capital investments, as well as approval from Parliament, and despite the frenzy of 'railway mania' for short periods in the 1830s and 1840s when 'every town thought it must have, not only its own line to London, but by the shortest possible route..', these capital projects were relatively high-risk ventures.[35] Few made substantial profits. Parliamentary enquiries into a proposed railway bill could be lengthy and expensive processes without any certainty that the bill would become

[31] Simmons, *Victorian Railway*.
[32] *The Welshman*, 26 April 1850.
[33] *Cheltenham Chronicle*, 28 January 1830; *Taunton Courier*, 9 March 1836.
[34] Robbins, *Railway Age*, p. 6.
[35] *Bristol Mercury*, 10 December 1836 quoting from a pamphlet published by the Great Western Railway; *Monmouthshire Merlin*, 'Despondency of Railway Stockholders', 19 October 1849.

law. The evidence was detailed and subject to counter-evidence and petitions from rival promoters and other objectors. The evidence presented in support of the bill to establish a Great Western Railway from London to Bristol in 1834 took 57 days and its chief engineer, I. K. Brunel, was cross-examined for eleven days. The bill was rejected by the House of Lords, but was successful the following year after a further forty days of evidence. The eventual completion of the line cost £6.5 million, three times the original estimate, while the Parliamentary campaigns alone cost £90,000.[36] This was capital expenditure on an unprecedented scale, far exceeding the scale of canal projects, requiring the support of wealthy investors which were, in the main, landowners, industrialists and bankers. The rail network served their interests.

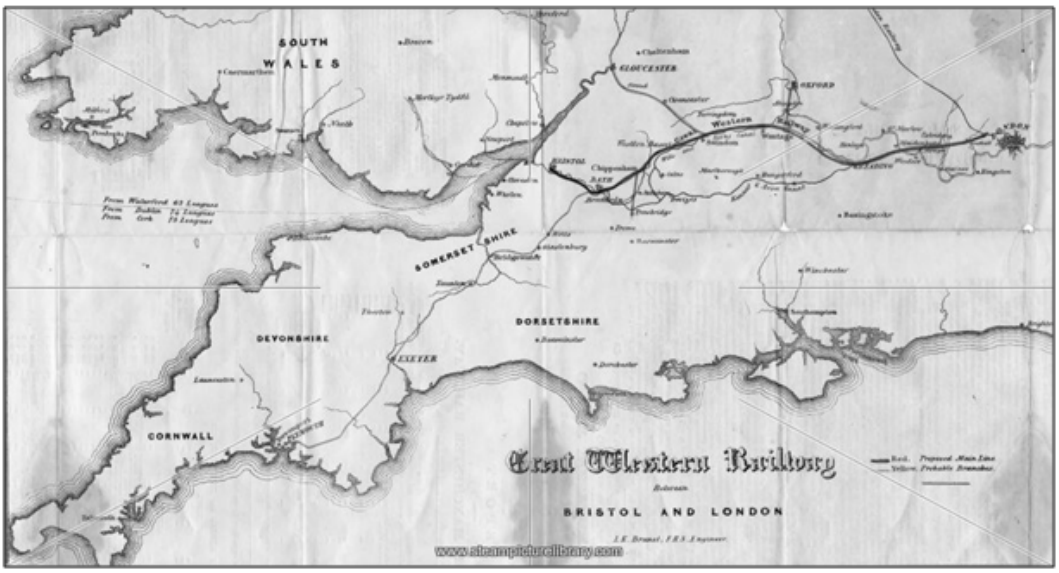
The Great Western Railway Company (1834) comprised two boards - one representing the London interests and one for Bristol - and the principal shareholders in the Bristol Committee together with their substantial share contributions are shown in table 9.[37] Membership of the Bristol committee of 1833 was drawn from commercial, industrial and civic interests. Membership included John Cave (Bristol Corporation), George Gibbs and Peter Maze (Society of Merchant Venturers), John Harford and George Jones (Bristol and Gloucestershire Railway), Nicholas Roch (Bristol Dock Company), William Singer Jacques (Bristol Chamber of Commerce), Thomas Richard Guppy (Businessman) and the Secretary to the Board, W. Tothill (Bristol Chamber of Commerce and chemical manufacturer).[38]

Table 9 Principal shareholders Great Western Railway 1834

Shareholder	Share value £	Shareholder	Share value £
Robert Bright	25,900	Thomas R. Guppy	14,900
Peter Maze	23,000	William Tothill	14,000
George Jones	20,000	William S. Jacques	12,000
John Cave	17, 900	John Harford	11,900
C. B. Fripp	15,500		

[36] Latimer, *Annals Nineteenth Century*, 81.
[37] Latimer, *Annals Nineteenth Century*. 81.
[38] E. T. MacDermot, *History of the Great Western Railway*, 2 vols. (London: Ian Allan, 1964) Revised by C. R. Clinker, p. 4.

Figure 16 1834 Prospectus of the Great Western Railway[39]



The apparent 'annihilation' of space wrought by the railway was not as simple as it sounded. The railway project in the 1840s was essentially an urban project intended to link large urban areas that were also associated with industrialization and trade. Public utility did not appear in the strategies of railway companies which were constantly aware of the needs of their shareholders and the profitability of lines. 'Direct' routes, which tended to engage civic élites, were not necessarily the 'best' routes as far as railway companies were concerned, having to balance profitability against the engineering challenges of hills, gradients and rivers. The routes followed by the GWR and its main rival in the northern section of the region, the London and Birmingham Railway (LBR), were of intense interest to towns in the region. The railway presented opportunities, but also threats to well-being, and towns effectively competed with each to ensure they connected at the expense of their rivals.

The Challenge to Cheltenham and Gloucester

Interest in the progress of the railway network from its origins in London was dominated in the early years by the route of the GWR. The first urban areas within the region to anticipate the impact of the railway, and to express concerns about its proposed route, were Gloucester and Cheltenham. Although Cheltenham prior to the railway was on the margins of the region and only linked indirectly to the region by its transport links with Gloucester, the regional railways of the GWR and of the LBR

[39] STEAM <https://www.steampicturelibrary.com> [accessed 30 April 2018].

brought both Gloucester and Cheltenham into the orbit of two regions - the Midlands and the Bristol Channel. These railway giants were intensely competitive, had different gauges and employed the two leading engineers of their age, Isambard Kingdom Brunel (GWR) and Robert Stephenson (LBR).

For over a century, Cheltenham had prospered as a spa resort for the gentry and as such had depended upon road links to London and surrounding counties for its visitors. In 1826, for example, Cheltenham had one daily express coach to London which took 10½ hours and five other daily coaches to London together with six coaches to Birmingham, four to Bath and one each to Exeter, Coventry, Wolverhampton, Liverpool, Manchester, Sheffield and Chester running on a daily basis from *The Plough* and *The Royal Hotel*. It was estimated that around 30-40 stage coaches used the High Street in Cheltenham on a daily basis.[40] However, by the time the GWR had reached Swindon in 1840 and the LBR had reached Birmingham in 1838 and from there completed a railway link to Gloucester with a branch to Cheltenham in 1840, Cheltenham's economy and society were undergoing a transformation. Fashion had changed; the appeal of the spa had declined significantly and Cheltenham was in the process of re-inventing itself as a centre of culture, education and 'taste'.[41] It had built upon royal patronage of the spa to present an image as a centre of élite culture and had also become something of a retirement home for officers of the East India Company and senior military figures. As one Cheltenham guide put it, it was no longer a fashionable watering-place but education had 'powerfully done its work for good in Cheltenham. The gross and vicious habits of a past generation have fled or died out before the spread of education and intelligence...'[42] The élite Cheltenham Ladies College, for example, was founded in 1853.

Whether Cheltenham was seen as a watering-place for the gentry, or as a cultural centre with a focus upon refinement and education, it remained dependent upon visitors. Consequently, with new transport systems making their respective ways to the north and south of Cheltenham, civic and commercial elites in the town perceived the railway both as an opportunity and as a threat. They had seen the demise of long-distance stage coach traffic with the advent of railways and feared for

[40] Gwen Hart, *A History of Cheltenham* (Leicester: Leicester University Press, 1965), p. 232.
[41] John Goding, *History of Cheltenham* (Cheltenham: Norman, 1863); Hart, *Cheltenham*; P. Hembry, *The English Spa 1560-1815: A Social History* (London: Athlone Press, 1990).
[42] Hart, *Cheltenham*, cited on p. 225.

the future of Cheltenham if the town continued to rely upon a road transport system that was out-dated. As *Cheltenham Looker-On* had observed in 1836, 'there will not in a few years be passengers enough to support a single stage coach on any of our present mail-roads.'[43] The debates that followed focused upon ensuring that the railway connected to Cheltenham and followed the shortest possible route to London which enmeshed Cheltenham in debates between rival railway companies who proposed different routes.

GWR confirmed at a public meeting attended by Brunel in 1834 that the route would allow for branches to be constructed between Swindon, Cirencester, Gloucester and Cheltenham giving Cheltenham a direct link to London; the connection at Swindon would also afford access to the main GWR line to Bath, Bristol and Exeter.[44] This, coupled with the connection to Birmingham along the Gloucester-Birmingham Railway, would provide railway connections to London, the North of England and the South-West. Cheltenham, along with Gloucester, anticipated that they would connect eventually to a railway link to South Wales and Ireland across the Severn at Gloucester and once these were completed, Gloucester and Cheltenham would replicate and extend traditional road routes with railway links and thereby ensure prosperous futures.

The debates that followed in Cheltenham and Gloucester demonstrated the intense interest in the relationship between time and distance and potential rivalries with other towns on the route of the railway. The *Cheltenham Chronicle* expressed its 'intense satisfaction' at the prospects that these railway connections promised for Cheltenham. 'We have long watched the rising importance of those watering places which are brought within a journey of six hours from London, and have earnestly wished that a similar advantage could be obtained for Cheltenham. Then indeed we may attract numberless visitors...' Conscious of rivalries, the connections that other towns were establishing 'behoves us all then to be "up and stirring" in this town.' With the projected connection at Swindon the travelling time to London would be cut to 4½ hours and it would take six hours to travel by coach to Swindon and then by train to London. Railway connection to the town was 'an important matter to every

[43] *Cheltenham Looker-On*, 19 March 1836.
[44] David St. John Thomas, *A Regional History of the Railways*, vol. 1, *The West Country* (Newton Abbott: David and Charles, 1966).

individual connected with the property and trade of the town... The immense traffic in passengers must ensure a very large revenue...'[45]

However, in the same year, controversy broke out over rival routes to the metropolis and the populace of Cheltenham became embroiled in the competition between the GWR and LBR over the best route - via Stroud and Swindon (GWR) or via Oxford and Tring (LBR). Heated exchanges between the protagonists were played out in public through editorials and letters to local newspapers. Much of the debate centred on notions of 'distance' with the Tring supporters arguing that it was the shorter compared with the Swindon route, while Swindon supporters argued that the shorter route was not necessarily the better route and disputed the distances quoted by the Tring supporters. The local newspapers tended to support the Tring proposal on the basis that it was shorter and would not offer advantages to Cheltenham's rivals whereas the GWR route took in Gloucester, Stroud and Cirencester. In an extended editorial, 'The Rival Railways', *Cheltenham Looker-On* put the case for the Tring line and used arguments that were repeated by other newspapers and supporters of this line.

The editorial calculated that the Tring option would involve a straight railway line from Cheltenham to Oxford, joining up with the LBR line at Tring which would add three miles to the then-current coaching route, compared with an increase of 27 miles with the Swindon route. This would avoid the 'gross and unjust absurdity' of the GWR route, and strengthen the existing coach route from London to Cheltenham and Gloucester and from there to South Wales and Ireland, as well as connecting to the industrial centres of the Midlands and North of England. It resembled traditional routes of communication, replacing the road with the railway for long-distance communications. Underlying the support for the LBR route was a fear that Cheltenham's interests 'were to be wholly sacrificed to those of Gloucester, Stroud and the other petty towns along this line' and Cheltenham would end up as a cul-de-sac to the Gloucester and Stroud branch railway using the GWR route. The GWR route was seen as a slight on the status of Cheltenham 'which has been more rapidly increasing than any other town in the kingdom' estimating that the population exceeded 30,000 and whose means of communication in the future would be 'by a

[45] *Cheltenham Chronicle*, 4 December 1834.

circuitous route of one hundred and twenty-two miles, and subject to inconveniences, costs and delays.' The editorial concluded,

> we have no desire whatever to see our hitherto-flourishing town cut off from direct communication with those places with which at present we are in immediate and profitable intercourse to serve the purposes of speculators either on the Grand Western or Swindon Branch Railway; or to be carried 75 miles round in order to get to Oxford...[46]

Along with other newspapers, the *Cheltenham Journal* reported on the formation of the company to promote a direct railway connection between Cheltenham and Oxford to join the LBR at Tring and printed a map of the route showing the GWR route as 121 miles and the LBR route as 99 miles.[47] In April, the *Cheltenham Journal* repeated the argument that the GWR line would enhance Cheltenham's rivals and the town would be 'better off without any railway at all than be rendered - as the town must be - dependent upon, and subservient to, the interests of Stroud and Cirencester.'[48] It published a letter supporting the LBR proposal later in April which was not untypical of the rhetoric that permeated these debates. It was signed by 'An Inhabitant of Cheltenham' who accused the GWR supporters of 'wilful misrepresentation' and 'an unblushing effrontery which have been so actively engaged in urging on the inhabitants of Cheltenham and Gloucester, to sacrifice the best interests of both towns on the altar of Cirencester and Stroud.'[49] The newspapers and correspondents appeared offended by the route via Stroud which they considered to be a 'petty town' which 'with all its aspiring ambition to lord it over Cheltenham, cannot support *one* Coach by the intercourse of its inhabitants with the Metropolis...'[50] The debates in Cheltenham energized rivalries with other towns and there was a close examination of how the proposed route may have disadvantaged Cheltenham to the benefit of its potential rivals.

The controversies continued throughout 1836 in a similar vein and Tewkesbury also intervened by supporting a petition to Parliament in April opposing the GWR route. However, parliament approved the GWR route to be constructed by the Cheltenham and Great Western Union Railway (C&GWUR), but the supporters of the LBR line continued to campaign for their favoured route and newspapers from

[46] *Cheltenham Looker-On*, 19 March 1836.
[47] *Cheltenham Journal*, 21 March 1836.
[48] *Cheltenham Journal*, 25 April 1836.
[49] *Cheltenham Chronicle*, 28 April 1836.
[50] *Cheltenham Journal*, 23 May 1836.

Gloucester and Bristol entered the fray in advocating the interests of their respective cities in support of the GWR route. In August, the *Gloucestershire Chronicle* published a letter from a shareholder in the Swindon line criticizing the *Cheltenham Chronicle* for misrepresenting the benefits of the two lines, describing the calculation of the two distances as 'false statements' and the newspaper followed that up with another letter in December, this time from a landowner at Tring who, not unnaturally, approved of the Swindon connection. 'I am pleased to find I can now refuse my assent to your cutting up my estate without doing any injury to the public.'[51]

In 1838 Cheltenham faced a further threat. The C&GWUR was short of funds and it was feared that the line to Cheltenham would not extend beyond Cirencester. 'An Inhabitant', in a letter to the *Cheltenham Chronicle*, expressed alarm at the prospect. The railway in its proposed route would establish new lines of communication which did not follow the traditional road routes to the west via Gloucester and consequently '*your site as a thoroughfare will be gone*, and thousands and tens of thousands of money ... will be diverted to other and alien channels... *the whole of the Western population* will make direct to Cirencester. [52] There was always a threat that the route would favour rivals over which towns like Cheltenham had no control. Cheltenham may have been the 'foremost town of the county in wealth and population, possessing an enormous and increasing traffic in the most profitable item of railway returns, namely *passengers*', but 'by a whimsical but unfortunate concurrence of circumstances, placed in a most inferior position, and pushed aside, as it were by the common consent of railway proprietors, to make way for rivals of an inferior grade...'[53] However, having completed its main object in reaching Bristol, the GWR took over the projected line from C&GWUR and completed the line from Swindon to Gloucester in 1845 but without a direct line to Cheltenham. It took a further two years for GWR trains to connect directly with Cheltenham and the announcement of the direct link was met 'with great satisfaction.'[54]

The mid-1840s saw the height of 'railway mania' which provoked a renewal of the debates within Cheltenham about the 'direct route' to the metropolis and

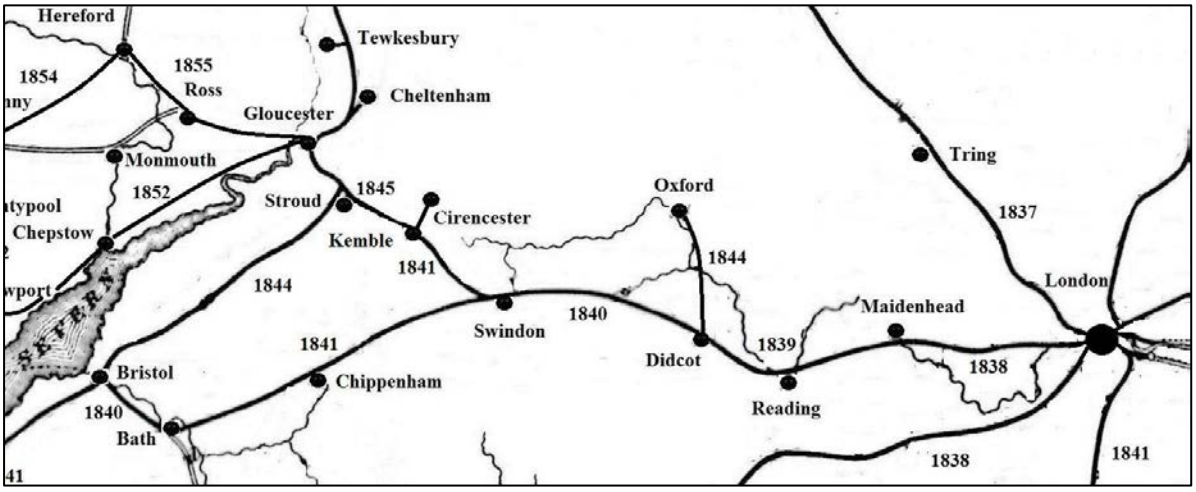
[51] *Gloucestershire Chronicle,* 27 August and 17 December 1836.
[52] *Cheltenham Chronicle*, 18 January 1838.
[53] *Cheltenham Chronicle*, 22 February 1838.
[54] *Cheltenham Chronicle,* 28 October 1847.

leading to a number of different proposals for new 'direct routes'. These debates virtually repeated the controversies of 1836. The eventual parliamentary approval of the GWR Oxford-Cheltenham-Wolverhampton line in 1845 and the consequent failure of the LBR Tring line were welcomed by the *Cheltenham Journal* with some enthusiasm. However, when the line opened from Oxford to Wolverhampton on 1 December 1853, it by-passed Cheltenham which tended to be the fate of Cheltenham's experience with railways.

An editorial from the *Cheltenham Chronicle* of 1861 reflected on Cheltenham's experience of dealing with railway companies and their routes which had been 'singularly unfortunate... There was to be a direct communication to Oxford (but) ... the capricious company (GWR) paused. Without word, sign or explanation, the plan was allowed to drop.' The amalgamation of the Great Western with the West Midland 'has taken away our last hope.' The West Midland will not rival the Great Western, 'while the Great Western will certainly do as they have always done, and will not make a line for our convenience when they feel no longer in danger of losing our traffic.' The editorial concluded:

> we suppose they will now take good care so to arrange their trains that we shall still be compelled to go the old weary round by the Stroud valley. Well, they cannot take away the gifts of Providence and our fine hills and broad valleys, nor our great facilities of communication to most points of the compass, which are even now only not unrivalled because great companies and influential individuals have treated us with injustice and caprice.[55]

Figure 17 Cheltenham's railway connections 1855[56]



[55] *Cheltenham Chronicle*, 14 May 1861.
[56] Adapted from Francis Whishaw, *The Railways of Great Britain and Ireland* (London: John Weale, 1842).

The debates of 1845 were heightened by another strategic decision of the GWR regarding its route - this time to south Wales and Ireland - and one which was perceived as a threat principally to Gloucester and its port, but with implications for Cheltenham. There were two possible routes into South Wales from Gloucestershire - either by railway bridges across the Severn Estuary or by extending the broad gauge connection from Gloucester to Chepstow from where the South Wales railway was projected to continue to Swansea and ultimately to Fishguard with a steamship connection to Waterford. Brunel's preference was for railway bridges to be constructed across the Severn Estuary near Frampton-upon-Severn which caused alarm in Gloucester and Cheltenham.

A letter from 'Senex' was published in the *Gloucester Journal* in February 1845 pointing out that such a scheme would disrupt navigation of the river and restrict access to the canal and the port of Gloucester and would 'annihilate forever any hope of any prospective increase in the shipping trade of the port of Gloucester...Gloucester, by the adoption of this scheme, is doomed to decay.'[57] The *Gloucester Journal* followed this up with an editorial opposing the bridges and argued for the traditional land route via Gloucester.[58] Mr. W. G. Gwinnett, the solicitor for the LBR, in a letter to the *Cheltenham Courier*, argued that Gloucester faced a twin threat from the GWR - to the port and to the traditional land route through Gloucester to South Wales and Ireland. He understood that the GWR was pressing ahead with its plans for the bridges which would '*divert from Cheltenham and Gloucester all the traffic from the metropolis to South Wales and Ireland*.'[59] These themes were debated in subsequent months in public meetings, meetings of Gloucester Town Council and in newspapers.[60] The threat to Gloucester was, however, short-lived. The Admiralty had refused permission for the Edinburgh and Northern Railway to construct a railway bridge over the Tay on the basis that it would interfere with traffic and the *Gloucester Journal* anticipated that the Admiralty would also refuse permission for the GWR bridges, a decision that was confirmed in June.[61] The decision was celebrated in an editorial in the *Cheltenham*

[57] *Gloucester Journal*, 15 February 1845.
[58] *Gloucester Journal*, 22 February 1845.
[59] *Cheltenham Chronicle*, 6 March 1845.
[60] *Gloucester Journal*, 8 March 1845; *Gloucester Journal*, 8 March 1845.
[61] *Gloucester Journal*, 15 March 1845.

Chronicle, 'Railway Doings and Prospects'.[62] The editorial demonstrated how the future prosperity of towns could be adversely affected by railway routes and the awareness that transport strategies outside of their control could have significant consequences for their well-being.

The challenge to Monmouth

In many ways, Monmouth and Cheltenham were similar rural county towns and they shared a similar experience with the onset of the railway network. The ancient county town of Monmouth had already encountered the new age of industrialization with the canal and tramroad network which made Newport the principal town in Monmouthshire by 1820. The railway further underlined Monmouth's position on the margins of these changes. Changes in population, manufacturing and transport systems ensured that Monmouth was virtually powerless to curtail its increasing isolation as railways encircled the town on their way to other destinations.[63] The town had been given effectively an advanced warning of how new transport routes were dictated by a combination of geography and industrial development by the construction of the canal system in Monmouthshire during the 1790s. The Monmouthshire Canal, and its connecting tramroads, linked the port of Newport with the iron and coal districts of Pontypool, Abergavenny and Ebbw Vale, which, in turn, connected with the Brecon and Abergavenny Canal to the west of Monmouth. In the early years of railway development, the railway followed similar routes and for the same reasons. Monmouthshire had become something of a powerhouse of industrial development from the 1790s onwards with its principal port at Newport, but industrialized transport systems showed no regard for traditional county and market towns. During the 1840s, when the debates over railways and their routes were raging, Monmouth looked in three directions for connections to different railways: south towards the projected SWR at Chepstow or Newport, west towards the mineral districts in Newport's valleys around Ebbw Vale (the western valley) and Abergavenny (the eastern valley) and east towards Ross and the proposed railway route from Gloucester to Shrewsbury via Hereford. The railway brought a

[62] *Cheltenham Chronicle*, 12 June 1845.
[63] J. J. Davis, 'The Railways of Monmouth', *Railway Magazine* (February 1959); Williams and Williams, *Industrial Monmouthshire*.

heightened sense of geography and distance to civic leaders, as Cheltenham had experienced.

Monmouth's preferred option as early as the 1830s was to connect to the expanding port of Newport which was seen to be on its way to becoming 'the Liverpool of the West'.[64] When the SWR was discussed as a practical option in the 1840s, Monmouth appeared to favour connection either at Chepstow or by diverting the route to follow a path from Gloucester to Monmouth and Brecon and then onto Carmarthen which was one of the traditional road routes to west Wales and Ireland. 'Veritas', writing in the *Monmouthshire Merlin* in 1844, put such schemes into their realistic contexts given how and why railways were built. However pleasing the trip via the 'romantic wilds' of Brecon and Carmarthen might be, 'it would be a seeming absurdity' to lay such a railway compared to the passenger and mineral traffic along the Chepstow to Swansea route.[65] With regard to the proposal to connect Monmouth to Newport travelling along the valley of the Usk, the SWR's view was that this would involve an unnecessary deviation over more difficult terrain from an engineering point of view and would detract from the main purposes of the railway which were to link the principal ports and towns of south Wales with each other and to provide a railway connection between the metropolis, south Wales and Ireland.[66] There remained, however, the possibility that the SWR could connect to Monmouth from Chepstow as reported to the House of Lords in 1845. The towns of south Wales from Chepstow to Milford Haven, including Monmouth, would 'all participate directly in the advantages afforded by this improved communication.'[67]

None of these possibilities were realized however, at least not in the early years of railway construction up to the mid-1850s. By September 1848, it was reported that construction on the proposed branch line from Newport to Monmouth had been halted and was not expected to resume until 1850.[68] In April 1850, a report on the Gloucester-Ross railway referred to the Monmouth-Hereford railway which was intended to connect at Ross as being 'in abeyance'. Although the Gloucester-Ross railway was to proceed, there was no certainty of a connection to Monmouth and at a public meeting in April 1850, the meeting expressed 'our sense of the great

[64] *Monmouthshire Merlin*, 1 August 1836.
[65] *Monmouthshire Merlin*, 27 April 1844.
[66] *Cheltenham Chronicle*, 3 April 1845.
[67] *Cardiff and Merthyr Guardian*, 2 August 1845.
[68] *Monmouthshire Merlin*, 30 September 1848.

convenience and benefit which such a line would prove to a considerable portion of the county...'[69] A deputation from Monmouth met the Board of Trade on the 28th and 29th of April, and the *Monmouthshire Merlin* expressed a confidence that 'the great chain of towns in our mineral district, of which Newport is naturally the market and shipping port, would but for a very brief period longer be cut off, as it were, from their capital town...' The connection to Gloucester would:

> remedy a great grievance and a loss, by affording to the town of Monmouth, and to the eastern side of the county, the advantage of a direct rail communication for agricultural, mineral and passenger traffic, with Gloucester, which is the centre of lines extending to all parts of the kingdom.[70]

Railway companies, following industrialization, took little notice of county towns and their capitals. Monmouth had little to offer the railway companies in the way of profitable lines; the ancient county town was surrounded by new sources of prosperity which brought new communication routes. By 1850, the SWR had opened in south Wales and construction was proceeding on the Chepstow railway bridge which would open in 1852 providing a direct railway route from Carmarthen to London but there was no apparent prospect of Monmouth connecting to the SWR. In 1851, the mayor of Monmouth, Thomas Gratrex, chaired a public meeting in Monmouth to urge completion of three separate railway lines: Monmouth-Hereford, Monmouth-Newport and Monmouth-Gloucester via Ross, and one of the speakers at the meeting voiced a common sentiment that if Monmouth did not connect to the developing railway network, 'instead of being the great line of communication with South Wales, you will become a forgotten country.' The Great Western Railway Company was heavily criticized for failing to complete the line from Newport despite 'a solemn pledge' to make a line from Ross to Monmouth and from there to Newport via Usk.[71]

By September 1852, railway lines had been completed from Newport to Ebbw Vale to the west and Abergavenny to the east of Newport with the intention of connecting Abergavenny with the Hereford-Shrewsbury line which was under construction. The line from Swansea to Carmarthen was about to open and there was a projected link from Gloucester to Hereford via Ross but without a connection

[69] *Monmouthshire Merlin*, 13 April 1850.
[70] *Monmouthshire Merlin*, 11 May 1850.
[71] *Monmouthshire Merlin*, 2 May 1851.

to Monmouth. The *Monmouthshire Merlin* perceived a very real threat to the future of Monmouth.

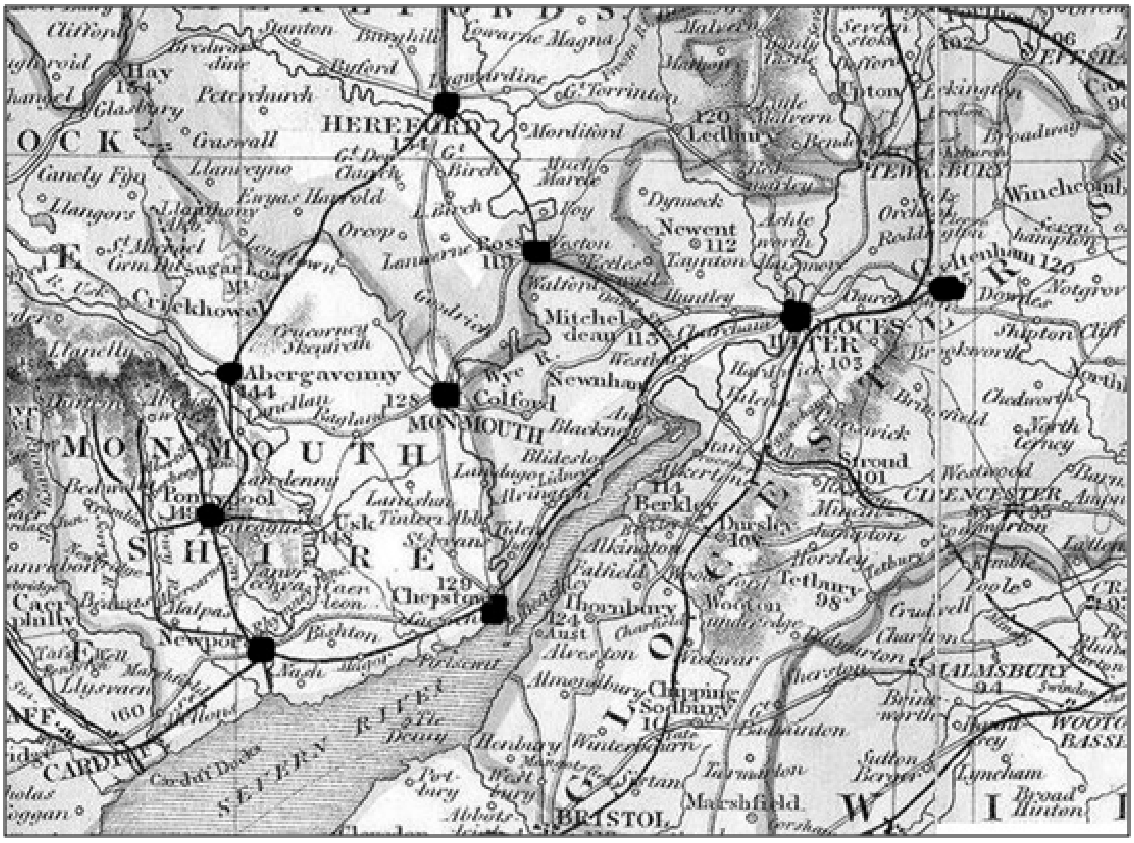
> Every place of any importance which has not some form of railway communication, may be expected to stand still, or even to retrograde... If then our county town is not to sink into something like a large village, its own inhabitants must spurn supiness, and energetically exert themselves... Let there be a vigorous and combined movement at once and Monmouth will be kept from sinking into decay.

The newspaper published a further editorial concerning Brynmawr near Merthyr expressing the sense of isolation for towns outside the railway network. Merthyr had been connected to Cardiff since 1840 through the Taff Vale Railway but Brynmawr remained without a rail link, despite its proximity to Merthyr, and people in Brynmawr 'had become almost an island people... shutting us out from that commercial and social intercourse with other places, which tends so largely to the improvement, comfort and prosperity of all concerned.'[72]

By March 1856, Monmouth had not fared much better than Brynmawr. In the midst of a distinct lack of progress in Monmouth's ambitions for railway links, the *Monmouthshire Merlin* expressed the sense of isolation and melancholy at Monmouth's apparent inability to connect to the expanding railway network in the region. Monmouth's 'declining Position in the scale of towns, of which the evidence is only too palpable, and which, all are agreed, is owing to her non-connection with the railway net-work of the kingdom, has at length made her feel the want of such communication...' Because Monmouth was 'shut out from intercourse with the world, she is truly in darkness.' It would be a 'happy day' when Monmouth could unite with neighbouring towns and 'instead of complaining of our deserted condition, rather lay the fault to ourselves, and endeavour to remedy so great a source of sorrow.'[73]

[72] *Monmouthshire Merlin*, 17 September 1852.
[73] *Monmouthshire Merlin*, 22 March 1856.

Figure 18 Monmouth’s communications c.1860[74]

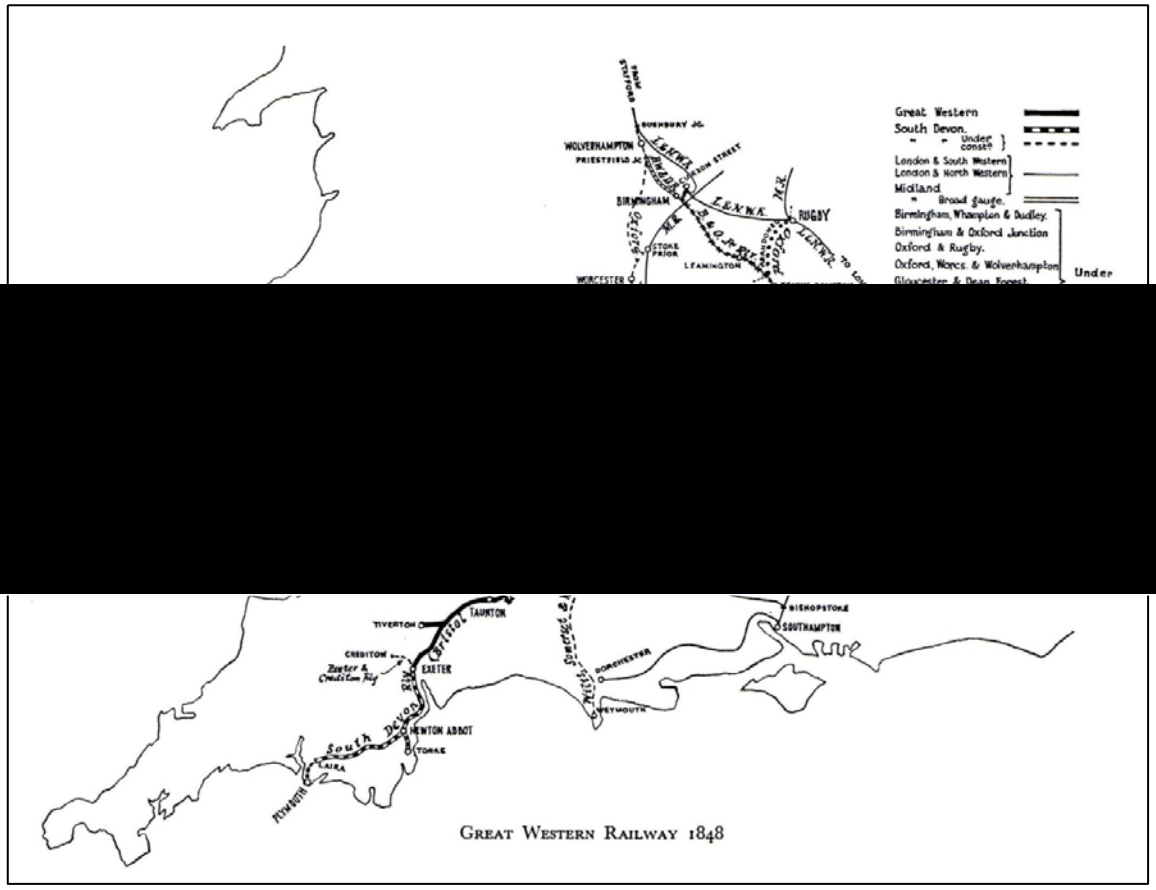


The routes of the railway around Monmouth are shown as black lines in Figure 18. The network skirted Monmouth leaving it in relative isolation. Prior to the railway, Monmouth was well-placed for road communications. There were connections to Hereford, Gloucester, Ross, Abergavenny and Chepstow. The old mail route through south Wales to Ireland went through Gloucester and then branched in two directions - a northern route through Monmouth and Abergavenny to Carmarthen where it would connect to the southern coastal route via Newport. Monmouth provided direct access to the northern route, but could also link to the southern route through its road link via Chepstow. The railway changed this communications system to Monmouth’s disadvantage by establishing a single mail connection to south Wales and Ireland from Gloucester via the southern coastal route. Monmouth was effectively isolated, or, as the *Monmouthshire Merlin* had put it - ‘deserted’. Such was the power of the railway.

[74] Adapted from *Phillips Map of England and Wales*, (1860). <https://en.wikipedia.org/wiki/Wikimedia_Commons> [accessed 22 March 2017].

Integration: the route to south Wales

Figure 19 The Great Western Railway in 1848 showing the projected route for the South Wales Railway[75]



Newspapers in south Wales commented on the impact of the speed of railways as they reported on the progress of the GWR in England and anticipated the construction of the SWR. They made a clear connection between 'speed' and 'civilization'. The *Cardiff and Merthyr Guardian's* commentary on the influence that railways had was fairly typical at the height of 'railway mania'. The steam locomotive was a force for 'civilization'. 'By annihilating time and space, and bringing the ends of the earth as it were together, a rapid circulation of intelligence and knowledge is insured...'[76] 'Intelligence' was commonly used at the time to describe information that was useful to commerce but included news about events at home and abroad held to be of interest to the newspaper's readership. The editorial indicated that the importance of the railway was not simply its ability to carry goods and passengers, but it provided a platform for the distribution of the mail and newspapers and exclusion from the railway network also meant that intelligence was

[75] MacDermot, *Great Western Railway*, p. 98.
[76] *Cardiff and Merthyr Guardian*, 19 October 1845.

delayed. *The Welshman*, in reporting a meeting at Carmarthen in 1844 in respect of the prospects of a South Wales Railway, voiced aspirations that were common at the time. It was a characteristic of the railway 'to promote civilisation, to facilitate and extend commerce, and to augment the riches and resources of the inhabitants of all those localities which are brought within its sphere.' The editorial did not mention the effect upon towns and villages outside the 'sphere'. There was no doubt that if England and Ireland could be brought 'into friendly and intimate connection, that then indeed we should be an united and happy people?'[77] The *Swansea Journal* took a similar view. The locomotive 'with a speed that mocks the eagle's flight, annihilates time and space, the agent by which new elements of improvement are called into being by which man's destiny, progress, is accelerated and fulfilled.' With the opening of the railway, Wales, the metropolis and the Midlands and Northern districts of England became 'as it were, one, and we are admitted into a fraternity of advantages into a community of the means of social progress and elevation with those great seats of intelligence, and creative industry.'[78]

A key factor in the route of the GWR was a proposed rail and steamship connection to Ireland as a means of 'improving the existing Communication between the Metropolis and the Western Districts of *England*, the South of *Ireland* and *Wales.*'[79] The GWR envisaged a direct railway link between London and Fishguard with a steamship connection to Waterford and from there linking to an Irish railway network, largely constructed under the auspices of the GWR. Traditionally, there had been five main ports connecting London with Ireland: Milford Haven to Waterford, Bristol to Waterford, Holyhead to Dublin, Liverpool to Dublin and Portpatrick to Dublin. The route through Gloucester and south Wales had largely fallen into disuse due to the unreliability of the road connection and competition from steamship connections at Bristol and alternatively Holyhead.[80] However, the connection to Ireland was an underlying factor in the debates relating to the route of the GWR and although the British government took no direct interest in railway routes, the delivery of mail both to and within Ireland was of particular interest.[81]

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[77] *The Welshman*, 27 September 1844.
[78] *Swansea Journal*, 18 June 1850.
[79] MacDermot, *Great Western Railway*, p. 8.
[80] *Post Office Communication with Ireland: report from the Select Committee, minutes of evidence and appendix* (London: HMSO, 1832).
[81] 'Report of the Commissioners appointed to consider and recommend a General System of Railways for Ireland', *Quarterly Review*, 63 (1839), 1-60.

Despite the recommendation from the Select Committee that the Milford Haven connection at Pembroke be discontinued in favour of Bristol and Holyhead, Milford Haven was considered the best site for a packet station to Ireland if land communications could be improved. The proposed route of the GWR to Pembrokeshire promised to restore a west Wales port to that pre-eminence, although the proposed land terminus was at Fishguard and not Pembroke.

Although British fears around insurrection in Ireland had largely subsided by the 1830s, speedy communication through the mail was seen to be important, and not only within the context of Ireland.[82] It was clear that the government's interest in the mail route to Ireland and its speed was also about the stability of Great Britain which rapid communications would support. The concluding remarks in the Report of the Commissioners investigating railways in Ireland made this clear and they also expressed stereotypes held by English authorities with the regard to the Irish and Ireland which mirrored those held of Wales - the railway would also be a 'civilizing' influence. The railway would encourage 'the capitalist to settle in the more remote parts of Ireland, and thus spread industry and happiness in these hitherto neglected districts; civilization and employment of the people will extend.' It was considered an object of English policy to connect Ireland more closely with England such that 'the most remote parts of Ireland should be connected as intimately and as closely as possible with herself... that thus the identity of feeling and interest will be soonest attained, on which depend the prosperity and permanence of the Union of the two Countries.'[83]

It was the issue of 'intelligence' in industry, commerce and trade that occupied Sir Henry Vivian, industrialist and M. P. for Swansea, in 1842 at a time when the importance of mail and newspapers was becoming apparent. In 1840, Roland Hill had introduced the 'Penny Post' in establishing a cheap, national mail system largely prompted by the demands of commerce and industry, and in parallel developments, newspapers were carried free on mail coaches once the newspaper stamp duty had been paid. This duty was reduced in 1836 and abolished in 1855 along with the advertisement duty on newspapers; the duty on paper was reduced in 1836 and abolished in 1861. The importance of communications using the railway was reflected in the requirement of railways to carry the mail on Sundays, despite

[82] *Post Office Communication*.
[83] *Post Office Communication*, pp. 30-31.

opposition from a variety of religious groups. Vivian was a member of a Select Committee considering mail communications with Ireland and he made clear in a letter to the Committee some of the logistical difficulties and barriers presented by the Severn Estuary which, together with the Bristol Channel as a whole, 'divides the western portion of the kingdom into two parts.' Vivian pointed to the 'inefficiency of the means at present employed for the conveyance of the mails across the Severn, a point of the greatest importance to South Wales'. As an entrepreneur, Vivian had a particular interest in the speed of the mail and it was an issue that he repeated during the opening of the South Wales Railway.[84]

With the advent of railways, mail could be delivered by steam locomotives and as one of the principal form of communications in trade and industry, along with the telegraph, access to the railway was of particular importance. In an extended letter to *The Cambrian* in 1842, Vivian dealt in detail with the options of using the Old or New Passage as a crossing point on the Severn and listed the respective mileages of each route, underlining the pre-occupation with distance and travel times. The Old Passage from Aust to Beachley was 1¼ miles, from Beachley to Chepstow was 3½ to 4 miles, and from Chepstow to Newport 16 miles; from Aust to Bristol was 12 miles. The New Passage was two miles south of Aust, the distance to Bristol being 10½ miles and to Newport 15 miles making 25½ miles from Bristol to Newport, as opposed to 32 miles by the Old Passage. However, improvements in the Old Passage and difficulties with tides and weather at the New Passage meant that the Old Passage was now favoured as the mail route to south Wales. During the winter of 1841 (a six month period) the mail was ferried in open boats 131 times in either direction - one-third of total crossings. Vivian argued that the Old Passage should be improved further so that a steamer could cross throughout the year.

Vivian considered that establishing a regular steamboat service across the Severn at Aust was 'an imperative' and on the same principle as establishing packets across the Irish Sea, the government 'should take every reasonable means of forming ready communication between two such important parts of the Empire as those on the north and south side of the Bristol Channel.' Under the then-current arrangements for the mail, it arrived at Bristol at 1.00 a.m. but was not transferred until 6.00 a.m. because the contractors of the mail from Bristol to Carmarthen would

[84] *The Cambrian*, 21 June 1850.

not cross the Old Passage until then when it was considered safer and more convenient for passengers. As a result 'Wales has little benefit, as regards the delivery of letters, from the establishment of the Great Western Railway'. Vivian concluded his letter by arguing that Hobb's Point in Milford Haven should be the packet station for Ireland, it being within easy reach of Carmarthen where the two mail routes met and was the shortest route.[85]

Vivian had demonstrated how the Severn Estuary isolated south Wales from England, and this isolation was exaggerated by delays in the mail which, in turn, increased a sense of being 'left behind' or distanced from the intelligence network. In *Hope and Heartbreak*, Russell Davies cited a painting by Hugh Hughes of an affluent Carmarthen family (c.1823) which depicted a letter and newspaper as 'symbols of the men's awareness of the outside world.'[86] They could equally be taken as signs of 'civilization' which, from the 1850s in south Wales, was associated with the railway. The argument that Vivian had followed in his letter concerned speedy access to intelligence which had become, not simply an imperative for commerce and trade, but a signal for civilization. The railway, and the intelligence it carried, had become routes for civilization and this was a theme that he pursued during the opening of the South Wales Railway.

South Wales experienced anxieties regarding exclusion similar to those experienced in England as the railways moved west. The region lay on the margins of Great Britain partly because of its distance from London but also due to its terrain and negative stereotypes that defined Wales as less civilized than England.[87] If the railway did not connect to Wales, then the relative isolation that Wales experienced would be reinforced along with the stereotypes of Welsh 'backwardness'. Under the South Wales Railway Act of 1846, a railway was authorized to run from Chepstow and follow a coastal route through the largest towns to Fishguard in Pembrokeshire. It would be financed through the South Wales Railway Company, but sponsored by the GWR and from there it would connect to Ireland by steamship, carrying

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[85] *The Cambrian*, 17 September 1842.
[86] Russell Davies, *Hope and Heartbreak: A Social History of Wales and the Welsh, 1776-1871* (Cardiff: University of Wales Press, 2005), p. 103.
[87] Jeremy Black, *A New History of Wales (*Stroud: Sutton, 2000); John Davies, *A History of Wales* (Harmondsworth: Penguin, 2007); Philip Jenkins, 'Wales', in Clark, *Urban History*, pp. 133-150; Howell, and Baber, 'Wales', in Thompson, *Social History*, pp. 281-354; *Glamorgan County History*, vol. 5, *Industrial Glamorgan from 1700 to 1970* ed. by A. H, John and Glanmor Williams (Cardiff: Glamorgan County History Trust, 1980) pp. 281-354.

passengers, goods, mail and newspapers. The GWR had failed in its attempt to cross the Severn by bridge south of Gloucester and was forced to create a railway link to south Wales via Gloucester crossing the Severn at Gloucester and the Wye at Chepstow. The main part of the line opened between Swansea and Chepstow on 18 June 1850 followed by the link from Chepstow to Gloucester on 19 July 1852 when the Chepstow railway bridge was completed.

It was twenty years into 'the railway age' before parts of south Wales were connected through the South Wales Railway and the euphoria that greeted the opening of the railway in every town along the line demonstrated what the railway meant and what expectations communities had of the railway.[88] For south Wales, it was particularly significant because it meant that at least parts of south Wales had rapid access to England and established an entry point more fully into the life of Great Britain and Ireland. In this sense, it redefined what it meant to be 'Welsh'. Early nineteenth century Wales has been described as a 'peasant economy' with 'atrocious communications' characterized by self-contained rural communities.[89] This was changing by the time the SWR opened in 1850 with substantial increases in population and significant industrialization in Glamorgan and Monmouthshire particularly around the iron and coal centres of Merthyr, Aberdare, Cardiff and Newport, while Swansea was expanding its industrial base in coal mining and the smelting of non-ferrous metals. There were similar industrial developments around Llanelli and Milford Haven.[90] The railway opened in south Wales during a period of change where anticipation of a rapid transit system was welcomed in both rural and industrial areas by providing access to urban markets in both south Wales and England.[91] The welcome that greeted the opening of the railway in all the towns that were connected in 1850 was extensively reported in newspapers in south Wales and the tone and content of the speeches that were reported, as well as the editorial commentaries and special supplements to mark the occasion, give some insight into how the railway was perceived and what expectations many people in south Wales had of the railway.

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[88] D. S. M., Barrie, *A Regional History of the Railways of Great Britain*, vol. XII, *South Wales* (Newton Abbott: David and Charles, 1980).
[89] D. W. Howell, *Land and People in Nineteenth Century Wales* (London: Routledge and Kegan Paul, 1978), pp. 1 and 9.
[90] Howell, and Baber, 'Wales', in Thompson, *Social History*, pp. 281-354; John and Williams, *Industrial Glamorgan*; Morgan, *Glamorgan Society*; Williams and Williams, *Gwent.*
[91] Howell, 'Railways'.

The euphoria that greeted the railway in south Wales was not simply due to the economic opportunities that this presented. There were strong cultural pressures surrounding the advent of the railway as a focus for a Welsh resurgence that dated from the eighteenth century.[92] The 'peasant economy' that was the dominant impression of Wales to outsiders underlined the inferior status of Wales in respect of England. This status was compounded by stereotypes of the Welsh language, which was the dominant language in Wales which few English people understood and which was considered in England as an obstacle to Welsh progress and civilization.[93] Wales was 'a land of comic, unchanging backwardness, with a people who had ancestry but no history.'[94] However, these stereotypes did not necessarily reflect the actual presence of Wales in the world. The Welsh were active in migration to north America and Australia and were familiar with world-wide trade. Swansea could be reasonably described as a global port before the railway reached south Wales, both English and Welsh capitalists were exploiting the natural resources of Wales in the eighteenth century and there was an active promotion of Welsh cultural traditions by Welsh 'exiles' in the capital. The sense of national grievance and inferiority had been challenged in the eighteenth century by a cultural resurgence in language and literature and in forging a new sense of history which redefined Wales and what it meant to be 'Welsh' and which has been referred to as a Welsh 'renaissance'.[95]

An important element in this resurgence was the emergence of a radicalism in both religion and politics which expressed itself in dissenting beliefs, reinforced by the Welsh language, against a background of industrial and social change which brought with it civic turbulence, unrest and violence. The rise of a Welsh urban culture in the wake of industrialization and the spread of towns in south Wales was the backdrop for a series of civil disturbances, some of which, particularly in Merthyr Tydfil (1831) and Newport (1839), caused alarm within political elites and

[92] Davies, *Hope and Heartbreak.*
[93] Daniel Defoe, *A Tour Through the Whole Island of Great Britain* (Harmondsworth: Penguin, 1979), pp. 375-377; Gwyneth Tyson Roberts, *The Language of the 'Blue Books': The Perfect Instrument of Empire* (Cardiff: University of Wales Press, 1998).
[94] Prys Morgan, *The Eighteenth Century Renaissance* (Llandybie: Christopher Davies, 1981), p. 14.
[95] *Wales and the British overseas empire: Interactions and Influences 1650-1830* ed. by H. V. Bowen (Manchester: Manchester University Press, 2011); Davies, *Hope and Heartbreak*, 1-83; Morgan, *Renaissance.*

could be described as 'uprisings' amid the Chartist influence in south Wales.[96] Disorder was not confined to urban areas; Carmarthenshire also witnessed rural disturbances in the form of the Rebecca Riots as violent protests against turnpike roads (1839-1844).[97]

The controversy over the 'Blue Books' in 1847, otherwise known in Wales as 'The Treachery of the Blue Books', exposed these underlying tensions.[98] The reports into the state of education in Wales reinforced a number of negative stereotypes about Wales and the Welsh, but particularly focused upon the language as being a 'peasant' language, an obstruction to Welsh progress towards civilization, incapable of embracing a 'higher culture' (like English). For the authors of these reports, the 'foreign' nature of Wales and the Welsh as a peasant people was compounded by the hostile physical landscape and fear of political insurrection from an aggressive working class, who were also radical in their religion, rejecting Anglicanism (and by implication England) in favour of their own versions of Protestantism. Many in Wales would probably have agreed that knowledge of English was of importance in being able to engage in the wider world but, as Gwyneth Roberts has pointed out, 'they had not expected to be told that they were drunken, dirty, superstitious and sexually promiscuous liars and cheats.'[99] The 'Blue Books' provoked a ferocious reaction within Wales and the opening of the South Wales Railway provided the opportunity to demonstrate that Wales was a civilization with a history that could enrich the United Kingdom as a whole. The 'Blue Books' were not mentioned specifically during the events which celebrated the opening, but their stereotypes were referenced indirectly. The railway became the gateway into Great Britain and how the railway was welcomed in south Wales was framed within a Welsh context and linked to a Welsh resurgence.

The opening of the line in 1850 was signalled by a steam locomotive travelling from Chepstow to Swansea carrying a party from the SWR, the GWR and other civic leaders. It stopped at each station along the line and the event at each town was very similar with the stations and streets regaled in flags and speeches

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[96] Angela V. John, 'The Chartist Endurance', *Morgannwg,* 15 (1971), 23-49; D. J. V. Jones, 'The Corn Riots in Wales, 1793-1801', *Welsh History Review,* 2.4 (1965), 323-350; D. J. V. Jones, 'The Merthyr riots of 1831', *Welsh History Review,* 3.2 (1966), 173-205.
[97] Elizabeth Amy Dillwyn, *The Rebecca Rioter: The Story of Killay Life.* vol. 1 (London: MacMillan, 1880).
[98] Roberts, *Blue Books*.
[99] Roberts, *Blue Books*, p. 209.

from civic dignitaries welcoming the arrival of their guests. The coverage of these events in most of the newspapers was extensive, including towns like Merthyr, Carmarthen and Haverfordwest that were not directly connected at that time, but which anticipated connection. The speeches of welcome and those by C. R. M. Talbot, M. P., a leading landowner and entrepreneur, the fourth richest man in Wales, the Lord Lieutenant of Glamorgan and the driving force behind the eventual completion of the SWR, were very similar.[100] They extolled the virtues of the railway and the expectations of the different communities in the way of economic prosperity, whether it be agricultural or manufacturing, together with a general expression that this was a great day for Wales as a nation which could now take its true place in the life of the nation. Wales and England would mutually benefit from the natural resources of Wales through the export of goods, livestock and minerals and from the influx of visitors to experience the natural beauties of Wales and in this process, Wales would become more highly valued and appreciated.

Like most of the newspapers, the *Cardiff and Merthyr Guardian* covered the opening of the line in great detail following the journey of the Directors' train from Chepstow to Swansea, but the coverage was framed within the context of Welsh resurgence. 'The scene at Newport was of the most exciting kind. Numerous arches crossed the line; flags waved from every elevation; the church bells rang their merriest peals; cannon boomed; and the thousands assembled shouted their welcome ...' At Cardiff, 'multitudes thronged the stations' and the Mayor of Cardiff remarked on the economic benefits of the railway by exploiting mineral resources, but also acknowledged its importance 'by connecting the principality more immediately with the great centre of intellectual as well as commercial activity.' At Bridgend, the opening was celebrated 'in great spirit' with the station decorated with 'garlands of flowers, triumphal arches, surmounted with crowns and banners, and the Bridgend band playing at intervals.' The Directors of the GWR were presented with a congratulatory address which expressed the town's gratitude that the line went through Bridgend, acknowledging that at one point in the planning of the line, it would not connect with Bridgend. At Neath, there was a similar congratulatory address and, on crossing the viaduct at Landore on the approach to Swansea, 'immense crowds of spectators' lined the way, but 'dense as were the people at

[100] Davies, *Hope and Heartbreak*, p. 93.

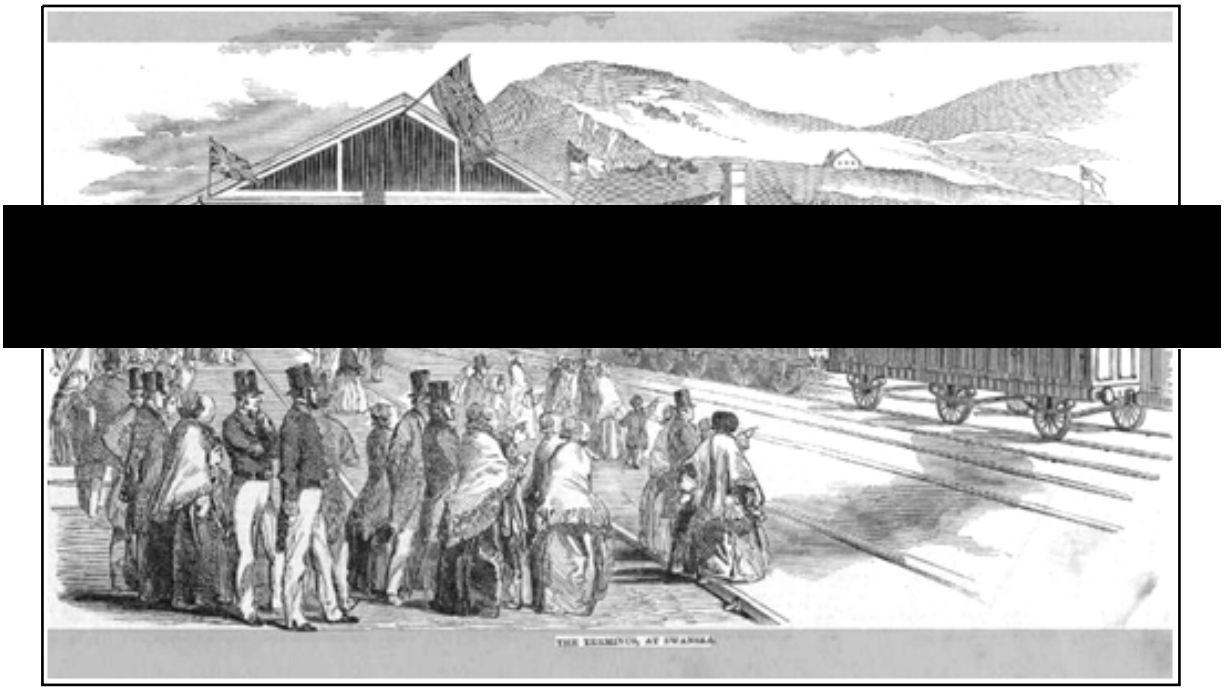
Landore, Hafod, and Vivian's Town, at Greenhill and the surrounding heights, they were literally jammed together - disclosing the great population of the neighbourhood...' The newspaper reflected on the event as being the dawn of a new age for Wales.[101] *The Cambrian* reported the opening in similar ways. In Swansea, 'the old bells, by their merry peals, proclaimed the advent of the new era...' and Wales, 'with its boundless but underdeveloped mineral resources, its projected branch railways, its fine harbours and progressing towns ... it may now be justly said

> "Our olden times are past and gone
> Our olden fancies banished."'[102]

In his speech at Swansea, Talbot also picked up on the Welsh theme. Having completed the first stage 'of a most magnificent enterprise ... I feel you will not be satisfied until you see it made to Carmarthenshire and Pembrokeshire, so as to join the whole of South Wales in one nation together - one common brotherhood.' For John H. Vivian, M.P., it was 'one of the proudest moments of his life... The small distinctions between the eastern and western portions of this country, and the petty feelings arising from this separation of localities, would be for ever obliterated.' Their mails would be within a day of London and Swansea would no longer be a hundred miles from the nearest railway station.[103] The speakers and the editorial comments on the opening of the railway pointed to the importance of Welsh identity both in terms of the interconnections across south Wales as the different parts were joined, but also in these connections with England as south Wales could, as an entity, speak with one voice. This changing identity did, however, tend to restrict itself to south Wales and particularly the urban areas touched by the railway as if this new consciousness or civilization was dependent upon the railway.

[101] *Cardiff and Merthyr Guardian*, 22 June 1850.
[102] *The Cambrian*, 21 June 1850; Gerald Gabb, 'The Railway Comes to Town', *Gower*, 28 (1977), 55-61.
[103] *The Cambrian*, 21 June 1850.

Figure 20 The opening of the South Wales Railway, Swansea.[104]



Although it was intended to continue the railway to Carmarthen and, Haverfordwest, there were doubts about whether this would happen. The GWR, in the wake of economic depression in Ireland and Britain, expressed doubts about completing the line to Fishguard and the proposed railway network within Ireland had been substantially curtailed by 1850. The SWR, on the other hand, under the leadership of Talbot was determined to complete the line, although its destination was altered to Milford Haven which benefited Haverfordwest which would now be on the main line and not a branch line. Attendees at a public meeting in Haverfordwest in 1850 discussed the possibility of not connecting to the town 'with surprise and alarm' and failure to do so would 'not only be a signal violation of good faith, but would also be illegal.' In the debate, the opinion was expressed that if the line were not completed, 'the county would sustain very serious injury inasmuch as it would not be in a position to compete with the other parts of the kingdom, which are netted with railways.'[105]

In February 1851, William Owen, the Mayor of Haverfordwest, wrote to the *Pembrokeshire Herald* announcing that the line would be completed to Haverfordwest, but the following year, construction of the line ran into opposition

[104] *Illustrated London News*, 29 June 1850.
[105] *Pembrokeshire Herald*, 25 January 1850.

from a Pembrokeshire landowner, Baron de Rutzen. Although most landowners sold lands for railway construction (often being accused of 'many monstrous instances of exorbitant demand'), periodically there was a determination to resist the railway.[106] In the case of the connection from Carmarthen to Haverfordwest, the *Pembrokeshire Herald* reported opposition at a relatively late stage in the proposal and took up a position that most newspapers did in these circumstances which was to heavily criticize the landowner. Railways were broadly seen as of importance to the future prosperity of a community and although they may have opposed some aspects of railway construction, as with Brunel's proposed Severn bridges, or with routes, as in the case with Cheltenham's railways, editors of newspapers were keen to support railways.

> Our readers will learn with regret, and we may use a stronger term, that there are some land-owners in Pembrokeshire who have not learned wisdom from the past to forbear a selfish and short- sighted opposition to the South Wales Railway - in a scheme which promises to give to this county, so distant from the metropolis and the great centres of consumption, a means of communication which would place it on a par with inland English counties... Is it not to be deplored that a great work of incalculable benefit to the county of Pembroke should be perilled by any factious opposition?[107]

However, despite some opposition from landowners and threats from the money market, the SWR was eventually completed to Carmarthen in 1852 and then to Haverfordwest in 1853. The newspapers celebrated the events in a very similar way to the welcome given to the opening of the SWR in 1850. In its coverage of the opening of the line from Llanelli to Carmarthen, the *Carmarthen Journal* published a supplement in a similar way to other newspapers covering the events, the expectations of Carmarthen and Llanelli, the history of the line and the wider implications for Wales as a whole. The event was 'without parallel in the history of Carmarthenshire' and 'a new and brighter future dawns upon Wales.' It was only 'facility of communications' that was required 'to raise the Principality to an equality with other parts of Her Majesty's dominions.', which expressed the sense of inferiority that Wales felt in relation to the nation as a whole, but also a determination to remedy the injustice of stereotyping Wales and the Welsh as 'backward' or 'uncivilized'. The people of Wales, on the contrary, 'possessing

[106] *Pembrokeshire Herald*, 30 December 1853.
[107] *Pembrokeshire Herald*, 14 May 1852.

faculties of the highest order, with indomitable perseverance, required only the impetus and stimulus that the railway always gives to develop these latent powers and place them far above their competitors.' Recalling the difficulties facing the SWR project, 'Wales seemed doomed to be not only isolated from the world but to remain in its rude and primeval state.' The railway 'was received with unrivalled pleasure, as there prevailed a deep consciousness that the prosperity of the county mainly depended upon the facilities and advantages afforded by railways.'[108]

On the opening of the line to Carmarthen, Talbot congratulated his audience that 'their noble country was at length connected to the more civilized portion of the kingdom'. He referred to Carmarthenshire (and possibly west Wales as a whole) 'without meaning any offence' as a 'terra incognita, a kind of back settlement, known to other parts of the world by the excellence of its butter, and its not very good oats. (Loud laughter)' In his response, J. H. Vivian 'could not but agree in the remark that this had hitherto been a species of terra incognita'. Viscount Emlyn, a landowner in Pembrokeshire, 'as a representative, however, of the benighted terra incognita which had been so often alluded to' promised to give the Directors (of the SWR) 'a hearty welcome' when they reached Pembrokeshire.[109] The references to 'terra incognita' about west Wales made by Talbot and Vivian were perhaps an indication of the tensions that Vivian had referred to between different localities within south Wales. They were an oblique acknowledgement of the sense of humiliation inflicted by the 'Blue Books' but accompanied by a determination that, with the railway, Wales would be a 'terra incognita' no longer. As far as the principal urban areas in south Wales were concerned, the railway was a force for inclusion.

Mobility: the traveller experience

The SWR revolutionized personal travel between the urban areas in south Wales through its unprecedented speed of movement and in the volumes of passengers railways could carry. However, the travelling experience in the region was heavily criticized on a number of levels. Many pamphlets and newspaper articles argued quite openly for closer government regulation of railways, including nationalization, as they expressed open hostility to railway company monopolies. There were

[108] *Carmarthen Journal*, 17 September 1852.
[109] *Pembrokeshire Herald,* 24 September 1852.

frequent disparaging comparisons between British railways and those on the European continent and the United States. Belgium, in particular, was held up almost as a model for the British to follow where the principal lines were owned by the state and where fares were substantially cheaper.[110] There were usually four classes of travel in the railway's early years: first, second and third class to be followed by a 'Parliamentary' class established by the 1844 Railway Act that was intended to both promote travel for lower classes and to improve their comfort and safety. There could, however, be as many as seven classes depending upon the management of the individual railway and their conditions of travel varied considerably between first and parliamentary classes.[111] The Act did not cover third class carriages which remained uncovered and without seats in many railways.[112]

Criticisms of railway companies often focused on their alleged lack of care for the safety and comfort of passengers. Railway accidents made headlines and occupied large sections of the reports of Railway Commissioners to parliament with detailed accounts of individual accidents. Although evidence was regularly produced by newspapers that railway travelling was the safest form of travel, the nature of railway accidents highlighted the novelty of high-speed travel for large numbers of passengers which was unknown before the railway. Accidents incurring from this form of travel often caused gruesome injuries and fatalities. Newspapers regularly reported on the physical impact of accidents upon the victims and how bodies could be mangled, dismembered or burnt.[113] Charles Dickens, in particular, who had experienced a railway accident at Staplehurst in 1865 that caused the deaths of ten people, published a regular diet of anti-railway tracts.[114] A major disaster at the Sonning Cutting on the GWR line in 1841 resulting in the deaths of nine third class travellers was influential in the passing of the 1844 Act intended to improve passenger safety and convenience. Medical assessments on the pathology of railway

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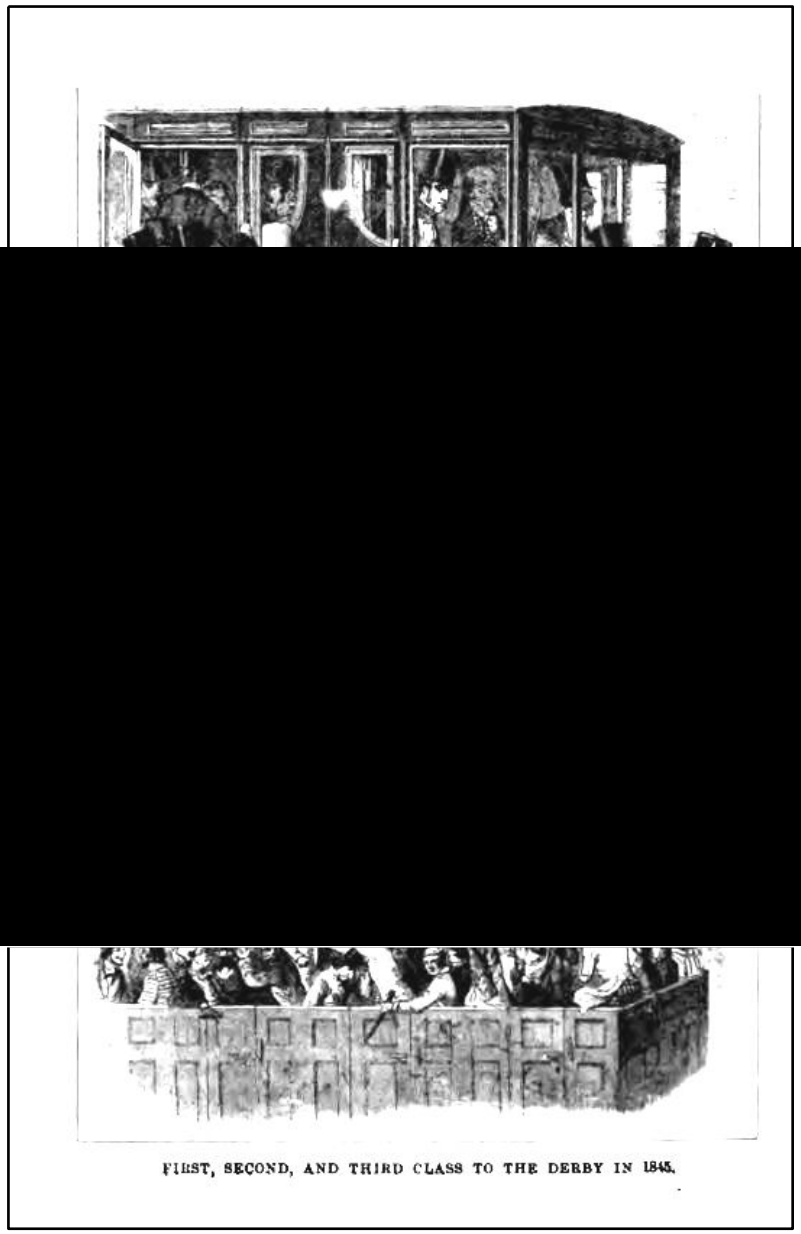
[110] John Raphael Brandon, *Railways and the Public etc* (London: LSE Selected Pamphlets, 1870).
[111] Simmons and Biddle, *Railway History*, pp. 84-85.
[112] John Pendleton, 'The Railway Travel of Queen and People', *English Illustrated Magazine*, 166 (1897), 445-450.
[113] Ralph Harrington, 'The Neuroses of the Railway', *History Today*, 44.7 (1994), 15-21;
Ralph Harrington, 'The railway accident: trains, trauma and technological crisis in nineteenth-century Britain', *Institute of Railway Studies*, University of York, 2003.
[114] Jill L. Matus, 'Trauma, Memory, and Railway Disaster: The Dickensian Connection', *Victorian Studies*, 43.3 (2001), 413-436; Charles Dickens, 'Need Railway Travellers be Smashed?', *Household Words*, 4 (1851), 217-221.

travelling were common ranging from the damaging physical side effects on the body to the psychological impact of stress, anxiety and even rapid ageing.[115]

Figure 21 First, second and third class carriages 1845[116]



FIRST, SECOND, AND THIRD CLASS TO THE DERBY IN 1845.

Apart from those who travelled first class in closed carriages, few appeared to enjoy the experience of railway travel and there were regular criticisms of railway companies by passengers and commentators. This view of the traveller is largely absent from the mainstream historiography of railways. There were suggestions that railway companies should be nationalized in the interests of the consumer and the

[115] The Lancet, *The Influence of Railway Travelling on Public Health* (London: Robert Hardwicke, 1862).

[116] John Pendleton, *Our Railways: Their Origin, Development, Incident and Romance*, vol, 2 (London: Cassell, 1896), p. 165.

level of fares criticized for effectively excluding 'poorer classes'.[117] Most third class travellers were exposed to the weather and the carriages could become very hot in summer and extremely cold in winter with no form of heating, except for 'footwarmers' in first class carriages. Some fatalities were recorded amongst passengers affected by extreme weather. One coroner's jury considered that a traveller's death in 1845 was 'accelerated by his exposure to the inclemency of the weather in one of the third-class carriages' and the jury 'made a strong recommendation to the Great Western Railway Company' to implement the improvements promised at their last half-yearly meeting.[118]

There was little coordination between timetables of different railway companies and therefore travellers could be subject to long waiting periods between trains and the inconvenience was aggravated by having to walk or take a coach between stations before railway companies amalgamated from the 1860s onwards and shared stations. Gloucester gained some notoriety in the early years of the railway as the junction between two railway companies, two gauges and with two separate stations with passengers having to move with their luggage from one station to the other.

The railway experience was often unfavourably compared to travel by stage coach, there being a marked contrast between the apparent helpful and welcoming attitude of stage coach drivers and inn-keepers on the one hand and the indifference or hostility of railway staff on the other. Social interactions within stage coaches and railway carriages were also contrasted unfavourably as far as railways were concerned. According to some commentators, stage coach travel was an opportunity for interaction with fellow travellers, while railway passengers developed strategies for isolation from fellow travellers. Reading novels and newspapers was a particularly popular strategy which sustained a new retail enterprise for the sale of these publications at railway stations.[119] The GWR was particularly criticized for its treatment of the region's working classes. In the view of a contemporary Sydney Samuel, the GWR 'have devoted all their efforts to making a gentleman's railway,

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[117] F. Keddell, *The nationalization of our railway system: its justice and advantages* (Bristol Selected Pamphlets, 1886); Llewellyn Archer Atherley-Jones, *The Grievances of Railway Passengers* (London: LSE Selected Pamphlets, 1894).
[118] *Cheltenham Examiner*, 19 March 1845.
[119] Brightfield, 'Railroad', 55.

and their success has cost so much money that they cannot afford to attend to the wants of poor working men.'[120]

Complaints about the punctuality of trains were common. From the testimony of travellers, trains would sometimes depart at the wrong time or arrive in unexpected places; it was sometimes not clear what train was going where and there could be long waiting periods in connecting between one train and another. For travellers over longer distances with possibly two or three connections to make, the timetables were difficult to follow and there were frequent suggestions, mostly ironic, that the traveller needed a guide to Bradshaw's railway guide in order to understand it.[121]

Figure 22 The complexity of rail timetables[122]

The railways in the region divided into two distinct types which reflected the nature of the societies and economies they served. 'Industrial' railways connected manufacturing regions (the Taff Vale and South Wales Railways, for example) while 'general' railways like the Great Western Railway linked urban areas with a mix of light industrial and commercial enterprises but whose hinterlands were largely rural and agricultural. This division reflected the growing separation of the region into

[120] Sydney, *Speed on Railways*, p.19.
[121] *Illustrated London News*, 20 March 1852.
[122] *Illustrated London News*, 20 March 1852.

two distinct areas and the travel patterns differed. South-east Wales had many heavily industrialized, urban areas with a network of railways compared to the more agricultural, rural areas to the west in Carmarthenshire and Pembrokeshire where a single line of railway connected fewer urban areas. The English counties to the south had fewer industrial areas, but a heavy urban concentration in Bristol and the railway linked urban areas which were more sparsely spread than in south Wales. There were substantial 'branch' lines in south Wales with considerable traffic linking industrial towns like the Taff Vale and the Vale of Neath railways. A timetable published by the *Monmouthshire Merlin* in 1855 listed no fewer than six separate railways serving south and south-east Wales including Monmouthshire.[123]

There were marked differences in travel patterns. In industrial railways, first and second class passengers tended to be a smaller proportion of all passengers, but travelled farthest but on the GWR they comprised a much larger percentage of passengers and travelled a similar distance as third class passengers. Industrial railways had relatively short average journeys of between five and fifteen miles whereas for the GWR average journeys were around 40 miles. Most journeys were local or confined to regional travel. The timetable for the SWR in 1855, for example, showed 19 stops between Haverfordwest and Gloucester, but only two stops after Gloucester (Cheltenham and Swindon) before reaching Paddington which indicated that travel on this railway was principally connected with business within south Wales and between south Wales and London.[124] There were four trains on Sundays and one mail train and three of these trains had third class carriages. Their travel distances varied - one travelled the whole length from Paddington to Haverfordwest, but most of the traffic, judging from the stops, took place between Newport and Carmarthen. The company returns do not indicate the nature of Sunday travel by class but with three trains having third class carriages, it suggests that third class travel was significant and much of this travel may have been for leisure. Similarly, the Bristol and Exeter Railway timetable of 1855 showed nine stops between Exeter and Bath, including Bristol, but only four after Bath before reaching Paddington. Between Exeter and Bridgwater there were a number of local stops but few after that.[125] Despite the dominance of London in travel networks, most railway

[123] *Monmouthshire Merlin*, 4 July 1855.
[124] *Monmouthshire Merlin*, 4 July 1855.
[125] *Taunton Courier*, 13 June 1855.

travel was local or regional with relatively fewer journeys to the metropolis or destinations outside the locality or region judging by the average length of journeys.

The GWR and SWR carried relatively large numbers of soldiers compared with other railways. Over 40,000 soldiers travelled on the GWR in 1853 and in the second half of 1854, 26,491 soldiers travelled an average of 23.9 miles. It is not possible to tell the origins and destinations of these soldiers or the reasons for this travel, but they appear to be short journeys and therefore were moving within the region. Over 5,000 soldiers travelled on the SWR in 1855, for example. Whatever the purposes of these troop movements, it was a novel method of travel for the military. Previously, soldiers had marched or sailed to their barracks or points of engagement.[126]

Timothy Leunig reached an important conclusion with regard to third class travel in an article published in 2006. Citing Dionysius Lardner and the Royal Commission on Railways of 1867, he concludes that third class passengers would not have travelled on stage coaches and that therefore these passengers were new to mobility, except when they would have travelled on waggons or walked, and this would place them among artisans, labourers and the poor.[127] Taking into account Leunig's view that third class passengers were new to travel, the numbers of 'new' travellers are substantial and the evidence of the opening of the South Wales Railway and the Vale of Neath Railway strongly suggests that many thousands of potential passengers were waiting for the opening of the railway. In the first three months of its operation in 1851, the Vale of Neath line carried over 29,000 passengers on 'Parliamentary' trains travelling an average of 12.44 miles and for the first full year of its operation in 1852 carried almost 140,000 'Parliamentary' passengers with average journeys of just over 10 miles. In its first six months of operation, the SWR facilitated just over 400,000 journeys and in its first full calendar year the number of journeys exceeded two million and over 80 per cent of these journeys made by third class and parliamentary passengers.[128] The SWR railway timetable published in 1855 gives some indication of the extent of travel within south Wales and to

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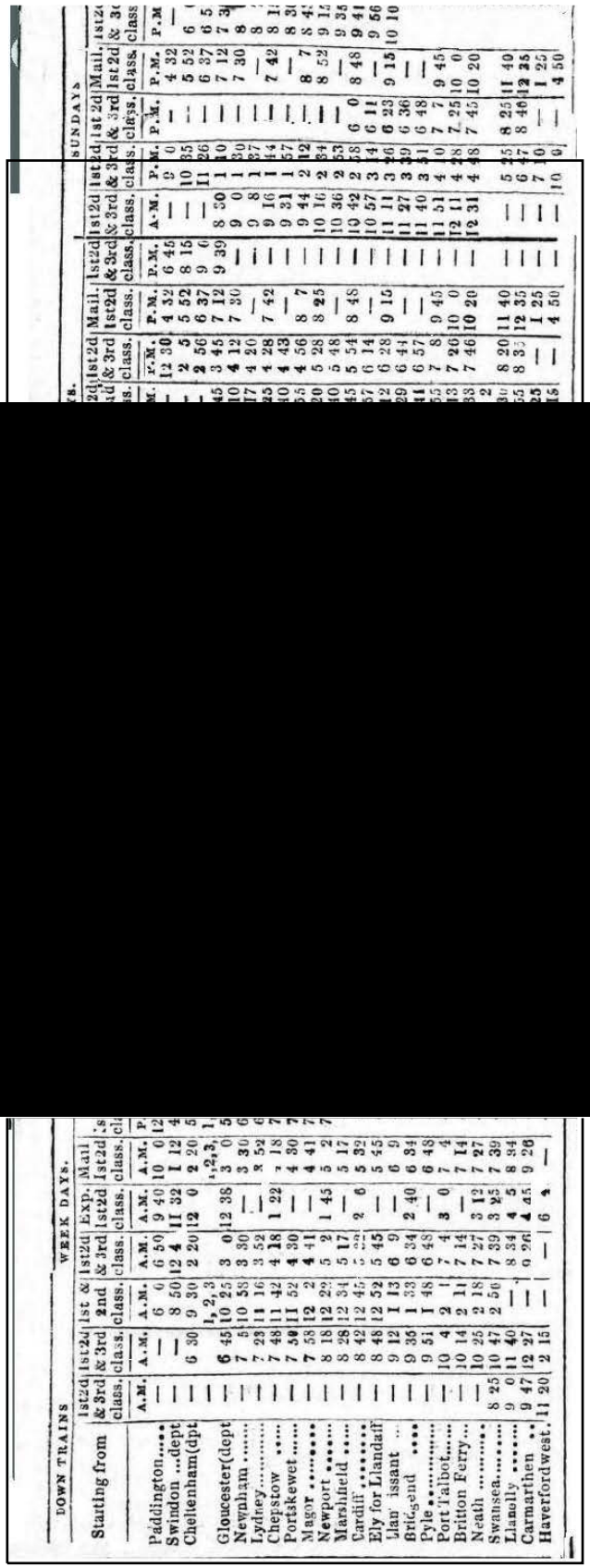
[126] *Railway Returns Relative to the Passenger and Goods Traffic on Railways* (London: Ayre and Spottiswoode for HMSO, 1853, 1854, 1855).
[127] Timothy Leunig, 'Time is Money: A Reassessment of Passenger Social Savings', *Journal of Economic History*, 66.3 (2006), 635-673 (p. 641); Dionysius Lardner. *Railway Economy* (London: Taylor, Walton and Maberly, 1850).
[128] *Railway Returns Relative to the Passenger and Goods Traffic on Railways* (London: Ayre and Spottiswoode for HMSO, 1851).

London as distance narrowed. There was substantial travel on Sundays along the south Wales coast which suggested enhanced leisure activity and there were early and late trains to and from Paddington (see Figure 23). Passengers could visit towns from Haverfordwest to Newport and Chepstow in ways that were not possible before the railway which may have contributed to a greater sense of identity between people who lived in south Wales. It also drew them closer to England and the metropolis.

Figure 23 South Wales Railway timetable 1855[129]



[129] *Monmouthshire Merlin*, 4 July 1855.

Allowing for travel outside the region, the two major railways serving the region in 1855 carried over 4.5 million journeys of which just over 3.3 million were 'new' journeys. If this is correct, then railways had a significant impact on the travel patterns of 'new' passengers with its implications for social history, but little is known about these passengers or why they were travelling (see Table 10).

Table 10 Journeys by traveller class and by volume 1845-1855 for the SWR and GWR[130]

% of journeys by class				Journeys by volume		
	1845	1850	1855	1845	1850	1855
GWR						
First	19.41	15.06	14.88	473,840	375,161	739,949
Second	67.67	66.28	54.60	1,651,948	1,651,598	2,715,698
Third	12.92	18.66		315,465	464,952	
Parliamentary			30.52			1,518,035
Total				2,441,253	2,491,711	4,973,682
SWR						
First		7.02	6.30		16,903	70,151
Second		56.71	26.29		136,451	292,789
Third		19.85	66.93		47,767	745,243
Parliamentary		16.41	0.48		39,496	5,357
Total					240,617	1,113,540

While the actual volume of journeys was recorded by railway companies and demonstrated how important travel by railway had become by the 1850s in the region, it is not clear from the evidence how extensive this travel was across social classes. Contemporary sources and historians give differing accounts of travel by social class ranging from the effective exclusion of lower classes from railway travel because of the cost to assertions that railways were used extensively by the labouring population and enhanced the free movement of labour. Throughout the century, pamphlets regularly argued that fares were too high and discriminated against 'lower

[130] *Reports of the Railway Commissioners, 1845-1855* (London: HMSO).

classes' whom, it was argued, were largely excluded from railway travel apart from excursions. Companies were considered to be hostile to most travellers for whom the experience of railway travelling was often an ordeal, but particularly for third class travellers.[131] According to a contemporary writer, the third class passenger who comprised 80% of the population was:

> carried only by the slowest moving trains. His train is shunted to a siding, like a goods train, and there he is detained sometimes for hours together, in the winter time shivering with cold often without a glimmer of light to cheer him... the third class passenger is despised by the money-taker, snubbed by the porter and looked upon as an intruder and an encumbrance by the railway director.[132]

However, according to Bradley, the 1844 Act 'gave a calculated stimulus to capitalism by promoting the free circulation of labour... the Parliamentary train represented an effective subsidy for the travel of the poorer classes...'[133] By the end of the century, railway travel was a 'converging experience ...one of the greatest instances of social levelling in our history... all but a shrinking proportion of the well-off sat down together in third class.'[134] Jack Simmons takes the view that travel by working classes was significant, despite the apparent hostility of railway companies and difficult travelling conditions. He cites a Captain Lawes from the Manchester and Leeds Railway in 1844 that 'strictly the working classes, weavers, masons, bricklayers, carpenters, mechanics, and labourers of every description, some of whom used formerly to travel by carts by the greater number on foot' comprised third class traffic. Simmons concluded that the volume of third class passenger traffic 'was clearly the movement of labour, arising from normal employment and the quest for new work; from travelling involved by the transfer of work from one place to another; from resettlement and permanent migration.'[135] Railways also 'encouraged an exceptional movement of labour in south-east Wales' but Simmons provides no evidence to support this statement.[136]

Debates about lower fares was a recurring theme in discussions about railways and mobility and one of the most convincing arguments of the impact on

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[131] W. Hodgson, *A plea for justice for third-class passengers* (Bristol: Bristol Selected Pamphlets, 1872).
[132] G. W. Jones, *G. W. Jones's Plan of Universal Penny Railways* (Bristol: Bristol Selected Pamphlets, 1869), p. vii.
[133] Bradley, Railways, p. 62.
[134] Bradley, *Railways*, p. 73.
[135] Simmons, *Victorian Railway*, pp. 320-321.
[136] Simmons, *Victorian Railway*, p. 338.

lower fares upon travel was put by Wyndham Harding in 1848.[137] Harding was the manager of the Glasgow and Greenock railway in the 1840s and introduced a third class fare of ¼d. per mile which resulted in a substantial increase in third class traffic. By 1847, the percentage of third class passengers had increased to 83.3, the Lancashire and Yorkshire Railway was 72.3 while the percentage for the GWR was 14.6. Harding was scathing about the practices of the GWR in respect of third class passengers which 'preclude hundreds of thousands of third class passengers yearly from using the railway who, with greater facilities, would be glad to use it.'[138] What Harding showed was that although there had been substantial use by third class passengers on 'industrial' railways, very many thousands of potential passengers were deterred by the level of fares.

Freeman and Aldcroft have questioned whether labouring classes used the railway and H. J. Dyos in his study of workmen's railway fares in London concluded that 'the cost of the daily journey to work was too high at penny-a-mile rates for most of the working class' and overcrowding in London was because workmen needed to live near their place of work because of the costs of travelling.[139] However, Douglas Reid considered that rail fares in Birmingham were within the reach of skilled artisans.[140] Although Philip Bagwell considered that there would have been little point in passing the Bank Holidays Act of 1871 unless rail fares were cheap enough to allow wage earners a trip to the seaside and back in a day, this does not support a view that wage earners used railways on a regular basis.[141] Trips during holidays and weekends would often have been provided in excursion trains.

Leunig considered the evidence of travel by social class to be inconclusive and in this takes a similar position to that of David Norman Smith.[142] 'We simply do not know what proportion of travellers in any class were travelling on business in 1865.'[143] He did, however, also cite Captain Lawes of the Manchester and Leeds Railroad in 1840 that third class travel was made up primarily of handloom weavers who otherwise would have had to walk to Manchester which saved them half a day a

[137] Wyndham Harding, *Facts bearing on the progress of the railway system.* (LSE Selected Pamphlets, 1848), p. 32.
[138] Harding, *Progress*, p. 327.
[139] H. J., Dyos, 'Workmen's Fares in South London 1860-1914', *The Journal of Transport History*, 1.1 (1953) , 1-17, (p. 6) ; Freeman and Aldcroft, *Transport*, p. 8.
[140] Smith, *The Railway and its Passengers*, p.20.
[141] Bagwell, *Transport Revolution*, p. 130.
[142] Smith, *Railway*.
[143] Leunig, 'Time is Money', 651.

week. On the volume of third class passenger traffic, he concurs with Bradley to some extent that 'it is unrealistic to assume that third class rail travellers would have been a representative cross section of the working class' and therefore the volumes of third class travel in themselves do not necessarily indicate the mobility of lower classes.[144] Douglas Reid considered that fares in 1846 were within the reach of artisans.[145] A pamphlet written by James Blewitt, M. P. in 1844, however, argued that the proposed Monmouthshire Railway from Newport to Nantyglo via Pontypool could involve a trade-off between the saving in time and the cost of the railway fare for labouring classes, thereby promoting the mobility of labour. 'The very poorest are hardly so poor but that the saving of time counterbalances the expense of railway convenience.'[146] His pamphlet also attempted to show that it was cheaper for labourers to go by train to work rather than walk.[147]

In the accounts of railway passenger traffic by both contemporaries and transport historians, there is an unstated assumption that travellers were overwhelmingly male and little attention has been paid to women travellers.[148] The railway challenged women, particularly those travelling alone, to leave the domestic, private arena and engage, through mass transport, in the public arena. The design of the railway carriage imitated that of the stagecoach as an intimate space which was secluded from outside.[149] The carriages were self-contained which restricted movement outside the carriage to stops at stations which presented a potential threat to women as well as children and there were numerous accounts in newspapers of women being assaulted in the confines of the railway carriage.[150] The railway carriage became the site of a variety of dramas and tragedies which inspired writers of detective fiction where victims of crime were often women.[151] The dangers to women were recognised in the provision of 'ladies only' carriages from 1845 which

[144] Leunig, 'Time is Money', 651, 661.
[145] Douglas Reid, 'The "iron roads" and "the happiness of the working classes"', *The Journal of Transport History*, 17.1 (1996), 57-73, (p. 61).
[146] Reginald James Blewitt, *New Monmouthshire Railway* (London: LSE Selected Pamphlets, 1844), p. 21.
[147] Blewitt, *Railway*, p. 22.
[148] Tina Young Choi, 'Fast Times on the Victorian Rails', *Journal of Victorian Culture*, 21.1 (2016), 126-129, (p. 126).
[149] 'A Day in a Stage Coach', *The Athenaeum*, 253 (1832), 569-570; W. Outram Tristram, *Coaching Days and Coaching Ways* (London; MacMillan, 1888).
[150] *Illustrated Usk*, 14 January 1865; *Monmouthshire Merlin*, 6 August 1875; *Bristol Daily Post*, 20 August 1875; *Western Daily Press*, 4 November 1876; *South Wales Daily News*, 5 November 1875.
[151] Ian Carter, 'The lady in the trunk: railways, gender and crime fiction', *The Journal of Transport History*, 23.1 (2002), 46-59.

was an attempt to provide safety in railway travel. Lone women travellers, therefore, faced the risk of railway accidents and assault, as well as the challenge of moving from the private to the public sphere.

Although railways on the nineteenth century presented a series of obstacles for women's travel, there is evidence that women rose to these challenges and used railways extensively.[152] A Board of Trade survey in 1887 designed to assess the availability of 'ladies only' carriages on mainline railways demonstrated that women travellers largely declined to use these carriages, preferring to occupy general carriages including 'smoking' carriages. The Great Western Railway's return for six days in October 1887 on its route from London to Penzance via Bristol and Plymouth was typical of the returns given by other mainline railways. The railway had provided seating for 1,060 in "ladies' compartments" but the maximum number of occupants at any one point was 248 women. For the same period, 5,141 women occupied seats in smoking compartments.[153] The return indicated that at least 900 women used the Great Western Railway for the short period covered by the survey and of those only around 5 per cent used 'ladies only' carriages. There were many instances recorded in newspapers where lone women as well as groups of women declined using 'ladies only' carriages in favour of 'smoking' or general carriages.[154] While it is not possible to identify from the survey how many of these women were lone travellers, or travelling with a group of other women, the survey's data strongly support the argument pursued by Anne Despotopoulou in her *Women and the Railway* that women extended their horizons by choosing to travel on railways which broke new ground in enhancing their self-confidence as women and their emancipation.

Conclusion

The scope of the railway networks indicates a divide within the region broadly between England and Wales which reflected the diverging economies of the two within the region. In south Wales there was a complex of railways connecting industrial centres while in England, there was basically a single line connecting the main urban areas. Travellers from Bideford and Barnstaple would have to go via

[152] Despotopoulou, *Women and the Railway*.
[153] *Brecon County Times*, 2 March 1888.
[154] *Bristol Daily Post*, 1 July 1875; *South Wales Daily News*, 13 September 1875; *South Wales Echo*, 21 August 1888; *Western Daily Press*, 20 May 1899.

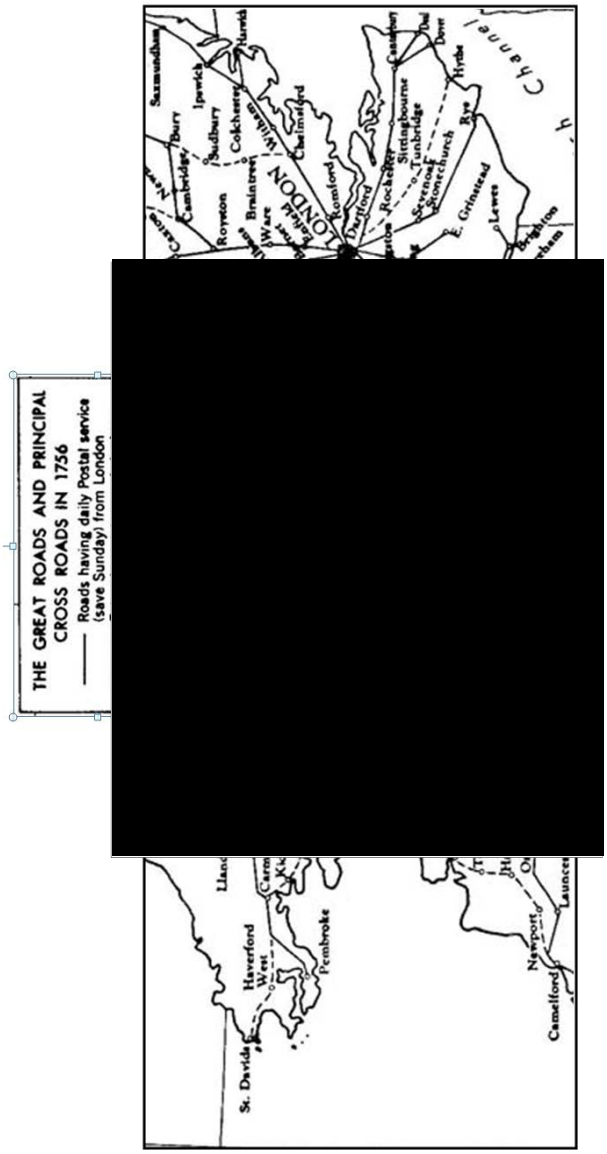
Exeter to reach Bristol, while those in Haverfordwest had access to the national network across south and central Wales. While there was an emphasis upon the importance of connection to London across the region, there is evidence from the commentaries on the opening of the SWR that connections within south Wales with the industrial centres in England at least rivalled the importance of London as a market and commercial centre. There was clearly a shift in Welsh focus towards land communications with England, but the railway also enhanced port trade which laid the foundations for dock development on both coastlines and an expansion in international trade. For much of south Wales, the railway enhanced a sense of integration within the United Kingdom while at the same time providing a platform for the expression of national and cultural identity and self-worth, as distinct from England. As a consequence, it probably weakened any sense of regional identity with the Bristol Channel.

In comparing land communications between 1750 and 1850, the railway did not always follow traditional land routes, was not as extensive as the road system, but revolutionized speed of travel (see figures 24, 25 and table 11). For large sections of the population in the rural areas of the region, they could only access the railway through traditional methods of walking or the horse. Despite the volumes of railway historiography, there is a crucial lack of data on travelling patterns which would illuminate who was travelling and for what purpose. Although there are extensive records on how some people viewed the railway, these are largely accounts from élites – the bulk of the population remained silent but testified to the popularity of travel by their patronage of railways. The locomotive's speed and carrying capacity clearly influenced peoples' perceptions of place but its role in unifying across distances was a work of the imagination rather than actual travel. The great majority of journeys were short indicating local or regional travel but the national distribution of mail and newspapers played a significant role in a sense of identity with the wider nation. This was clearly evident in south Wales. However, much of the practice of travelling would not have promoted a sense of unity across classes as has sometimes been claimed, but it probably had a limited impact as Douglas Reid has concluded. 'The experience of travel must have helped in some measure to instil a sense of membership of a national community.'[155]

[155] Reid, 'The "iron roads", 70.

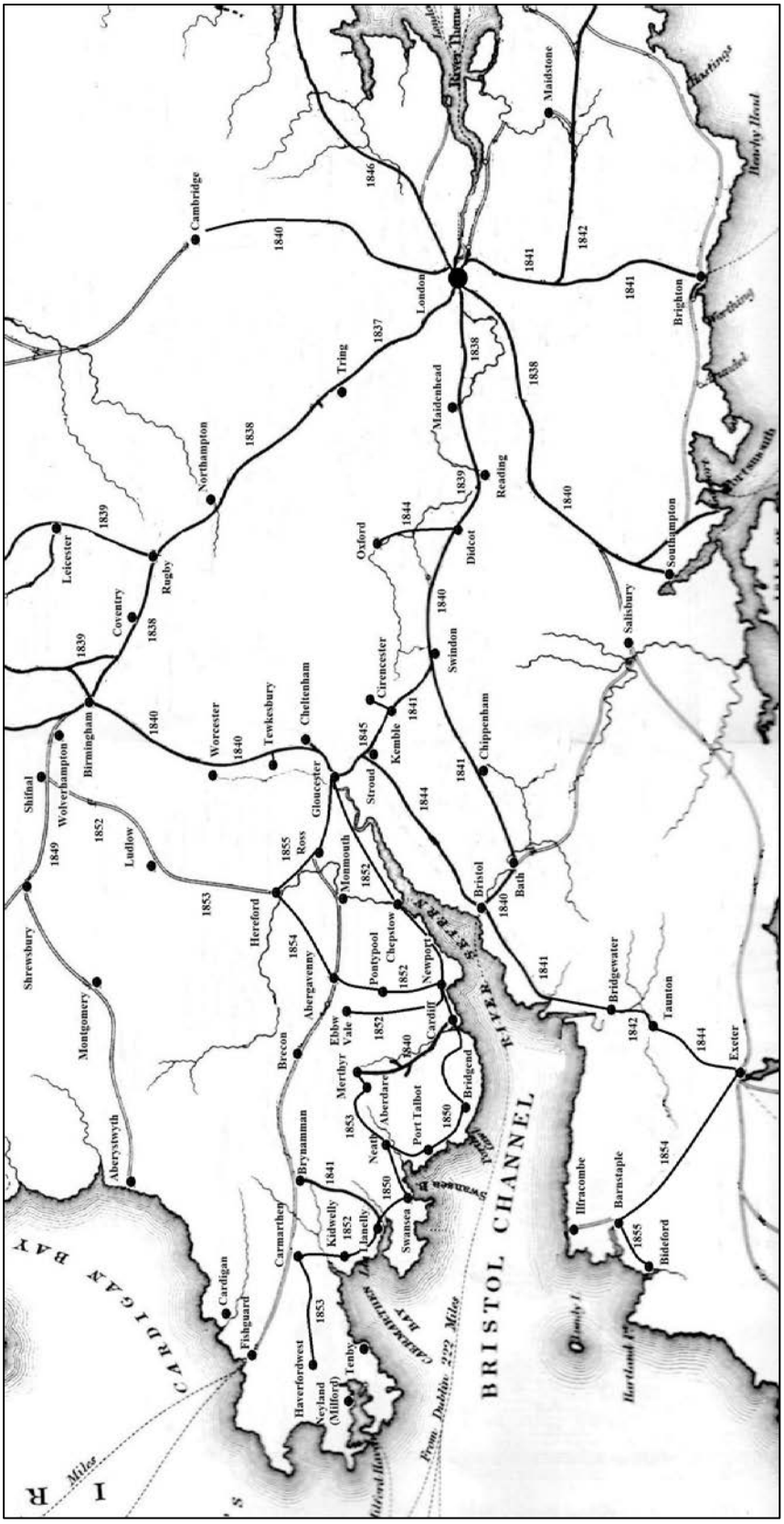
The railway would have strengthened notions of class divisions given the classification of travel. The GWR was almost notorious amongst railways for the poor accommodation it provided for third class travel and contemporary commentators were heavily critical of railways on a number of fronts demanding nationalization of the companies. The experience of travel on railways and opinions of railway companies do not support a view that railways were somehow a liberating experience, even if there was a great demand for railway travel. They were sought after and welcomed because of the anticipated impact on the town or city which had been included in the network and not excluded, much to the relief of civic leaders.

Figure 24 Principal road system between London and the Bristol Channel 1756[156]



[156] Pinterest <https://i.pinimg.com/originals/11/38/04/113804128ba8ed84ca314aad95d75e5f.jpg> [accessed 11 July 2016].

Figure 25 Principal rail network between London and the Bristol Channel 1855[157]



[157] Adapted from Whishaw, *Railways*.

What is clear from the data that are available is that travel increased substantially from the early or middle of the eighteenth century and by the opening of railways, there was a substantial unmet demand for travel which was not satisfied by stage coaches. Little is known about these travellers, particularly third-class travellers, but the volumes of travellers has been recorded which demonstrates that millions of journeys were undertaken in the region annually mostly within the region but also to England and London. The bulk of these travellers were third-class passengers and while it is not clear who they were and why they were travelling, they were on the move and in substantial numbers. Conclusions about this travel are largely speculative because of the lack of evidence. The view that this was principally urban travel is partly supported by the numbers of passengers on 'industrial' railways, which probably included artisans on their way to work, but does not explain the high rates of third-class travel on the GWR in the rural areas of Somerset and Gloucestershire. Given the volumes of passengers, mechanized mobility on railways would appear to be significant for the lives of many people in the region for both urban and rural communities, but little is known about this travel and what impact it had on peoples' lives.

The use of parliamentary and third class trains by millions of travellers in the 1840s and 1850s is little understood, but what is clear is that unprecedented levels of movement using mechanical traction was experienced by all social classes and both genders, albeit to varying degrees. The reduction in fares that stimulated much greater levels of travel indicated that potentially hundreds of thousands of people were deterred from travelling by railway because of the levels of fares, but it is equally clear that many artisans, labouring classes and the poor used railways during the working week as well as on weekends and on excursions. There is clear evidence that the railway gave opportunities for women to enter the public sphere and many women travelled alone which had its impact upon gender relations. However, the social history of the second half of the nineteenth century cannot fully account for the importance of travel, except for changing patterns of leisure amongst the working classes.

Table 11 Approximate journey times of land transport 1821[158] and 1855[159]

Journey	Journey time	
	1821	1855
London-Gloucester	18 hours	2 hours 58 mins.
London-Bristol	24 hours	4 hours 50 mins.
London-Bridgewater	30 hours	6 hours 40 mins.
London-Cardiff	30 hours	4 hours 26 mins.
London-Swansea	36 hours	6 hours 5 mins.
London-Haverfordwest	42 hours	8 hours 24 mins.

Perceptions about speed and distance changed in fundamental ways. People experienced new dimensions in the speed of travel which affected their perceptions of distance. Travel times by railway gave the location and leaving time and the approximate journey time which was unknown prior to the railway. The introduction of specific times by the railway required accurate time-keeping which introduced a new form of a mysterious invisible energy, unconnected with coal or steam, which transformed ideas about time. According to the rhetoric at the time, electro-magnetism in the form of the electric telegraph created a new form of communications which abolished time and with it space itself.

[158] Michael Freeman, 'Transport', in Langton and Morris, *Atlas*, pp. 80-93, (p. 82).
[159] *The Welshman*, 20 April 1855; *Taunton Courier*, 13 June 1855.

Chapter 4 The end of time: the impact of the electric telegraph upon landscapes of time and space 1837-1870

> Of all the discovered agencies of nature impressed to do the bidding of man, the most marvellous is certainly Electricity, which annihilates time and space, connects the distant with the near, and proves to man a slave more faithful, more untiring, and more unslumbering than ever the dainty Ariel was to his master, Prospero. Even the wayward Puck himself could not compete with Electricity in putting a girdle round the earth...[1]

The electric telegraph, powered by a new form of energy, revolutionized perceptions of time and space. Electricity travelled at speeds which appeared to exceed the speed of light and effectively collapsed all previous boundaries in the spanning of space, at least in the imagination. It pioneered new forms of communications technology as terrestrial and subterranean cables crossed much of the world and electrical impulses were translated into texts. As such, it shrank global space and led to new aspirations in international relations. Originating as a method of improving safety in railways, it quickly developed as a system for commerce and news but had little direct impact on everyday life in comparison with its 'twin', the steam railway. Nonetheless, in the rhetoric of the nineteenth century, space and time were 'annihilated' by the electric telegraph.[2]

For the Bristol Channel region, the electric telegraph established a communications system that promised instant messaging across much of the British Isles and the outside world which changed perceptions of distance. The towns in the region were placed on an equal footing with any town or city in the United Kingdom in accessing the 'intelligence' that the electric telegraph carried, provided there was access to a telegraph office. It followed the lines of the railway and was organized as an arterial system that emanated from London, which brought parts of the region more closely into the orbit of the metropolis, and the urban-industrial regions of England. It marginalized towns and villages outside the network which were doubly disadvantaged by the close connection between the lines of the railway and the electric telegraph. This had the effect of diminishing a sense of region as mainly urban areas more closely integrated into a new national and international communications system. It affected the perception of spatial networks which

[1] *Bristol Times*, 19 July 1865.
[2] Henry Frith, *Marvels of Electricity and Magnetism* (London: Ward, Locke and Company, 1880).

extended far beyond the region, but which were confined to the lines of the telegraph and the railway. It was selective in its scope.

Between 1837 and 1870, the electric telegraph fundamentally altered perceptions of time and space. It linked the peoples of the British Isles in a communications network that fostered commercial intelligence, provided newspapers with a regular diet of national and international intelligence, improved security measures in the protection of the public and was used as a strategic and tactical weapon during armed conflicts including foreign wars. The electric telegraph was closely associated with the railway network which may not have been possible without the telegraph. It was used to send messages ahead of locomotives in the interests of safety and to transmit the time nationally which made railway timetables possible, if complicated. In similar ways to the railway network, the electric telegraph established a new communications network as contemporaries stressed the importance of being 'inside' and not 'outside' of this network. The network was an opportunity, but also a threat and followed the railway network. Being outside the railway network inevitably meant being outside the telegraph network with its implications on inclusion and the integrity of national unity.

Global connections westwards to the Americas and eastwards to India using submarine telegraphs demonstrated a developing sense of proximity with land areas thousands of miles from the region as the globe appeared to shrink. The Atlantic cable linking Great Britain with North America was successfully laid in 1866 during which time land networks extensively covered North America, Europe and India which led to the notion that the cable bounded the world in a form of 'capture'.[3] The 'wiring of the world' promoted a greater awareness of global events and stimulated new concepts of international relations based around the exchange of information and mutual understanding. This exchange incorporated notions of 'cultural imperialism' as Great Britain and the United States were imagined as having a particular destiny in leading this new world. The telegraph was compared to the body's nervous system as an 'intelligent fabric' for the diffusion of information created by a network of wires that crossed the globe. It seemed to affirm the supremacy of science over nature.

[3] Dionysius Lardner, *The Electric Telegraph*, revised by Edward Brailsford Bright (London: Lockwood, 1867); Roland Wenzlhuemer, *Connecting the Nineteenth-Century World: The Telegraph and Globalization* (Cambridge: Cambridge University Press, 2012).

Historiography

The significant changes wrought by the electric telegraph are understated in British historiography. In substantive British histories of this period, the impact of the telegraph rarely appears in any significant way.[4] There are, however, useful studies of the history of the telegraph by James B. Calvert, Bill Glover and Stephen Roberts and contemporary accounts which are referenced in this chapter.[5] F. M. L. Thompson has suggested that historians are drawn to the dramatic and drama in the nineteenth century was about the power of steam, machines, railways and steam engines to the detriment of the horse.[6] The electric telegraph may have shared a similar fate to that of the horse, lacking a sense of drama or power - much of the activity of the electric telegraph was unseen, but imagined.

Although the telegraph was used on a global scale principally for trade and news gathering, economic histories have marginalized the impact of the telegraph.[7] Simone Müller and Roland Wenzlhuemer have considered the telegraph as a global communications network from sociological perspectives and tend therefore to focus upon the period from the 1860s onwards, although Wenzlhuemer has useful chapters on the British and Indian telegraphs. Jeffrey Kieve's social and economic history does not consider perceptions of time and space, or of international relations.[8] The *Victorian Internet* is principally an anachronistic narrative from an American perspective.[9] Consideration of the telegraph, if it appears at all, tends to be limited within a wider discussion of media as in the work by Asa Briggs and Peter Burke, or

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[4] *The Cambridge Urban History of Britain*, vol. 3, *1840-1950*, ed. by Martin Daunton (Cambridge: Cambridge University Press, 2000); K. Theodore Hoppen, *The New Oxford History of England*, vol. 4, *The Mid-Victorian Generation 1846-1886* (Oxford: Clarendon Press, 1998); *The Oxford History of the British Empire*, volume 3, *The Nineteenth Century*, ed. by Andrew Porter (Oxford: Oxford University Press, 1999); Thompson, *Social History*.

[5] James B. Calvert, *The History of the Electromagnetic Telegraph* <https://mysite.du.ed> [accessed 16 June 2020]; Bill Glover, *History of the Atlantic Cable: Underseas Communications 1850-2018* (<https://www.atlantic-cable.com> [accessed 6 August 2016]; Stephen Roberts, *A History of the Telegraphic Companies in Britain between 1838 and 1868*. <http://distantwriting.co.uk/> [accessed 23 June 2017].

[6] Thompson, *Victorian England*.

[7] M. J. Daunton, *Progress and Poverty: An Economic and Social History of Britain 1700-1850* (Oxford: Oxford University Press, 1995); *The Cambridge Economic History of Britain since 1700*, 3 vols, ed. by Roderick Floud and Deidre McCloskey 2nd edn (Cambridge: Cambridge University Press, 2004).

[8] Jeffrey Kieve, *The Electric Telegraph: A Social and Economic History* (Newton Abbot: David and Charles, 1973); Simone M. Müller, *Wiring the World: The Social and Cultural Creation of Global Telegraph Networks* (Columbia University Press, 2016); Wenzlhuemer, *Connecting*.

[9] Tom Standage, *The Victorian Internet: The remarkable Story of the Telegraph and the Nineteenth Century's On-line Pioneers* (New York: Walker and Company, 1998).

Brian Winston.[10] Media historians have tended to equate media history with the impact of 'mass media' and effectively ignore the origins of these media - the ability to send messages along a wire.[11] Media histories often begin with newspapers without acknowledging the impact of the telegraph upon news gathering and transmission.[12] The telegraph is consigned to 'pre-history' in the view of Asa Briggs, which reflects the focus of media historians on the mass media.[13]

Steven Kern's attempt to demonstrate the cultural change in perceptions of time and space begins forty years after the telegraph's initial impact and therefore it also misses the impact of the railway. While he examines in some depth changes in the mental worlds in art, literature, science, mathematics, psychiatry and sociology, this is limited to the impact by and upon elites in these fields, and not upon how these changes were reflected in everyday life.[14] By the 1880s, people had already experienced the twin revolution of the railway and the telegraph and, to a lesser extent, the steamship and their mental worlds had come to terms with new concepts of time and space. Iwan Morus has published three substantive articles on the history and impact of the telegraph, pointing to the pioneers of electro-magnetism and the roles of Charles Wheatstone and William Fothergill Cooke in the invention of the first patented British telegraph, and its role in contributing to the commercial culture during this time.[15] In this article, Morus raises the analogy of the telegraph with the human nervous system which was proposed by some contemporary writers including Andrew Wynter and George Robert Parkin.[16] He develops the argument for the 'nervous system' in a subsequent article, highlighting the role of the telegraph

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[10] Asa Briggs and Peter Burke, *A Social History of the Media: From Gutenberg to the Internet*, 2nd edn (Cambridge: Polity, 2002); Laszlo Solymar, *Getting the Message: A History of Communications* (Oxford: Oxford University Press, 1999); Brian Winston, *Media, Technology and Society: A History: from the Telegraph to the Internet* (Routledge: London, 1998).

[11] *Mass Communication and Society*, ed. by J. Curran, M. Gurevitch, and J. Woollacott (London: Edward Arnold, 1977); J. Curran, 'Media and the Making of British Society, 1700-2000', *Media History*, 8.2 (2002), 135-154.

[12] Boyce, *Newspaper History*; *Nineteenth-Century Media and the Construction of Identities* ed. by Laurel Brake, Bill Bell and David Finkelstein (Basingstoke: Palgrave, 2000).

[13] Asa Briggs, 'The Pleasure Telephone: A Chapter in the Prehistory of the Media', in *The Social Impact of the Telephone* ed. by Ithiel de Sola (Cambridge, Mass: Massachusetts Institute of Technology Press, 1977), pp. 40-65.

[14] Kern, *Time and Space*.

[15] Iwan Rhys Morus, 'Currents from the Underworld: Electricity and the Technology of Display in Early Victorian England', *Isis*, 84.1 (1993), 50-69; Iwan Rhys Morus, 'The Electric Ariel: Telegraphy and Commercial Culture in Early Victorian England;, *Victorian Studies*, 39.3 (1996), 339-378.

[16] Andrew Wynter, 'The Electric Telegraph', *Quarterly Review*, 95.189 (1854), 118-164; Andrew Wynter, 'The Nervous System of the Metropolis' in *Our Social Bees: or pictures of town and country life and other papers*, 2nd Series (London: Robert Hardwicke, 1861).

in the gathering of intelligence and the significance of the historical analogy with the body. The telegraph network is compared with that of a nervous system with a central organizing force or 'intelligence', which has London as the metropolis.[17] He sees the telegraph as part of Victorian regulation in three aspects: empire, time and social and political regulation that imposed 'a kind of regulatory grid on the body under the supervision of the mind, the Victorians saw the telegraph as imposing such a grid on the body politic.'[18] It was the 'ultimate recalibration.'[19] Morus develops the changing concepts of time and space in the article and his contribution is almost alone within the historiography of this period. He sees the electric telegraph as a regulatory instrument in Victorian society as a form of intelligence that could be fashioned to regulate the body politic.

The chapter covers the period covers from 1837 when the telegraph was first patented in Britain to 1870 when a discrete submarine cable connection to India was achieved, and the telegraph was nationalized under the aegis of the Post Office. The chapter considers four aspects of the telegraph's impact within the region: its origin and development in concert with the construction of a railway network as a new technology; how it was imagined as a new form of energy that travelled at previously unimagined speed and what impact this had on perceptions of distance; as a new communications system, its power to include as well as exclude and its impact on a sense of being in the mainstream or in the margins; and as a new global landscape of communications that 'wired' the world.

Origins and Development

When theories of electro-magnetism were translated into practical electric telegraphs in both Europe and the United States, the principal method of long-distance communication, independent of transport systems, was the optical telegraph, or semaphore which took three hours to send a message from the Admiralty in London to the fleet in Milford Haven in fine weather.[20] The most common forms of communications - the mail and the newspaper - were dependent upon transport systems on land and at sea, where speeds in the 1830s were not significantly

[17] Iwan Rhys Morus, '"The Nervous System of Britain" Space, Time and the Electric Telegraph in the Victorian Age', *British Journal for the History of Science,* 33.4, On Time: History, Science and Commemoration (2000), 455-475.
[18] Morus, 'nervous system', 470, 473.
[19] Morus, 'nervous system', 455, 470.
[20] Charles G. Harper, *Milford Haven Road*, p. 45.

different from those in the medieval world.[21] Even allowing for the more rapid delivery of mail and newspapers by railway, the telegraph could convey messages at speeds which appeared timeless.

In 1816, Francis Ronalds, arguably the first British electric engineer, laid an iron wire eight miles long in his mother's garden in Hammersmith and could detect no delay in sending and receiving an electrical impulse along the wire. He subsequently constructed the first practical working electric telegraph in Britain in 1818, but did not patent his invention having been discouraged by the Admiralty. Ronalds, however, was something of a visionary as well as a scientist. 'Let us have *electrical conversazione* offices, communicating with each other all over the kingdom ... give me materiel enough, and I will electrify the world.'[22] Following indifference from the Admiralty towards electro-magnetism, Ronalds turned his attention to other engineering and meteorological projects including the construction of the Observatory at Kew which would become important later in attempts to systematize time-keeping nationally and internationally using the electric telegraph. He was knighted at the age of 82 partly in recognition of his contribution to electrical telegraphy.

Just under twenty years after Ronalds' telegraph, Wheatstone and Cooke patented an electric telegraph in 1837 which opened on a 13-mile stretch of the Great Western Railway between Paddington and West Drayton in 1839. It was designed to improve safety on railways by telegraphing to stations warnings of oncoming traffic but launched a revolution in communications. Interest in the telegraph line was initially something of a curiosity but soon rapidly accelerated as its value was demonstrated in railway safety, trade, the transmission of news, crime detection, the setting of standard time across the nation and in global connections, including the calculation of longitude.[23] An electric current could be sent either up or down a cable and would move a needle in two directions depending on the direction of the current. The needles were then used to point at letters and numbers. The American system (Morse) used sound and a code to represent letters and numbers. A

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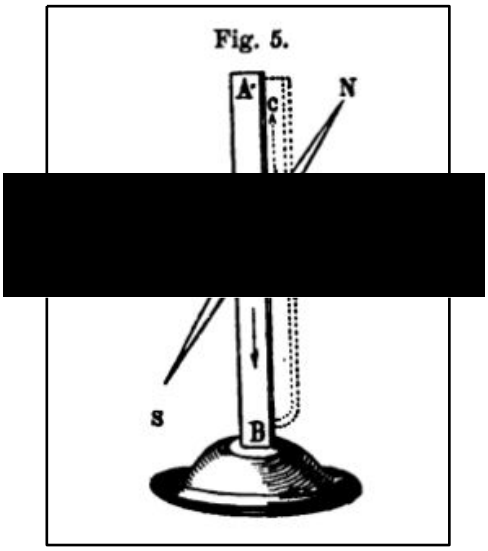
[21] Peter T. Marcy, 'Bristol's Roads and Communications on the Eve of the Industrial Revolution, 1740-1780', *Transactions of the Bristol and Gloucestershire Archaeological Society*, 87 (1968), pp. 149-172.
[22] Francis Ronalds, *Description of an Electric Telegraph* (London: Spon, 1823), p.3.
[23] J. J. Fahie, *A History of Electric Telegraphy to the year 1837* (London: E. and F. N. Spon, 1884); Geoffrey Hubbard, *Cooke and Wheatstone and the Invention of the Electric Telegraph* (London: Routledge and Kegan Paul, 1965).

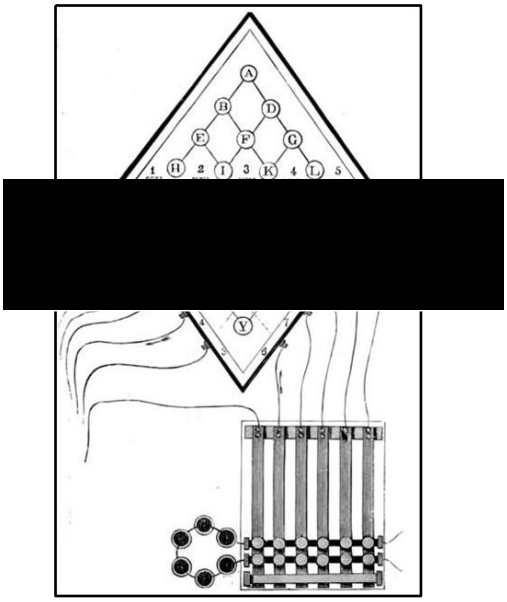
simplified version of Morse code was eventually used as the international standard, but European systems tended to use magnetized needles - the oscillating telegraph - until they were replaced by the Morse telegraph.

Figure 26 The needle telegraph used in Great Britain and Europe.[24]



Although, Wheatstone and Cooke's telegraph was not the only telegraph to be patented and used - other notable telegraphs were those patented by Alfred Brett and George Little (1847) and Edward Highton (1850) - Wheatstone and Cooke's telegraph dominated the domestic network as it developed.[25]

Figure 27 The Five-Needle Telegraph (1837)[26]

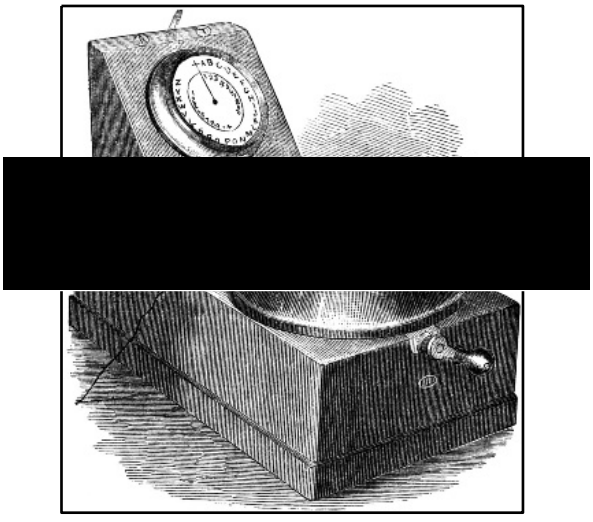


[24] Lardner and Bright, *Telegraph*, p. 18.
[25] Edward Highton, *The Electric Telegraph: Its History and Progress* (London: John Weale, 1852), pp. 87 and 106.
[26] Roberts, *Telegraphic Companies*.

The 5-needle telegraph was patented by Wheatstone and Cooke in 1837 which used six wires and was uneconomic for railway companies. Wheatstone later simplified his telegraph to a more economic two-needle system and further simplified the system with his 'universal telegraph' patented in 1858 and perfected by Augustus Stroh in 1863 (see Figure 28). The needle was rotated around the dial by cranking the handle and the operator would use a finger to halt the needle at the appropriate point to send messages. The Universal Private Telegraph Company acquired the patent in 1860 with the intention of using the simplified model to facilitate private personal and commercial communication between individual homes and offices. In 1859, W. D. and H. O. Wills installed the first private connection in the region between their offices in Bristol.[27] By 1867, Bristol had one mile of private cables; Liverpool, however, had over 120 miles.

By 1852, Britain had a telegraph network that shadowed the rail network, including much of the Bristol Channel region, although there was an inequality in its reach. Submarine telegraphy was piloted in connecting with Ireland and France and in 1866 when the Atlantic submarine telegraph successfully connected Ireland and Newfoundland, a global telegraphic network was viewed as a practical possibility using a combination of land and submarine telegraphs.[28]

Figure 28 The Single-Needle Telegraph (1858-1863)[29]



These networks stimulated intense interest in the science of electro-magnetism as well in the possibilities for 'timeless' communication. They

[27] Roberts, *Telegraphic Companies*.
[28] Lardner and Bright, *Telegraph*.
[29] Roberts, *Telegraphic Companies.*

underlined London's importance as a metropolitan centre, being the 'nerve centre' of a complex of communications, even if the analogy with the human nervous system as a form of Victorian regulation for both time and communications may have been speculative.[30] This pre-eminence, in turn, reflected a sense of power within the British world view, or landscape, over the natural world - space had been abolished by the telegraph using nature to defeat nature. The electric telegraph affected material aspects of everyday life in five broad areas under an overarching umbrella of 'intelligence' - commerce, news, public safety, the defence and time.

The state, in the form of governments and government agencies, was not an active participant in the development of the telegraph network although it did construct short networks between government buildings and from Parliament to Windsor Castle. The Admiralty used discrete networks to connect with the fleet in Plymouth, for example, and it was used as a form of military intelligence in the Crimean War (1853-1856) and the Indian Rebellion (1857), but it was not until the end of the century that the global telegraph network was viewed by Britain's military as an important means of maintaining secure communications for the purposes of the defence of Britain's empire. It was also used by police forces to transmit intelligence to each other and as a security measure in the Crystal Palace during the Great Exhibition, as well as an intelligence mechanism which was used in anticipation of a Chartist insurrection in April 1849.[31]

The telegraph in Great Britain was constructed by private companies for profit rather than public good, unlike the telegraph systems on the European mainland which were largely state enterprises. France had a system of vetting all telegraph messages and coded messages were banned.[32] The telegraph in the British Isles was viewed in its earliest years as an open intelligence fabric which served the interests of the railway and commerce, both nationally and internationally. The sum total of these diverse efforts was, however, a series of land networks linked into a global network using submarine telegraphy and which was largely achieved by 1866, less than thirty years after the construction of the Paddington-West Drayton telegraph of thirteen miles. The telegraph network, like that of the railway, lacked a centralized, planning intelligence and development lay in the hands of telegraph

[30] Andrew Wynter, 'The Electric Telegraph', *Quarterly Review*, 95.189 (1854), 118-164; Wynter, 'Nervous System' in *Our Social Bees*, pp. 284-296.
[31] *Wiltshire and Gloucestershire Standard*, 10 April 1841.
[32] Highton, *Telegraph*, p. 154.

companies who exercised a largely unpopular monopoly until the network was effectively nationalized in 1870.[33] Access to the telegraph was not therefore uniformly experienced in the early years of its development and élites in the region expressed frustration at what they saw as delays in connecting the region to the national network.

Electro-magnetism imagined

Early accounts of the demonstrations of the electric telegraph displayed a curiosity about the invention and stimulated discussions on its potential use as a new form of communications. There was intense interest on the technology of electrical communications. It stimulated speculation about what impact this might have upon both time and distance given the unprecedented speed of an electrical signal along a wire. This was often accompanied by discourses on the science of electro-magnetism and how the telegraph worked; commentaries often framed these discourses within a context of human scientific genius using nature to defeat nature. A report in *The Cambrian* of an electric telegraph invented by a Portsmouth resident who was not identified predicted that the invention would lead to 'a considerable saving of time in working, greater accuracy in communication and impenetrable secrecy in conducting the correspondence.'[34] However, it was an article in *The Scotsman* of July 1837 - the year when Wheatstone and Cooke patented the first working electrical telegraph in Britain - which was published in a number of the region's newspapers that heralded the electric telegraph as something that had major implications for the future. The report stated that a new invention promised:

> to lead to the most astonishing results, and to exert a vast influence on the future progress of society. It is an electric telegraph, the powers of which as much surpass those of the common instrument bearing that name, as the art of printing surpasses the picture writing of the Mexicans.

The transmission of the signal was 'perfectly instantaneous' and may be 'conveyed over a hundred or a thousand miles with the same velocity', which will 'convey intelligence with the speed of thought... the discovery will be, perhaps, one of the

[33] Charles R. Perry, 'The Rise and Fall of Government Telegraphy in Britain', *Business and Economic History*, 26.2 (1997), 416-425.
[34] *The Cambrian*, 26 November 1825.

grandest in the annals of the world, and its effects will be such as no efforts of the imagination can possibly anticipate.'[35]

The *Taunton Courier* expressed astonishment in 1840 that was shared amongst the region's newspapers at the reputed speed of 'this extraordinary machine' that 'will excite unqualified admiration when our readers learn that intelligence is conveyed at the rate of 200,000 miles per second, 8,000 times quicker than light travels during the same period.' This estimate was revised downwards in 1843 when it quoted a report that the speed was calculated at 'about 120,000 miles per second! A message could go to Bristol or Birmingham in 1/1400 of a second, or round the globe ... in one sixth of a second!'[36] It was common for newspapers in the 1840s to publish a variety of estimates on how fast the signal would travel. Wheatstone's estimate of 288,000 miles per second through the air was often quoted, an actual overestimate of around 100,000 miles per second.[37] *The Cambrian* reflected the pre-occupation with speed with the revelation that 'intelligence is conveyed ... 8,000 times quicker than light travels' and a similar pre-occupation with how it worked. Science had 'captured' the electrical force using coils of wire, magnetic needles and dials in its description of the telegraph between Paddington and West Drayton.[38]

The speed of the telegraph opened up a number of possibilities and the *Pembrokeshire Herald and General Advertiser* outlined a view of time and space in 1845, in the midst of these developments, that was echoed across the region.

> Time and distance, our former ideas of which have been so entirely changed by the rapidity of railway travelling, will, by the effect of the electric telegraph, be almost annihilated ...[39]

The article encapsulated the essence of what the telegraph meant to contemporaries. Time and distance were 'annihilated' and it reached all areas of everyday life from trade and government to social and community contacts and this 'annihilation' also marked the supremacy of science over nature. Science had 'captured' an elusive and powerful force of nature - lightning - and controlled 'the quickest element of nature

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[35] *Bristol Mercury*, 15 July 1837. The report was also published in the *North Devon Journal* of 6 July, 1837, and the *Gloucester Journal* of 22 July, 1837.
[36] *Taunton Courier*, 2 September 1840 and 24 May 1843.
[37] Bruce J. Hunt, 'Scientists, Engineers and Wildman Whitehouse: Measurement and Credibility in Early Cable Telegraphy', *British Journal for the History of Science*, 29.2 (1996), 155-169.
[38] *The Cambrian*, 29 August 1840.
[39] *Pembrokeshire Herald and General Advertiser*, 10 October 1845.

ridden by the highest faculty of man - electricity invisibly carrying thought ...'[40] Lightning, associated with storms and destruction, had been tamed by science which made it all the more impressive to contemporaries. 'So completely has the hand of science prevailed, and brought that most destructive and fearful of all Nature's powers under the immediate control of man, and made it in another form to minister to his wants and comforts.[41]

The earlier report in *The Scotsman* which was published in the *Bristol Mercury* had raised an analogy between the electric telegraph, with its network of wires, and the nervous system of the human body and human intelligence which would prove to be an early theme in conceptualizing the networks of the electric telegraph:

> A capital like London, with these electric nerves ramifying from it over the whole country would be truly the "sensorium" of the empire. Men a thousand miles from each other would be enabled to confer as if they were in the same apartment, or to read each other's thoughts as if they were in the sky.[42]

The telegraph would establish an 'intelligent fabric' within the nation and, once established, it could be extended across the globe. It proved to be the beginning of a new world view which linked the speed of the telegraph with the demise of distance. The *Monmouthshire Merlin* repeated *The Scotsman's* analogy of a nervous system with a central intelligence - the metropolis - as its 'brain' in reprinting an extensive article from *The Times*.

> The electric telegraph, in a few years, will bring, as it were, the whole population under one roof, and into one room ... The island will thus become one nervous system, with a scarcely less quick and infallible action than the human frame. Our metropolis will be the sensorium of one acutely sensitive and intelligent fabric.[43]

The article was also published by the *Taunton Courier* and *The Welshman*.[44] The concept was popularized to some extent by Andrew Wynter (1819-1876), a physician born in Bristol who practised medicine in London. He was struck by apparent similarities between the telegraph network and the nervous system in the human body - a system that was being revealed by medical science at that time.

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[40] *Bristol Mercury*, 18 July 1846.
[41] *Cardiff and Merthyr Guardian*, 21 November 1846.
[42] *Bristol Mercury*, 15 July 1837.
[43] *Monmouthshire Merlin*, 6 September 1845.
[44] *The Welshman*, 22 August 1845; *Taunton Courier*, 26 November 1845.

According to Wynter writing in 1854, following a visit to the Central Telegraph Station in Lothbury, the station was 'the great brain - if we may so term it - of the nervous system of Great Britain ... (and) beneath the narrow pavement of the alley lies its spinal chord consisting of 224 fibres which transmit intelligence...'[45] He developed the theme in 1865 in describing efforts to establish individual access to the telegraph network.

> We may view the vast net-work of wire about to be erected over our heads as a plexus of nerves answering to the ramification of nerves which makes the skin so sensitive... Who shall say that this old earth is near its decadence? Why, it has only just been endowed with its nervous system...[46]

There was also a reference in the *Illustrated Usk Observer* to the telegraph as a 'nervous system' in the *Great Eastern*.[47]

Despite frequent references to London as 'the metropolis', there was considerable resistance to the idea of centralized control at the expense of regional and local autonomies and identities. The prevailing view was more accurately described by the *Bath Chronicle* as a network, but without any form of regulation. 'The electric telegraph marches apace over continental Europe - and so complete is now the magic network of intellectual nerves, that for all purposes of communication, it may be said that there is no longer a British Channel.'[48] It was seen as an open system where virtually anyone could communicate with anyone else on the planet if they had access to a telegraph station and could pay for the use of the line. It was a means of conveying intelligence, any form of intelligence, without regulation, but fears were expressed about the control of the system through private monopolies.

There was considerable disquiet and even hostility expressed towards the telegraph companies associated with a demand that the telegraph be controlled by government to prevent 'rapid intelligence monopolised for stock-jobbing, political gambling, produce gambling etc. The possible monopoly of this earthly exercise is looked upon with some apprehension, and public opinion is clamouring loudly for its immediate purchase and control by the government.'[49] The newspaper repeated the

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[45] Wynter, 'Electric Telegraph'. 132.
[46] Wynter, 'Nervous System' in *Our Social Bees*, p. 284.
[47] *Illustrated Usk Observer*, 3 May 1856.
[48] *Bath Chronicle*, 30 December 1852.
[49] *Bristol Mercury*, 18 July 1846.

argument in 1850 and considered that 'it does not follow that a degree of centralization, in proper hands, may not be conducive to the general good ...'[50] This reflected a concern amongst the protagonists for state control that the situation of the telegraph was exceptional and that sometimes state control was in the public good.

Despite widespread opposition to the practices of the telegraph companies (mainly about costs) throughout the century, the network was not placed under the control of the Post Office until 1870 which was indicative of the lack of state interest in the network as a form of intelligence. The *Cardiff Times* expressed a widely held view that the telegraph 'is practically in the hands of a great monopoly, which not only charges what it pleases, and does the work when it pleases, but leaves whole districts untouched ...'[51] The 'nationalization' of the telegraph was widely supported in order to defend against the excesses of monopolies, particularly in reducing the costs of telegrams, while demonstrating an awareness of the potential dangers of centralized control. The *Bristol Mercury* expressed fears around the dangers of state management, but felt, like many of its contemporaries, that state control may guarantee public benefit.

> The electric telegraph plays so large a part in the daily life of the community that the cheapening of its use is a conspicuous public gain... There are many cases in which the calling in of State management would be a distinctly retrograde step; but in this instance it has been a great public benefit. One direct consequence of the change was the regeneration of the provincial daily press.[52]

The prevailing conception of the telegraph network was perhaps summed up by the *North Devon Journal* in 1850 which stressed the open nature of the network promoting communications across the world and as a conduit for intelligence and ideas - it was essentially a 'free' system, not one of regulation and through it 'the leading ideas of human progress will become the common property of the world ... which will prove one of the mightiest instruments to set it (the human mind) free...[53]

A force for integration or exclusion

The electric telegraph was seen essentially seen as a network allowing for a freedom of intercourse and intelligence between and within nations and like all networks to

[50] *Bristol Mercury*, 7 September 1850.
[51] *Cardiff Times*, 2 September 1865.
[52] *Bristol Mercury*, 17 September 1855.
[53] *North Devon Journal*, 5 September 1850.

be outside the network meant to be excluded from some benefit, usually 'intelligence'. The electric telegraph was no exception to this rule and to be excluded from this network presented a threat to well-being. It also meant to be ill-informed about events, locally, nationally and internationally which became of some importance as communications systems involving newspapers with access to the telegraph exchanged and transmitted intelligence. Uneven access to the network across the nation meant that some areas had more information than others about events in the kingdom and this was taken as sign of inequality, of not having the same rights as others or of being on the margins.

Its principal use, at least initially was to improve safety on railways as the telegraph network followed the lines of railways, although the installation of the telegraph usually lagged behind the extent of the railway network, particularly in the early years. It was financed by telegraph companies to meet the needs of their principal customers, the railway companies, and were not motivated by the needs of local civic or commercial interests. The telegraph reached Bristol over a decade after the railway, for example. By April 1850, 5,447 miles of railway had been constructed; a further 1,784 miles were under construction while 2,215 miles of telegraph line had been completed.[54] Although the term 'intelligence' was commonly used in newspapers prior to the telegraph, the telegraph heightened and broadened its use.

The dissemination of intelligence through the network was mainly transmitted through newspapers and usually involved the publication of prices of raw materials, commodities and agricultural produce and share prices, along with the launching of new shares and companies as well as 'news'. It became common for newspapers to identify if the source of news as the electric telegraph and their connection to the telegraph was usually announced as an important advance in keeping their readership abreast of the latest 'intelligence' and in advance of the London press. To be outside the telegraph network became, in an important sense, to be 'outside' and not privy to 'intelligence' which others had and who were therefore at an 'advantage', however ill-defined this 'advantage' might be.

This sense of being 'outside' was of significance to the Bristol Channel region, being largely on the periphery of these new networks. The Dover-Calais

[54] Highton, *Telegraph*, p. 142.

subterranean cable was laid in 1850, two years before Bristol and south Wales were connected which aggravated a sense of isolation. This fragmentation of the network was particularly important in the region which did not connect to the railway and telegraph networks until the 1850s following the opening of the South Wales Railway.[55] Bristol was not connected until 1852 and Bristol newspapers expressed their continual frustration over their exclusion from the network.[56] The range of the network was uneven. The network reached the region at Gloucester in 1848 but did not open from Gloucester to Swansea until 1852 and much later reached Pembrokeshire and Devon (see Table 12). Even when the network was 'completed' areas within the region remained outside the network.

Table 12 Telegraph connection across the Bristol Channel region from London 1840-1855

Location	Date
Box Tunnel	1 December 1847
Gloucester-Birmingham	January 1848
Bath	February 1852
Bristol	4 March 1852
Gloucester - Chepstow	April 1852
Gloucester - Newnham	May 1852
Bristol - Bridgwater	July 1852
Bridgwater - Exeter	September 1852
Gloucester (direct line to London)	September 1852
Gloucester - Swansea *	April 1853
Kidwelly	May 1853
Carmarthen	July 1853
Llanelli	October 1853
Haverfordwest	December 1853
Barnstaple	21 March 1854
Pembroke Dock	July 1855

Historically, this inequality had always been the case with the region, in particular, on the margins of 'intelligence' given the travelling time to London and

[55] Jenkins, 'Wales', in Clark, *Urban History*.
[56] *Bristol Mercury*, 1 March 1851.

reliance upon London newspapers. However, the telegraph network changed these expectations. Exclusion from the network was seen as a disadvantage because of the developing importance of 'instant intelligence' and this sense was evident in the region which experienced isolation from the network until Gloucester was connected in 1848. Bristol, Bridgwater and much of south Wales connected in 1852 while other towns in south Wales and north Devon like Carmarthen, Haverfordwest and Barnstaple were not connected until later in the 1850s.

The connection along the Great Western Railway had reached Slough by 1843, but although there was a clear intention to extend to Bristol, no further progress was made on the line during the 1840s. By contrast, the telegraph connection to Gloucester along the London and Midland Railway was completed in 1848. Despite laying the first telegraph line, the Great Western Railway (GWR) appeared to be rather lethargic in developing its system. By 1846, the GWR had laid 18 miles of cable compared to 124 miles on the South-Eastern Railway and 251 miles on the Midland Railway, which reflected the greater demand (and greater profits to the telegraph companies) from industrial centres of the Midlands and the north of England compared to the west of England and Wales at that time.[57] Cheltenham expressed a common view in referring to Gloucester's use of the telegraph as 'a very great benefit, both to the commercial communities of that mercantile city and the metropolis, as the market prices of foreign and home produce, state of the public funds, prices of railway and other shares, &c. can be transmitted in a few minutes to agents at either place.'[58] The *Pembrokeshire Herald* expressed a similar view about the benefits of connection which would be 'of paramount importance to the shipping interest, particularly as the letters to those engaged in the West India Trade are not delivered for more than 24 hours after the arrival of the packet at Southampton.'[59] There was a consciousness within the region of the importance of connection to this network and of the disadvantages of being 'outside'.

In 1847, the *Cardiff and Merthyr Guardian* published a map showing the progress of the national network which appeared in a number of the region's newspapers and which illustrated the marginality of the region. Much of the region

[57] Roberts, *Telegraph Companies.*
[58] *Cheltenham Chronicle*, 15 May 1845.
[59] *Pembrokeshire Herald and General Advertiser*, 7 May 1847.

including Bristol, Somerset and Devon 'present a perfect blank as regards the means of telegraph despatch... But the most remarkable blank in the whole map is that presented by Wales, the entire Principality, north and south, not being able to boast of one solitary line of telegraph.'[60] The sense of neglect in the west of England and Wales was underlined by the regular reports in the region's newspapers on the progress of the telegraph network in England. The *Gloucester Journal* reported in 1845 that 'the electric telegraph is now being laid down on the Grand Junction Railway, from Liverpool to Birmingham, and to Manchester and Cheshire; and we understand that under certain restrictions, the telegraph will be made available for commercial purposes'.[61] By 1846 the telegraph had been completed between Leeds and Birmingham and in October the newspaper reported on progress linking London and Liverpool and Manchester which would include Birmingham via the London Midland railway. The northern branch of this railway was also reported as being in progress to connect Newcastle, Hull and Leeds.[62]

By May 1851, the situation had not greatly improved for the region, although the telegraph would connect to Bristol the following year. The *Weston super-mare Gazette* expressed the sense of being 'outside'.

> In this part of the country, telegraphic communication is much wanted. Whilst the north, the north-west, the north-east, the south-east have lines to the metropolis, all the south-west is quite shut out. A person in Edinburgh gets his London news hours before it reaches him in Bristol; and in these days of progress to be hours behind is to be, before long, excluded from the race altogether.[63]

The Welshman found it 'impossible to overrate the value of the introduction of the telegraph into South Wales' by linking the area with London, Liverpool and Birmingham and 'nearly all the great towns and seaports in the North, and with Plymouth and other important ports in the West of England.'[64] South Wales still awaited connection to the railway network in 1850 and it was anticipated that the telegraph connection would follow shortly after. These combined connections promised to end the historic isolation of south Wales both from itself and from the great industrial centres of the Midlands and the North and from London as the

[60] *Cardiff and Merthyr Guardian*, 25 September 1847.
[61] *Gloucester Journal*, 27 September 1845.
[62] *Gloucester Journal*, 25 July 1846 and 24 October 1846.
[63] *Weston-super-Mare Gazette*, 17 May 1851.
[64] *The Welshman*, 25 April 1851.

metropolitan centre - sentiments which were fully expressed over the opening of the railways. It was the debates within Bristol, however, on the delays in connecting the city that illustrated the importance of the telegraph network in accessing 'intelligence' whether it was trade, economy and commerce, Parliamentary debates and decisions, international affairs or news.

The frustrations felt by Bristol were aggravated by the early connection between Liverpool, the industrial centres in England and with London, given Bristol's sense of decline from its position as the second city in England in the eighteenth century, while the connection to Gloucester in 1848 appeared to give Bristol's trade rival an advantage in commerce and intelligence.[65] The *Gloucester Journal* quickly demonstrated the value of the connection through the speed and range of its news coverage. In April the newspaper started reporting on the insurrection in Paris, the news of which 'reached Gloucester Thursday afternoon through the medium of that wonder of all modern inventions the electric telegraph which announced despatch from Paris, in the following exciting terms: "Paris, Wednesday evening, The National Guard have sided with the people."' The same edition provided a further report on events which unfolded in the form of a narrative. The use of times and locations and the truncated nature of telegraph reporting added to the sense of drama.

> London, 11.5 a.m. No mail from Paris, the railway stations and barriers being in the possession of the people. Rails taken up some distance from Paris to prevent troops reaching the capital from the provinces. The sacrifice of life is frightful. Paris, 3 a.m.[66]

Without a submarine telegraph line between England and France, the news took eight hours to cross the distance by land telegraph and mail steamer but if Bristolians wished to know what had happened to Louis Philippe and the French royal family ahead of the London newspapers which arrived by railway, they would have to read a Gloucester newspaper.

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[65] Alford, B. W. E., 'The economic development of Bristol in the nineteenth century: an enigma?', in *Essays in Bristol and Gloucestershire History: The Centenary Volume of the Bristol and Gloucestershire Archaeological Society*, ed. by Patrick McGrath and John Cannon (Bristol: Bristol and Gloucestershire Archaeological Society, 1976), pp. 252-283; Christmas, 'Growth of Gloucester'; Paul E. Clemens , 'The Rise of Liverpool, 1665-1750', *The Economic History Review*, New Series, 29.2 (1976), 211-225; *A Grand City' – 'Life, Movement and Work': Bristol in the Eighteenth and Nineteenth Centuries*, ed. by M. J. Crossley Evans (Bristol: Bristol and Gloucestershire Archaeological Society, 2010); F. M. L. Thompson, 'Town and City', in Thompson, *Social History*, p. 24.

[66] *Gloucester Journal*, 26 February 1848.

However, the telegraph was probably viewed more importantly as a source of commercial intelligence and the *Cheltenham Journal* was typical of the newspapers that used the telegraph to publish regularly extensive commercial and trading reports. To rub salt into Bristol's wounds, the newspaper announced in 1849 that it would publish a second edition in the evening of 'exclusive information' detailing trading on the London corn market and readers would receive this intelligence twelve hours earlier than the London papers, and the newspapers also undertook to include 'any events of importance which may transpire in the locality up to the hour of our going to press.'[67]

The extension of the telegraph to Gloucester may have accounted for the increasing impatience regarding connection that was evident in Bristol and other newspapers in the 'west country' from 1848 until Bristol, Taunton and Bridgwater were connected in 1852.[68] The debates within the newspapers gave strong indications of why connection was important and pointed to the potentially damaging effects of exclusion, including the importance of speed and time. 'Magneticus' complained in the correspondence columns of the *Bristol Times* in 1848 that 'we were obliged to wait until the evening on Monday last for the intelligence of the proceedings in London' and requested to know when the telegraph would reach Bristol.[69] 'Philo' in the *Taunton Courier* pursued a similar theme from a 'west country' perspective, complaining that the telegraph had stopped at Slough and that 'the meanest station' on other railway lines (London, Edinburgh, Glasgow) had telegraphic connection and questioned why 'should Reading, Chippenham, Bath, Bristol, Bridgwater, Taunton ...be left so long in perfect neglect?'[70] The greatness of Bristol was perceived as being in its maritime trading origins and the continuing prosperity of Bristol was dependent upon 'her mercantile men' who were placed at a disadvantage because of the loss of 'valuable time for want of information, which, at present, is received and acted on by the merchants Liverpool, Birmingham, Manchester, and even of Glasgow and Edinburgh, often many hours before it reaches the inhabitants of this city?'[71] The *Taunton Courier's* article was headed 'BRISTOL versus LIVERPOOL—THE ELECTRIC TELEGRAPH' which probably indicated

[67] *Cheltenham Journal*, 8 October 1849.
[68] Jonathan Barry, 'South-West', in Clark, *Urban History*, pp. 67-92.
[69] *Bristol Times*, 15 April 1848.
[70] *Taunton Courier*, 24 July 1850.
[71] *Taunton Courier*, 12 February 1851.

that Bristol was seen as having been out-manoeuvred (again) in respect of Liverpool. In the same edition, however, the newspaper took Bristol to task for allowing 'the extraordinary absence of an electric telegraph', it being 'somewhat damaging to their reputation for pre-eminent vigilance that on this occasion, their slumbering energies need being aroused...' The city was accused of 'apathetic contemplation of one of the most astounding and beneficial processes of intercommunication.'[72] The criticism appeared to be directed towards civic leaders in the city who were hampering commerce because of their inactivity. Bristol's civic and commercial élites, however, were largely at the mercy of telegraph companies who followed the most profitable lines in the early years of the telegraph. Liverpool's enterprise usually cast a long shadow over Bristol when the city was accused of apathy or inactivity.

In an extended article in 1851, the *Bristol Mercury* expressed its frustrations at the 'discreditable state of things' from delays in connecting the city to the national telegraphic network and considered the city to be in a 'state of isolation.' The city was reliant on the London papers for its intelligence and lagged almost 'a day behind the fair.' It anticipated that a submarine telegraph would shortly connect England and France. 'Will that shame us into stretching them between Slough and Temple-mead? Or shall we continue like country villagers, to get our news and our fashions at third or fourth hand?'[73] The *Bristol Times* echoed similar feelings of isolation in responding to a statement from the rival British Electric Telegraph Company stating the intention to connect Bristol to Falmouth and to south Wales to Milford. It looked forward to connection to the network when 'this discreditable state of things is likely to be soon remedied.'[74]

Connection to the network did not occasion public celebrations in the ways that railway connections did. The telegraph may have been perceived as having little direct or immediate impact on everyday life unlike the railway. It made no great visual impact and connection was the click of a switch. It did not have the public impact of the railway. However, once connected, newspapers expressed a satisfaction to their readers that they were now able to provide a news service as good as anywhere, and in important senses that was true. Local newspapers could

[72] *Taunton Courier*, 12 February 1851.
[73] *Bristol Mercury*, 1 March 1851.
[74] *Bristol Times*, 17 May 1851.

publish news virtually at the same time as any other newspaper and certainly ahead of the arrival of London newspapers which previously had been an important source of intelligence for local newspapers. The ability to access telegraphic news had closed space and counties such as Devon and Pembrokeshire which traditionally were on the margins of the nation because of the slowness in communications, now found that they were as well-informed as any area in national and international news and in commercial intelligence. However, these connections, and the advantages that followed, were applied unevenly in regions and localities, as well as for the nation as a whole: access to this 'intelligence' was dependent upon access to the telegraph.

The welcome with which the *Bristol Times* greeted connection to the network in 1852 was typical of newspapers at the time. 'By Electric Telegraph' was described as 'the name and the notion of the Nineteenth Century' as if Bristol had finally joined the nineteenth century. The newspaper announced its arrival as an equal to London's newspapers - this was a common assertion by local newspapers - and stated its intentions to publish,

> the proceedings of Lords and Commons, to the close of the debates ... simultaneously with their publication in the London morning journals of Saturday ... the latest debates, will be on the breakfast tables of our citizens, whilst the London newspapers will not reach Bristol until after twelve o'clock.[75]

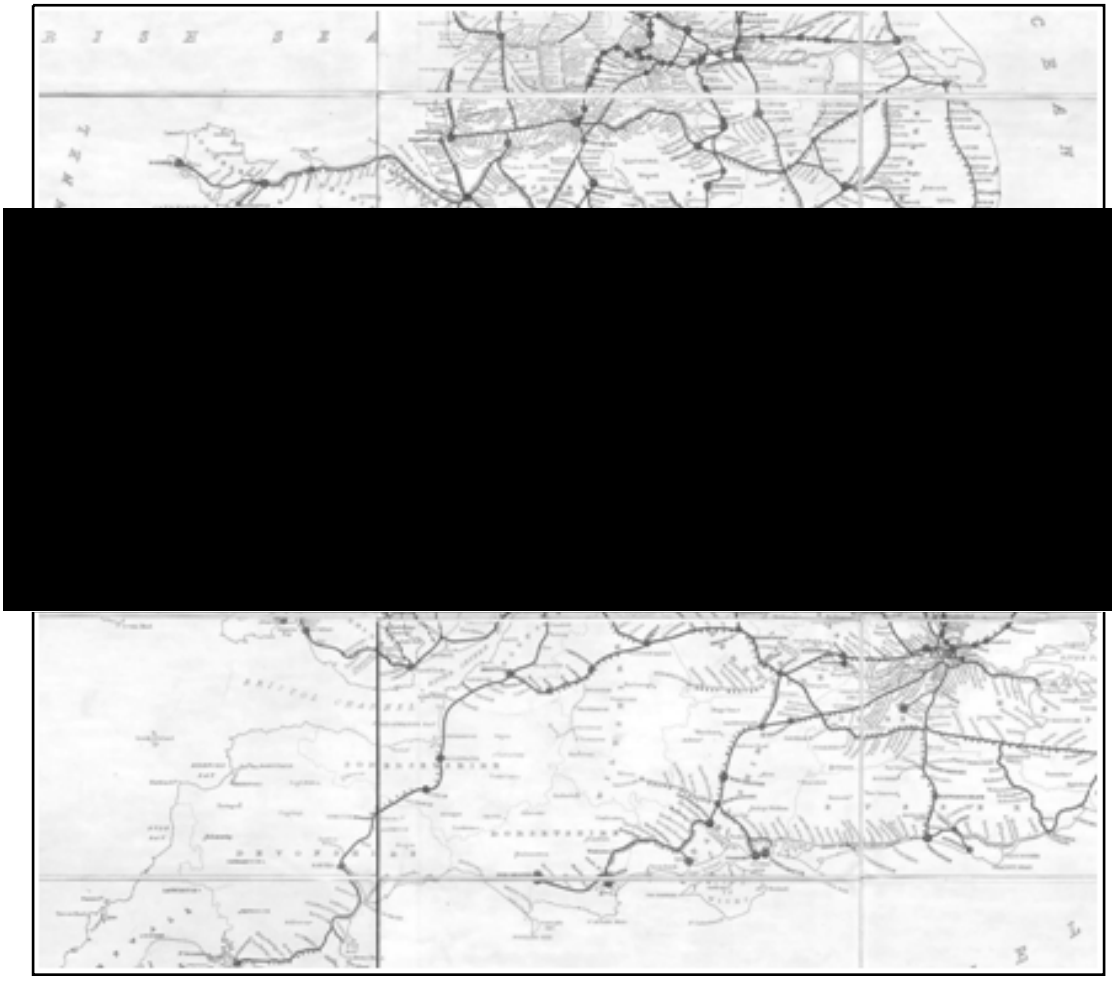
However, it later issued a similar warning to Bristol's sense of enterprise as that issued by the *Taunton Courier* a year earlier. The telegraph's speed represented 'the impatience of the present age... Everything is too slow for us but lightning.' Bristol was urged to 'read the signs of the times - not to obstinately shut their eyes to the fact that the age is moving forward, and that we must move forward with it, or be left behind'.[76]

The idea of 'keeping up with the times' or being 'ahead of the race' was a common theme with newspapers as they connected to the telegraph. *The Welshman* expressed its dismay at the staffing of the telegraph office by the Electric Telegraph Company after its installation in Carmarthen. The newspaper had hoped 'to have rendered this important invention subservient to the accommodation of our readers', but the staffing arrangements had rendered the telegraph 'useless' for all practical

[75] *Bristol Times*, 1 May 1852.
[76] *Bristol Times*, 23 October 1852.

purposes and it was ‘exceedingly annoying to know that we have such an important element in civilization at our doors, and are practically deterred from availing ourselves of its agency.’ The newspaper paid for an additional clerk to take messages and concluded the article with a warning for the Electric telegraph Company - ‘they are altogether mistaken in the supposition that Wales is deficient in spirit, and call upon them to meet the public requirements in a fair and liberal manner.’[77] By 1852, most of the largest population centres in the region had been connected, but much of Pembrokeshire, Devon and Somerset had no telegraph connection (see Figure 29).

Figure 29 The Bristol Channel Electric Telegraph Network (1852)[78]



In February 1854 the *Pembrokeshire Herald* made an announcement to its readers which reflected statements commonly made by newspapers once they had connected to the telegraph network. The paper was now able to furnish readers with

[77] *The Welshman*, 8 July 1853.
[78] Roberts, *Telegraph Companies.*

the 'LATEST POSSIBLE NEWS, and which in the ordinary course of communication cannot reach this Town until Saturday Afternoon.' The newspaper would be able to communicate 'the Latest Intelligence, and especially at a time when events of unusual importance may be expected to transpire.' which was a reference to the Crimean War.[79] Extensive commercial, financial and commodity reports were published and presented with a particular style of imparting 'intelligence' by telegraph which was usually headed 'BY ELECTRIC TELEGRAPH!' Reports usually included the London Produce Markets as well as intelligence on foreign markets:

> Sugar, West India, sales 500 hogsheads at full rates; Refined sales large; Grocery Lumps, 44s. 6d. to 48; Bengal and Mauritius in good demand. Coffee demand limited Native Ceylon, 44s. 6d. to 45. Tea wanted at full rates: ordinary Congou sold slowly at 11½d to 1s. Rice, few buyers: White Bengal: 13s. 3d. to 14s. Madras, 12s. 6d.[80]

Pembrokeshire had joined the nineteenth century as the *Bristol Times* might have put it.

The telegraph network followed the railway network and in combination they established a new form of spatial relationships in which large areas of the region were excluded, or were remote from the system. Mainly urban areas in south Wales, coupled with Gloucester, Bristol and Taunton, for example, had relatively simple access to the network which brought them closer to other urban areas on the network inside and outside the region. It was easier for someone in Carmarthen to communicate to Newcastle than to Ammanford, for example, which brought Newcastle nearer. The telegraph narrowed space for those on the network, but relatively extended distance for those not on the network.

The electric telegraph had a fundamental impact upon how communications were conducted and upon landscapes of space, time, nation and global relations from the 1830s onwards.[81] Use of the telegraph increased from less than 30,000 messages in 1850 to almost 10 million by 1870 (see Table 13). Of these, in 1868 there were 800,000 external messages, indicating the extent of its use for international trade. Commerce, insurance and trade dominated telegraphic communication, with railway messages constituting only approximately 5 per cent of all messages by 1868.

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[79] *Pembrokeshire Herald and General Advertiser*, 10 February 1854.
[80] *Pembrokeshire Herald and General Advertiser*, 21 April 1854.
[81] Yrjö Kaukiainen, 'Shrinking the world: Improvements in the speed of information transmission, c.1820-1870', *European Review of Economic History*, 5.1 (2001), 1-28.

Table 13 Telegraph expansion in Great Britain 1850-1865[82]

Year	Miles of wire	Miles of line	No. of stations	No of messages (internal)
1850	6,730	1,684	180	29,245
1855	38,028	7,649	586	882,360
1860	51,556	10,854	1,032	1,863,839
1865	77,440	16,066	1,882	4,650,231
1866 (projected)			c.2000	<5,000,000
1868				6,002,034[83]
1868	91,068	21,750		6,800,000 *[84]
1870				9,900,000 *[85]
				* all messages - internal and international

The telegraph made international commerce easier and the dominance of the British telegraph in world telecommunications during this time, partly due to Britain's empire, helped establish British dominance in world commerce and insurance and the strength of the City of London, as well as regional centres like Liverpool. The region was on the fringes of these developments, but south and south-east Wales thrived within the context of the region which reversed the historic pattern of the pre-eminence of Bristol and of Gloucester (see Figure 30).

[82] Lardner and Bright, *Telegraph*, p. 258.
[83] Wenzlhuemer, *Connecting*, Table 7.1, p. 173.
[84] Perry, 'Government Telegraphy', Table 1, 417.
[85] Perry, 'Government Telegraphy', Table 3, 422.

Figure 30 Telegraphic activity proportionate to population[86]

The darker the area, the greater was the activity. Activity in south-east Wales was comparable to activity anywhere in Great Britain, including London, and south Wales as a whole was relatively active and exceeded many industrialized regions like the Midlands. The southern part of the region - Gloucestershire, Bristol, Somerset and Devon - as a whole showed a relatively low level of activity, confirming its marginal status in the changing economic profile of the region. Prior to connection, frustrations were voiced over these delays and interpreted as a slight on the status of the region or locality. However, the perceptions of the local populations about their involvement and contribution to national economy and life following access to the telegraphic network did not indicate any sense of inferiority or of operating on the margins. Access to the network was interpreted as an entry point into the nation and world, and one based upon equality and these were

[86] Wenzlhuemer, *Connecting*, Map 7.10, p. 198.

perspectives that were shared across the region, irrespective of the local levels of economic or telegraphic activity.

The region's first daily newspaper, the *Western Daily Press* may have exaggerated when it claimed that 'the telegraph has been the means of enabling the English reader to discuss at his breakfast-table the important events which have taken place in various parts of Europe on the previous day', but the sense that the world was a more intimate place made possible by rapid communications was clear.[87] Equally, it also became clear that a region traditionally on the margins of English commerce, trade and industrialization could now, through the telegraph, compete and participate on equal terms in access to intelligence through its membership of a network that had no hierarchy. Bristol in the 1830s had long since lost its status as the second city of England; the region had witnessed rather than created industrial and agricultural change until the south Wales coalfield propelled the region into the industrial revolution.[88] The region's newspapers, as they were inclined to point out, could publish commercial and political intelligence and other forms of news gained through the telegraph ahead of London's newspapers - the traditional source of national and foreign news - and the region's farmers, commercial sectors and entrepreneurs could use commercial and commodity intelligence to plan their enterprises. They had equal access to this intelligence and, in concert with the speed of railways, could transport goods and commodities to those markets which would be profitable, many of which were in the expanding population centres of the industrialized Midlands and the north of England. To exploit these markets effectively, however, required the commercial intelligence which the telegraph provided.

By the 1850s in the region, railway timetables measured distances by times travelled and this practice became common in measuring telegraphic distances - these were measured in times, rather than distances - which emphasized the importance of speed in a changing world and how this speed was to be managed in communications as well as in transport.[89] It became common-place to refer to contemporary life as a form of race, determined by speed, but in the form of

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[87] *Western Daily Press*, 28 July 1866.
[88] John, *Industrial Development*; Howell and Baber, 'Wales' in Thompson, *Social History*; John and Williams, *Industrial Glamorgan*; Williams and Williams, *Industrial Monmouthshire.*
[89] Norris Pope, 'Dickens's "The Signalman" and Information Problems in the Railway Age', *Technology and Culture*, 42.3 (2001), 436-461.

networks (rail and telegraph) and membership of the network made it possible to participate in the 'race' and thus avoid being 'left behind'. Speed was not always welcomed uncritically.

> Speed is the idol of the time, and the more rapid his pace the more devoutly is he worshipped, although it is doubtful whether the idol is not, in some sense, MOLOCH (the pagan god of child sacrifice), which demands human sacrifices ... Truly the age is a fast one; we go at a wonderful pace; let us hope that our speed is always in the right direction.[90]

Newspaper reports and commentaries on the telegraph emphasized this notion of speed leading to the 'demise of distance' which was indicative of a greater awareness of speed and distance and the supremacy of science.

The global landscape of time and space

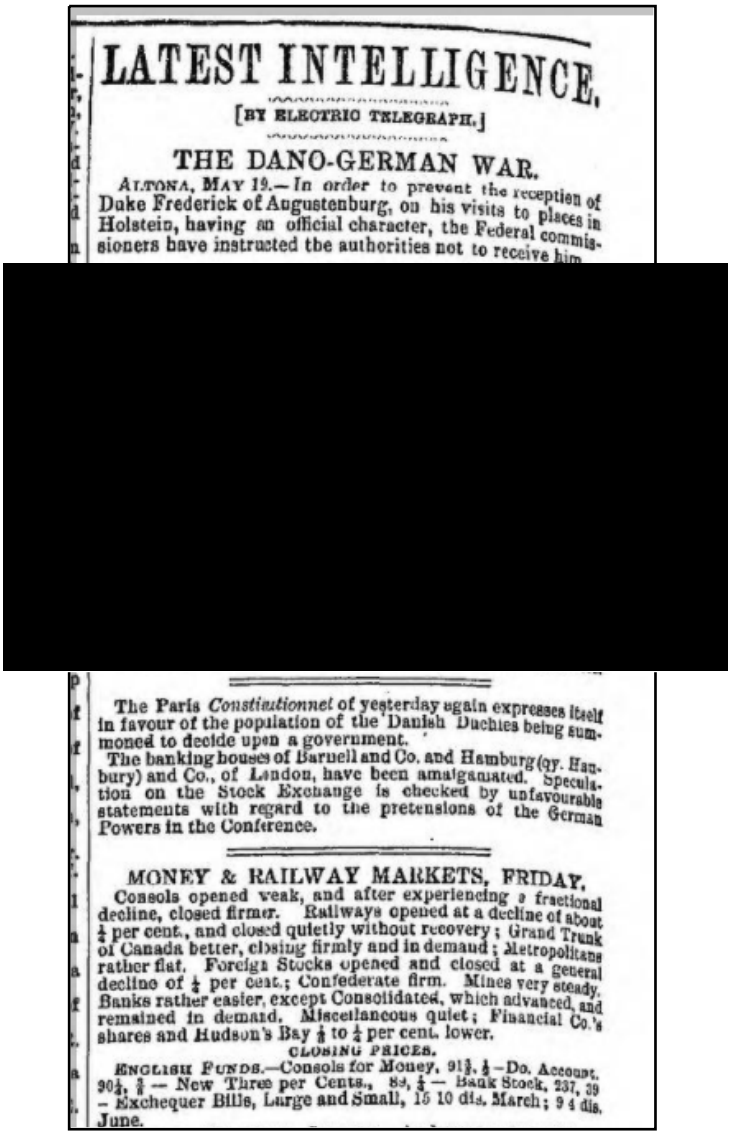
The compression of time and space had a global dimension and the region became more aware, mainly through newspaper reporting, of events in foreign lands that were seen to be of relevance to the region and nation. This, in turn, implied that the region had relationships with foreign countries and peoples whom they had never met, and were never likely to meet or to visit, which included the empire. This new landscape of national and international connections, and the subsequent shrinking of space, appeared to be shared across the Bristol Channel region and there was no discernible difference between industrialized and rural areas, between north Devon and south Wales, for example, in these shared perceptions. Industrialized nations had to learn how to function in a world of closer and more immediate connections and for the British and their empire, as the world's most powerful political, industrial and trading state, it consequently had the greatest implications.

In the early 1850s, the possibility of a global electric telegraph network was largely imagined or projected, mainly due to the lack of submarine connections between land masses, but on land, the networks were extensive - around 3,000 miles in India alone. In 1856, *The Welshman* estimated that the network had extended 'over the whole civilised world and in fifteen years the magic wires have so ramified that the vast continents of Europe and America are already overspread by fully a hundred thousand miles of these lines of intercommunication.'[91] The impact upon

[90] *Western Daily Press*, 3 August 1866.
[91] *The Welshman,* 28 November 1856.

newspapers of this developing network was significant and the *Pembrokeshire Herald's* explanation to its readers about accessing these networks in order to extend news coverage reflected a developing practice amongst the region's newspapers. It became common practice from the 1850s onwards to indicate that the source of news was the telegraph. This enabled newspapers, as the *Pembrokeshire Herald* indicated, to pay more attention to foreign news stories and to questions that 'agitate the world'. The inclusion of foreign news was hampered by the disruptions in the network where cables had not been laid and intelligence, therefore, had to be conveyed by mail train and packet or mail steamships as well as land telegraphs. Nonetheless, newspapers could cover foreign news stories in 1855 at a pace in the transit of news which was beyond the imagination in 1830 when news was communicated by stagecoach or sailing ship. The effect was that newspapers, via the telegraphs and railway networks that existed, contributed to the closure of space and made foreign events, particularly those involving the British as a global power, more immediate. The world, through the telegraph and newspapers, became a regular diet for news and brought the outside world into everyday life. The rapid dissemination of 'intelligence' covered a spectrum of events from foreign conflicts, bankruptcies, and financial markets (see Figure 31). Equally, those distanced from newspapers who were reliant on local distribution networks using roads and local carriers for access to this intelligence were relatively remote. The telegraph could diminish as well as extend space.

Figure 31 The electric telegraph and dissemination of 'intelligence'[92]



LATEST INTELLIGENCE.

[BY ELECTRIC TELEGRAPH.]

THE DANO-GERMAN WAR.

ALTONA, MAY 19.—*In order* to prevent the reception of Duke Frederick of Augustenburg, on his visits to places in Holstein, having an official character, the Federal commissioners have instructed the authorities not to receive him

[redacted]

The Paris *Constiutionnet* of yesterday again expresses itself in favour of the population of the Danish Duchies being summoned to decide upon a government.

The banking houses of Barnell and Co. and Hamburg (qy. Hanbury) and Co., of London, have been amalgamated. Speculation on the Stock Exchange is checked by unfavourable statements with regard to the pretensions of the German Powers in the Conference.

MONEY & RAILWAY MARKETS, FRIDAY.

Consols opened weak, and after experiencing a fractional decline, closed firmer. Railways opened at a decline of about ¼ per cent., and closed quietly without recovery; Grand Trunk of Canada better, closing firmly and in demand; Metropolitans rather flat. Foreign Stocks opened and closed at a general decline of ¼ per cent.; Confederate firm. Mines very steady. Banks rather easier, except Consolidated, which advanced, and remained in demand. Miscellaneous quiet; Financial Co.'s shares and Hudson's Bay ⅛ to ¼ per cent. lower.

CLOSING PRICES.

ENGLISH FUNDS.—Consols for Money, 91⅞, ⅛—Do. Account, 90⅞, ⅞ — New Three per Cents., 88, ⅛ — Bank Stock, 237, 39 — Exchequer Bills, Large and Small, 15 10 dis. March; 9 4 dis. June.

The prospect of a global telegraph seemed to herald a new age that would bring the ('advanced') peoples of the world closer together. In 1846 and before a submarine cable had been laid successfully across any ocean, the *Monmouthshire Merlin* anticipated a future where a telegraphic network would encompass the globe and the Christian democracies of Britain and United States - the 'Anglo-Saxon' powers - would lead this new world. It published a full report on a speech by Elihu Burritt, the US Consul to Birmingham, made at Gloucester on 14 August 1846 which set out this vision of promoting harmony in the place of enmity, referring to the

[92] *Bristol Mercury*, 21 May 1864.

projected submarine cable between London and Paris, even though this would not be completed successfully for another four years.

> We are not dealing in fancy... Paris and London will soon be brought within the same whispering gallery, and the "natural enmity" between the two nations be lost for ever, in the unbroken current of friendly intercourse... will there not be a glorious brotherhood, a nice family circle of mankind...

The ultimate global network will be created by 'that wonderful Anglo-Saxon race which is diffusing itself and its genius over the world... whose language is fast absorbing or displacing the spiritless tongues and dialects of the heathen world...' and which ultimately may see 'half the habitable surface of the globe covered with the Anglo-Saxon race, and half of the human family speaking the English language.'[93] Twenty years before the successful laying of the Atlantic cable, Burritt had outlined a vision of a world networked through the electric telegraph, which brought nations closer together led by Great Britain and United States. Later that year, the newspaper fused two of the most prominent themes on the prospects of the telegraph, linking a global network of intelligence with a world community.[94]

The key to a global system was the submarine telegraph.[95] Speaking from the perspective of the eighteenth century, Edmund Burke had seen distance as a fixed concept and consequently the conflict with the American colonies in 1776 'laid deep in the natural constitution of things... Nature has said it ... This is the immutable condition, the eternal law of extensive and detached empire... The ocean remains. You cannot pump this dry...'[96] From the opposite end of the political spectrum, Thomas Paine shared a similar view. 'Even the distance at which the Almighty hath placed England and America is a strong and natural proof that the authority of one over the other, was never the design of Heaven'.[97] The challenge, which seemed perfectly possible to contemporaries as early as the 1840s, was to construct national and international electrical networks using combinations of land and submarine cables. Newspapers in the region followed these developments with increasing excitement, not to say wonder, at the perceived abolition of time and the potential for

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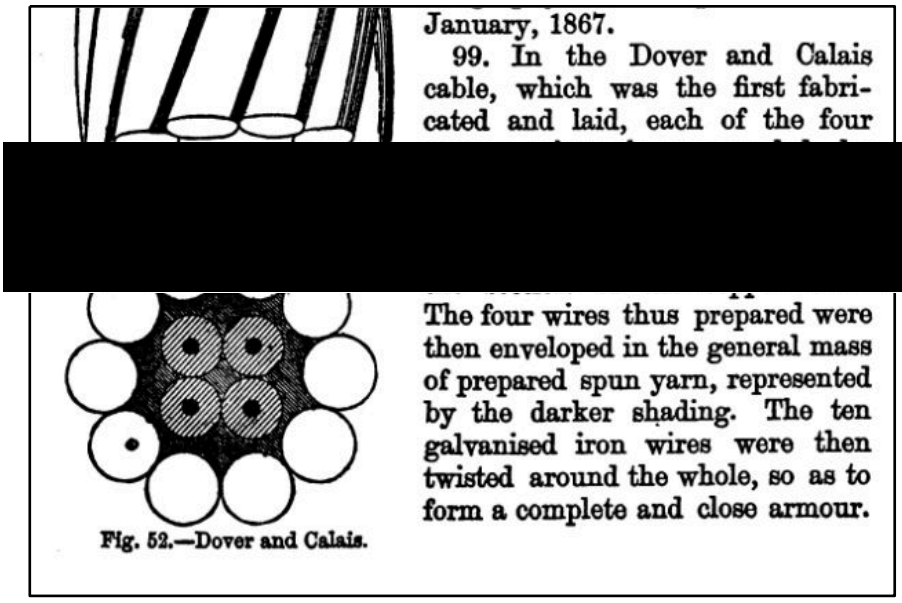
[93] *Monmouthshire Merlin*, 29 August 1846.
[94] *Monmouthshire Merlin*, 5 December 1846.
[95] *Edmund Burke, On Conciliation with America,* ed. by Sydney Carleton Newsom (London, 1775), p.38; Elmer James Bailey, 'Burke's Speech on Conciliation', *The Journal of Education*, 62.26 (1905), 736-737.
[96] Glover, *Atlantic Cable*; Müller, *Wiring the World*. Wenzlhuemer, *Connecting*.
[97] Cited in Bell, 'Dissolving Distance', 533.

a world communications system using the 'electric fluid' that raced along wires at speeds that were previously unknown to human experience or invention, except in myths or literature. In an extended article on the prospects of a submarine telegraph connection with France, the *North Devon Journal* speculated on what this could mean. The telegraph, it argued, 'will unite all portions of the civilized world, and lead to an interchange of thought and information that will have a stupendous effect on modern civilization.' Combined with railways and steam ships, the three inventions would 'multiply beyond all precedent the peaceful ties which bind nations together... they are propagandists of liberal ideas, which make despots tremble.' The ideas of human progress would be shared and the telegraph would become 'one of the mightiest instruments to set it (the human mind) free.[98]

A global system required new technology to enable an electrical signal to be transmitted by cable under water, but capable of resisting the water pressures of an ocean as well as the uneven surface. The first successful submarine telegraph was made possible by the invention of a cable that could transmit messages under water and resist the water pressure of oceans (see Figure 32). A submarine cable was successfully laid between Dover and Calais in 1850, and this was quickly followed by connections between Holyhead in Wales and Howth in Ireland and Port Patrick in Scotland and Donaghadee in Ireland both in 1852 after several unsuccessful attempts.

Figure 32 The internal structure of submarine cables - the Dover-Calais cable of 1851[99]


January, 1867.

99. In the Dover and Calais cable, which was the first fabricated and laid, each of the four

The four wires thus prepared were then enveloped in the general mass of prepared spun yarn, represented by the darker shading. The ten galvanised iron wires were then twisted around the whole, so as to form a complete and close armour.

Fig. 52.—Dover and Calais.

[98] *North Devon Journal*, 5 September 1850.
[99] Lardner and Bright, *Telegraph*, p. 82.

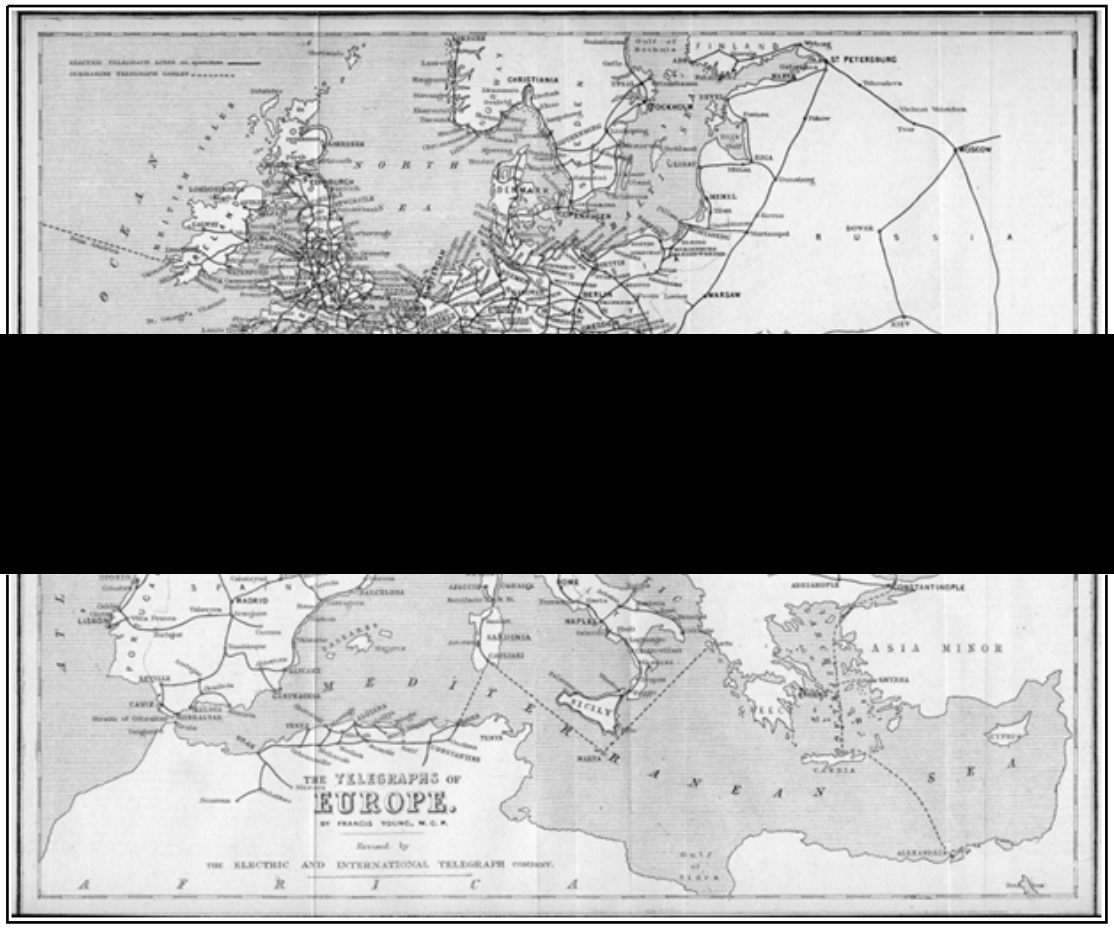
The network was extended to Denmark (1853), Holland (1853-1855) and projects were established to connect to Egypt, India and eventually Australia. By the mid 1850s, the European land mass was connected through many urban areas. The sentiments expressed by the *North Devon Journal* in 1850 were echoed at the annual meeting of the Cardiff Literary and Scientific Institution of 1851 after the successful completion of the subterranean telegraphic link with France. Two themes were brought together - the demise of distance and, in its wake, a greater understanding between peoples.

> Distance is dying. France and England now commune in spaceless conversation. May God grant that heart may be drawn to heart by a yet nobler magnetism...I cannot but think that the peaceful tendencies of the progress of knowledge forms its great and enduring glory. Peace! lasting peace![100]

It was also taken as further evidence of the triumph of science with the conquest of the seas which 'have been reduced by scientific skill to be the highway of human thought... this conquest gained by science over the waves must ever remain recorded as amid the greatest of human achievements.'[101] The success of submarine telegraphs had opened up the possibility of a global network. The telegraph had triumphed over the oceans. On the opening of the telegraph between England and France in November 1851, the *Monmouthshire Merlin* took the prospects of peace and harmony a stage further; it was clearly perceived as a momentous event for the spread of liberal ideas and civilization, alongside trade, where Britain would perform a leading role, almost akin to a manifest destiny. 'Will the nations who are so far behind us in liberty, in practical wisdom, in many of the advantages we enjoy, receive no good from an extended intercourse with us?'[102]

[100] *Cardiff and Merthyr Guardian*, 18 January 1851.
[101] *North Devon Journal*, 20 November 1851.
[102] *Monmouthshire Merlin*, 21 November 1851.

Figure 33 The European Telegraph Network (1860)[103]



The geography of the northern hemisphere meant that Great Britain could connect with the land telegraphs that stretched across Russia, India and China once the submarine cable connected to France, but submarine cables were also being laid across the Mediterranean to connect with Egypt and from there to northern India via the Persian Gulf. There was some debate on the best route to the Indian Ocean - either the Red Sea or the Persian Gulf - and from there to India.[104] In 1850s, there was no direct connection with India. Telegraphic communication to India was routed through either the Ottoman Empire or Russia, both terminating at Constantinople and from there by land to northern India. By 1855 the land telegraph in India almost reached 3,000 miles and although the route was tortuous, there was

[103] Electric and International Telegraph Company (1860) < http://distantwriting.co.uk/> [accessed 11 June 2018].
[104] W. P. Andrew, *Telegraphic Communication with India* (Manchester: Foreign and Commonwealth Collection, 1858); *Telegraph to India* (Manchester: Foreign and Commonwealth Collection, 1870); H. C. Rawlinson, 'Notes on the Direct Overland Telegraph to India', *Proceedings of the Royal Geographical Society of London,* 5.5 (1860-1861), 219-224.

telegraphic communication with India.[105] In 1866, it took an average of four days eleven hours and 18 minutes for transmission through Turkey and via Russia just over ten days.[106]

It was the Indian Rebellion in 1857 that would provoke the British government into supporting and part-financing a direct route to India using principally submarine telegraphs.[107] This proved to be the first 'red line' of imperial communications, a strategy that was adopted extensively towards the end of the century, and which would ultimately connect with Australasia.[108] It brought an added sense of importance to the telegraph, and underlined the experience in the Crimean War when Anglo-French forces installed military telegraphs to assist in the prosecution of the war. Without the telegraph, the 'Commander-in-Chief would lose the effect of half his force. It has served him better than his right arm. By it, he is enabled to direct the march of his battalions, the movements of his artillery and cavalry...'[109] In the same year, the *Weekly Mail* argued for a submarine connection to India via the Mediterranean to Alexandria and Suez, and from there south through the Red Sea to Aden and then Kurrachee (Karachi).[110] However, the efforts to establish a direct link between England and India did not signify a strategic imperial enterprise. The submarine connection was not completed until 1870 and it was not until the turn of the century that the 'red line' became a recognizable strategy.[111]

Newspapers were far more enthusiastic than governments over imperial lines to India. In its review of the progress of telegraphy in 1853, the *Taunton Courier* had made the value of imperial connections clear.[112] In 1855, the telegraph would 'place India within one day's journey of England'.[113] By 1859, the space between England and India had narrowed further. 'In a few months the capitals of India and England

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[105] *The Welshman*, 9 March 1855.
[106] *Western Daily Press*, 15 December 1866.
[107] *Taunton Courier*, 26 August 1857.
[108] *Telegraph to India*; Amelia Bonea, *The News of Empire: Telegraphy, Journalism and the Politics of Reporting in Colonial India* (New Delhi: Oxford University Press, 2016).
[109] *North Devon Journal*, 27 April 1858.
[110] *Weekly Mail*, 29 August 1857; Sir Charles Wheatstone, 'An Account of Some Experiments made with the submarine cable of the Mediterranean Electric Telegraph', *Proceedings of the Royal Society of London*, 7 (1854-1855), 328-333.
[111] Charles Bright, 'The Administration of Imperial Telegraphs', *Journal of the Royal Society of Arts*, 62.3212 (1914), 643-662; Bell, 'Dissolving Distance'; P. M. Kennedy, 'Imperial Cable and Communications Strategy, 1870-1914', *English Historical Review*, 86.341 (1971), 728-752.
[112] *Taunton Courier*, 14 September 1853; *The Welshman*, 15 August 1856; Robert W. D. Boyce, 'Imperial Dreams and National Realities: Britain, Canada and the Struggle for a Pacific Telegraph Cable, 1879-1902', *The English Historical Review*, 115 (2000), 39-70.
[113] *The Welshman*, 23 November 1855.

will be only a few hours apart in point of time, although half the globe intervenes, and midnight covers one while it is high noon at the other.'[114] The *Weston Gazette*, in an article headed 'The Annihilation of Space and Time', outlined the progress made towards this annihilation and the relative closure of space in Britain's eastern empire.

> the electric telegraph, now preparing to be laid across the Mediterranean, will have reached Suez, and the 4,000 miles of wire which have already reached Calcutta, will connect every great town in India with the port of Bombay, so that, before the year 1856 expires, we shall have communication by electric telegraph in ten or eleven days' time, with every part of India, and by steamer and rail from Bombay in 21.[115]

The following year, the same newspaper continued the theme by presenting an image of the developing network stretching out across the world in an article published by the *Eclectic Review*. The importance of the imperial connection was repeated a year later where 'these wondrous wires' will connect Egypt with India and 'London may then convey instantaneous messages to Bengal or Calcutta.' The article repeated what had become a relatively popular analogy of man's 'capture' of lightning within the telegraph wires. 'Appropriately does Dr. Lardner quote the singularly beautiful words of Job "Canst thou send the lightnings that they may go and say unto Thee, Here we are!"'[116] The article summarised progress in Great Britain: 25,233 miles of wire covering 4,625 miles for the six months ending June 30 conveying 235,867 messages. Globally, the network extended from Aberdeen to Corsica, from Cork to New Orsova, and from Konigsberg to Marseilles and Toulon and in the Unites States, telegraphs covered over 41,392 miles. This meant, however, that there were two separate global networks - one in the United States, and the other emanating from Europe but extending to the Mediterranean, Africa and the Indian Ocean region.

The geography of the northern hemisphere dictated that to unify the networks required laying a cable across the Atlantic to the Americas.[117] Given the excitement and rhetoric associated with telegraphic networks, the 'global network', even with an Atlantic cable, was more apparent than real - it would be more of a 'skeleton' than a 'fabric'. However, even in constructing a skeleton network, the north Atlantic

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[114] *The Welshman*, 13 May 1859.
[115] *Western Gazette*, 28 January 1854.
[116] *Weston-super-Mare Gazette*, 10 March 1855.
[117] Glover, *Atlantic Cable*.

presented formidable logistical problems and was a challenge to the technology of the electric telegraph. The distance between the proposed connection points at Valentia in Ireland and Trinity Bay in Newfoundland was over 2,000 miles, the ocean reaching depths of over two miles and the cable would have to cross the mid-Atlantic ridge without breaking which was around 20,000 ft. from its base to the apex. Although the submarine cables to India were far longer than those required to cross the Atlantic, the Atlantic was considered the most challenging ocean in the world and the ultimate challenge for a submarine telegraph.[118] In reviewing the prospect, the *Gloucester Journal* acknowledged that 'The practicability of successfully laying down a submarine insulated wire, for the purpose of placing England and, fact, Europe, in telegraphic communication with America, is a question very grave and serious consideration', and raised the possibility of a northern route via Scotland, Iceland and Greenland which was much discussed at the time but which doubled the length of the cable. Despite the difficulties, the newspaper reflected opinion at the time that technology would meet any challenge. 'We live in an age when the terms "difficulties " and " impossibilities " are well nigh expunged from our engineering vocabularies...' and the project was considered worthwhile in order to 'lay the groundwork for encircling the earth with the means of instantaneous intelligence.'[119] The secondary challenge was in financing such a scheme. There was no railway company that crossed the Atlantic and therefore the capital financing of the project would have to come from speculators. The project captured the imagination of Cyrus West Field who founded in America the Atlantic Telegraph Company in 1854 and who spent much of the next twelve years criss-crossing the Atlantic in his efforts to raise sufficient capital.[120]

Newspapers in the region took great interest in the attempts to lay an Atlantic cable - far more interest than they had shown in the Indian connections - which probably reflected the region's historical focus towards the north Atlantic and its intimate knowledge of the ferocity of the ocean and its weather. However, submarine connections to both India and North America mirrored each other during the 1860s and were both followed in the region's newspapers. Their reporting of the attempts was used by newspapers to illustrate aspects of the telegraph's impact upon

[118] Philip Cowburn, 'The Atlantic Cable, 1866', *History Today*, 16.8 (1966), 564-571.
[119] *Gloucester Journal*, 2 October 1852.
[120] Glover, 'Atlantic Cable'.

the imagination - the demise of distance, the supremacy of science over nature, the community of nations and an identity with the American nation in promoting the advance of world civilization.

The first attempt to lay an Atlantic cable was made in 1857 using the ships *HMS Agamemnon* and the *USS Niagara*, with the cable in two sections being too long for one sailing ship. The separate cables were spliced in mid-ocean with *HMS Agamemnon* sailing west from Ireland and the *USS Niagara* east from Newfoundland. The first attempt failed when the cable snapped after being spliced but in the second attempt the following year, the cable was spliced mid-ocean and successfully connected, spanning the north Atlantic. The *Cardiff and Merthyr Guardian* celebrated the achievement with its headline 'ACROSS THE ATLANTIC AND BACK IN TWO HOURS AND A HALF', describing the Atlantic cable as 'an extraordinary feat'.[121] The reaction in the United States and Canada was euphoric and their peoples 'have been wrought to the highest pitch of enthusiasm, and their delight has manifested itself in illuminations, torchlight processions, military parades, salvos of artillery, and numerous other demonstrations.' The report also gave an example of how the success was reported in the American press and reflected the importance of membership of the world network. '"The news from Newfoundland is almost too good to be true. The Atlantic cable is laid! ... The news will send an electric thrill throughout the world."'[122]

The symbolic exchange of telegrams between President Buchanan and Queen Victoria in 1858 on the completion of what was to prove to be a short-lived cable expressed some of these sentiments. In her message to President Buchanan, the Queen hoped that 'the electric cable which now connects Great Britain with the United States will prove an additional link between the two nations, whose friendship is founded upon their common interests and reciprocal esteem.' In his reply, the President was rather more expansive. The telegraph was 'an instrument destined by Divine Providence to diffuse, religion, civilization, liberty and law throughout the world.[123] As with many experiences of the electric telegraph, however, there was a dislocation between expectation and reality. The failure of the cable in less than four weeks brought great disappointment, but also a determination to succeed, sentiments

[121] *Cardiff and Merthyr Guardian*, 28 August 1858.
[122] *North Devon Gazette*, 24 August 1858.
[123] *Gloucester Journal*, 27 August 1858.

that were reflected by the *Western Daily Press*, Bristol's first daily newspaper established in the same year. The vision had not been abandoned.

> One of the most magnificent enterprises of the age has failed for the second time. Every abortive attempt at uniting nations, even by copper wires and gutta percha, is to be deplored... Politically speaking, the Atlantic cable perfected would be among the greatest boons to the old and new worlds as it would be the noblest triumph of scientific and mechanical skill of any era in Earth's history.[124]

The *Western Daily Press* set the tone for the urgency of connecting England and America in 1858, linking trade with brotherhood, race and kinship.

> With America our relations are intimate. The Americans are, of our own race, blood, and kindred. Our commercial transactions with them are gigantic. Anything that tends to facilitate these affairs is a work of the greatest importance to both countries. It not only brings us the state of commerce and trade, but by its medium we can learn how our friends are...[125]

In a similar vein, the *Western Daily Press* expressed a confidence in the science of submarine telegraphy that 'the practicality of uniting the two Anglo-Saxon communities has been clearly established.' as well as affirming the close amity between the two nations and their shared origins and identity.[126]

The third attempt was made in 1865 during the American Civil War using the giant steamship *Great Eastern*, the only ship capable of carrying a cable over 2,000 miles long and which would be laid as a single cable east-to-west. Newspapers across the region covered the preparations for the voyage and received daily telegraph messages from the ship on its progress.[127] The prospects and expectations of the venture were described by the *Bristol Times and Mirror*, repeating the perception that speed could overcome space in a further triumph over the natural world,

> so that it may be possible to flash from one another tidings of events in time counted not by weeks or days, or even hours, but by minutes - is surely as vast a work human intellect ever contemplated. In these modem times, in which the human mind has so triumphed over matter obliges nature's lifeless agencies and forces in the service of man.[128]

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[124] *Western Daily Press*, 26 July 1858,
[125] *Western Daily Press*, 6 July 1858..
[126] *Western Daily Press*, 14 October 1858.
[127] For example, *Monmouthshire Merlin*, 1 August 1857; *Gloucester Journal*, 1 April 1865; *Cardiff Times*, 2 June and 21 July1865; *Bristol Mercury*, 22 and 29 July 1865.
[128] *Bristol Times and Mirror*, 19 July 1865.

Figure 34 The *Great Eastern* laying the Atlantic Cable[129]

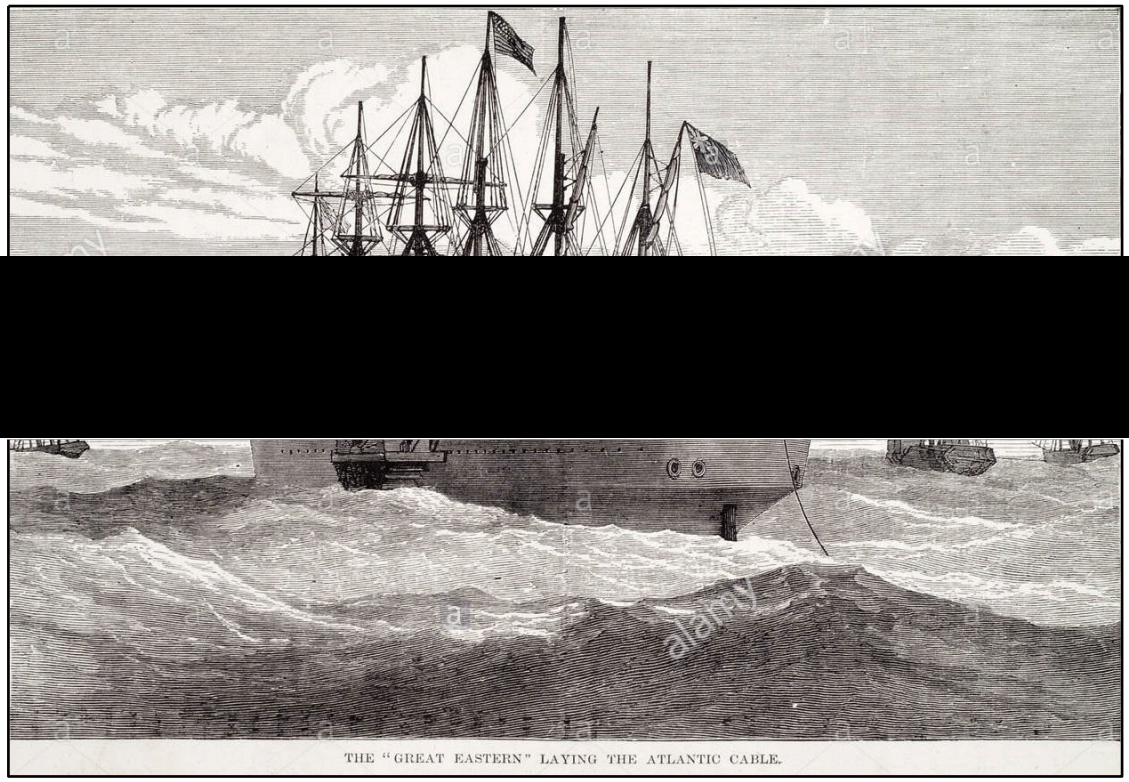

Figure 35 The paying-out machinery used to lay the Atlantic Cable (1865)[130]

The 1865 cable was stored and laid as a single, unbroken cable on the giant steamship *The Great Eastern.* The attempt was perceived as a challenge to the

[129] <https://c8.alamy.com/comp/D86F5N/laying-the-atlantic-cable-on-the-great-eastern-D86F5N.jpg> [accessed 10 August 2017].
[130] Lardner and Bright, *Telegraph*, p. 128.

natural world using scientific and engineering knowledge to defeat a ferocious ocean. If successful, it would show that the Atlantic was not 'immutable'. The attempt failed when the cable snapped and the failure was reported extensively.

The importance of network membership applied equally to the projected global network. In response to the failure of the Atlantic cable in 1865, the *Bristol Mercury* described this as a 'calamity to both Europe and America... In these days when intelligence is money, power, dominion, everything rests on the position each country holds in the great onward race... We must be first in the race, or we shall be nowhere ...'[131] Both newspapers imagined connection to the network as participating in a race where time was accelerated, and speed was all important. Failure to connect was likely to have adverse consequences for the region and the nation and the stress upon connection was also indicative of a developing consciousness that region, nation and globe were bound together in a new world order where intelligence was the currency.

Figure 36 Recovering the 1865 cable[132]

The contemporary illustration attempted to turn the failure into a triumph as the cable's location was marked and recovered. The message of the illustration was to celebrate the power of scientific knowledge and engineering skills in locating exactly where the cable snapped and the process of recovery in August 1866. The ocean had won one battle, but human ingenuity and perseverance would win the war.

[131] *Bristol Mercury*, 19 August 1865.
[132] W. H. Russell, *The Atlantic Telegraph* (London: Dawson, 1866), p. 87.

By comparison, a submarine cable laid in the Persian Gulf successfully connected to India in 1865, linking with the land network at Constantinople and although this was not to prove to be the long-term connection with India, the *Western Daily Press* celebrated this success, emphasizing the commercial significance to Bristol in this latest closure of space. 'Eight thousand miles in six hours!'[133] The report anticipated the eventual success of the Atlantic cable and looked towards the completion of what would constitute an imperial line of communication connecting London with India and Australia, and expressed the changing attitude to distance. The telegraph stretched over 8,000 miles to India and 'a little more than three thousand (miles) are required to unite England with Australia.'

Figure 37 The submarine route to India (1870) [134]

The southern route from Falmouth to Bombay via the Atlantic, the Mediterranean and the Red Sea (1870) was longer than the northern route, but more secure and quicker. The short section between Alexandria and Suez was the only part of the connection not under the direct control of the empire. By

[133] *Western Daily Press*, 9 March 1865.
[133] *Telegraph to India*; Christina Phelps Harris, 'The Persian Gulf Submarine Telegraph of 1864', *Geographical Journal*, 135.2 (1969), 169-190.

1870, a global perspective on imperial communications was emerging with routes planned to South-east Asia, China and Australasia.

The fourth attempt to lay an Atlantic cable was made in the summer of 1866 and the pattern of newspaper coverage and comment was similar to the previous attempts. Newspapers reported on the preparations of the *Great Eastern*, the loading of the new cable and its connection at Valentia and published regular reports on the ship's progress across the Atlantic via the ship's telegraph.[135] The attempt proved successful and the *Weston Gazette's* report was typical of the sense of triumph that followed and highlighted a number of themes relating to the telegraph: the triumph of science over space, global intelligence and contact and completion of a global network. 'But though we could talk with one another about business and diplomacy, the New World was shut out of the communication. There was no Atlantic Telegraph. That was the great want. But now we have one...'[136] There were actually two cables as the cable broken in 1865 was recovered in 1866 from two and a half miles below the surface.[137] The *Aberdare Times* shared this 'triumph over space' and underlined the importance of a global network and the globe's 'capture' by a cable. Edmund Burke and Thomas Paine had been confounded. Following scientists who had revealed the powers of electro-magnetism, electrical engineers and navigators had 'pumped the Atlantic dry'. 'All the principal countries of the world are thus bound together by the mysterious chain of electric communication, and Puck's idea of putting a circle round the earth in forty minutes is practically realised.'[138] *The Cambrian*, in reporting an address by Elihu Burritt, celebrated the triumph of science over nature and the abolition of time;

> time and space were virtually annihilated by the Electric Telegraph ... he had trained the lightning to carry his messages... The world would be engirdled with the magic wire... and from a great central station would be flashed round it the intelligence that the end of all things had come before the angel's trumpet could announce that "Time should be no longer".[139]

In an exchange of telegrams between Queen Victoria and President Johnson, the Queen 'congratulates the President on the successful completion of undertaking which she hopes may serve an additional bond of union between the United States

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[135] *Bristol Mercury*, 21 July 1866.
[136] *Weston-super-Mare Gazette*, 8 September 1866.
[137] *Bristol Times*, 5 September 1866; Russell, *The Atlantic Telegraph.*
[138] *Aberdare Times*, 4 August 1866.
[139] *The Cambrian*, 3 July 1866.

and England' and, in response, the President 'cordially reciprocates the hope that the cable that now unites the eastern and western hemispheres may serve to strengthen and perpetuate peace and amity between the Government of England and the Republic of the United States..'[140] In a subsequent statement to Parliament, Queen Victoria acknowledged implications for the empire as well as for relations with the United States by trusting that the undertaking would:

> cement yet closer the ties which bind her Majesty's North American Colonies to their mother country, and to promote the unrestricted intercourse and friendly feeling which it is most desirable should subsist between her Majesty's dominions and the great Republic of the United States.[141]

The successful connection between the two 'Anglo-Saxon' nations was seen as a re-uniting of two peoples who had been separated by distance which had led to misunderstanding, often citing a controversy over the *Trent* as an example. If a telegraph had existed between the continents, issues over the *Trent* would not have resulted with 'those serious apprehensions which we have witnessed and would have saved the vast expenditure which our government incurred ... and that interference with commerce and manufactures which resulted from the ill-judged and un-authorised conduct of Captain Wilkes.[142]

The bonds between the 'old' and 'new' worlds also had an important regional perspective which stemmed from migration from the 'new' to the 'old'.[143] Since the 1830s, migration from south-east Wales to North America in particular had been met with a mixed reaction from local newspapers. As early as 1830, the *Monmouthshire Merlin* was remarking that 'a great number of our Cambrian brethren and others are leaving old England' and issued a warning that 'the advantages of *emigration* are too often painted in delusive Colours, while the difficulties and disadvantages that will inevitably be encountered are kept out of mind.'[144] Migration was viewed with some alarm regarding the potential effect upon the local economy, but was often tempered by sympathy for those who wished to emigrate to improve their lives.[145] The 'mania

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[140] *Gloucester Journal*, 4 August 1866.
[141] *Gloucester Journal*, 11 August 1866.
[142] *Cardiff Times*, 7 February 1862.
[143] James Horn, 'British Diaspora: Emigration from Britain 1680-1815', in *Oxford History of the British Empire*, volume II, *The Eighteenth Century*, ed. by P. J. Marshall (Oxford: Oxford University Press, 1998), pp. 28-52; Gwyn A. Williams, 'Frontiers of Illusion: The Welsh and the Atlantic Revolution', *History Today*, 30 (1980), 39-45.
[144] *Monmouthshire Merlin*, 17 April 1830.
[145] *The Cambrian*, 17 March 1832.

for emigrating' as the *Monmouthshire Merlin* described it in the 1830s reached a new peak in the 1860s establishing strong personal, family and community ties between south Wales and regions in the United States.[146] Bill Jones has described these ties, strengthened through the news and letters from migrants published in local newspapers, as forging an 'international Merthyr' where emigrants lived within a 'greater Merthyr'.[147] The *Cardiff and Merthyr Guardian* reflected on these personal and family connections with the United States and envisaged the telegraph as bringing these ties closer together. 'The good news respecting this cable caused general satisfaction in the town. Merthyr is represented in the States by many hundreds of her sons and daughters, and any link additional is received with gratitude.'[148]

The success of the Atlantic cable strengthened the argument for a submarine connection to India and by 1868, as a report from the *Cardiff and Merthyr Guardian* indicated in reporting the progress of a Mediterranean cable between Malta and Alexandria, the most favoured route appeared to be via the Mediterranean and the Red Sea, with a short land connection between Alexandria and Suez. The article also presented the prospect of the future direct connections between England and the eastern empire that were directly under English control and did not rely upon other land connections except between Alexandria and Suez. 'This line completed, will give therefore a very large instalment of that great desideratum for this country, viz., a line of Telegraph to India in English hands.' The article then looked to the immediate future envisaging a cable 'direct from the south-west coast of England to Gibraltar, and thence to Malta... it is possible to have a complete submarine communication between England and India ...[149] The connection from Falmouth to Malta via Gibraltar was completed in June 1870, connecting to the line between Malta and Alexandria which had been completed in 1861. The land cable between Alexandria and Suez had been completed in March 1870 which accommodated the completion of the submarine cable from Bombay to Suez in the same month. Fresh from its triumph in the Atlantic, the *Great Eastern* laid the cable across the Arabian Sea from Bombay to Aden, with *Hibernia, Chiltern, Hawk* and *William Cory*

[146] *Monmouthshire Merlin*, 21 April 1832; W. D. Jones, 'Inspecting the "Extraordinary Drain": emigration and the urban experience in Merthyr Tydfil in the 1860s', *Urban History*, 32.1 (2005), 100-113.
[147] Jones, 'Extraordinary Drain', 112.
[148] *Cardiff and Merthyr Guardian*, 3 August 1866.
[149] *Cardiff and Merthyr Guardian*, 10 October 1868.

completing the cable from Aden to Suez.[150] By June 1870, Great Britain had secure and discrete cable connections directly to North America and Canada and to its eastern colonies, stretching nearly 7,000 miles by sea, with connections planned to incorporate Ceylon, Hong Kong, Singapore and Australia into the network which meant an additional 7,000 miles of submarine cable.[151]

Conclusion

The English writer E. L. Blanchard (1820-1889) lived a life which spanned stage coach and canal, telegraph and the railway, and he greeted the electric telegraph in his poem, *Song of the Electric Telegraph*, in 1850. He expressed the wonder and anticipation experienced at the time of the unseen electric fluid spanning the globe, defying time and forging a community of nations. It was characteristic of the rhetoric at the time.

Away where the sunlight is bright'ning,
Away where its last beams expire.
I speed with the flash of the lightning,
I fly on the wings of the wire!
By me are earth's barriers riven,
By me are its boundaries spread;
A word - and the impulse is given,
A touch - and the mission has sped.
Hurrah! tis the best conjuration
That Science, the wizard, has done!
Through me nation speaks unto nation,
Till all are united in one.[152]

Electricity was a new form of energy, unseen and capable of travelling at unimaginable speeds. It brought a new dimension to the perception of both speed and distance. Because there was no discernible time delay between sending and receiving a signal, in one sense it abolished space. It required new technologies for the transmission and receipt of signals, and new sources of financed for making subterranean cabling possible. It led to concepts of an 'intelligent fabric' that could operate on a global dimension and was instrumental in establishing an 'instant' information network on financial markets or world events.

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[150] J. C. Parkinson, *The Ocean Telegraph to India: A Narrative and a Diary* (London: William Blackwood, 1870).
[151] Glover, *Atlantic Cable*.
[152] *North Devon Journal*, 10 October 1850.

It was pioneered and funded by railway companies as a safety measure but it quickly transposed into an intelligence system available to all who had access to a telegraph office. It was at that point that the real world frustrated the rhetoric surrounding the electric telegraph as an intelligent fabric. The lines of the telegraph followed those of the railway which essentially divided the real world into those who had access and those who did not. It was not universal and favoured urban areas. In doing so, it altered spatial networks to incorporate those towns and cities on the network and placed those not on the network at a relative disadvantage. It altered perceptions of 'near' and 'far' and reinforced the perceptions that railways had established.

It also favoured some regions over others in terms of the pace of connectivity. The region was relatively late in connecting and underlined a sense of inferiority, particularly in Bristol. The same scenario applied within the region which had a mix of urban and rural areas. Rural areas were relatively disadvantaged in having access to the telegraph in a time when speed was something of a currency. While newspapers celebrated the telegraph, they tended to focus upon urban areas for financial reasons and may have reflected urban needs and interests which left rural areas with less of a voice. If rural areas had a sense of grievance about the telegraph, it was not reflected in newspaper editorials. For much of south Wales, it reinforced a sense of integration that had followed the railway, but it also promoted a sense of equality. Intelligence from the telegraph placed urban areas within the region on the same footing as London newspapers and therefore reduced dependence on the metropolis, which the region's newspapers were eager to point out.

The telegraph's impact upon time and space was not limited to the imagination or to messaging between railway and telegraph stations across the world. It was often claimed that it had abolished time through the speed of communication, but it had a further dimension so far as time was concerned. It was the only phenomenon within human agency that could travel faster than a steam locomotive and as such could transmit measured time ahead of a railway. This made a national timetable for railways possible by informing all stations on the network what the time was. The telegraph may not have been an agent for regulation, but in its time dimension it was perceived as making possible a uniform measure of time across the British Isles and the world.

Chapter 5 What time is it? Whose time is it? Greenwich Time, local time and the eccentricities of clocks

> The inhabitants of Cardiff, we are sure, have long experienced great inconvenience from the fact of their being unable to satisfy themselves as to the correct time of day. It is true there is a plenteous supply of clocks, but the difficulty is which are right and which are wrong? and unless the trouble is taken to walk as far as the railway stations, there is but little chance of obtaining anything like a correct idea of the time.[1]

The measurement of time using clocks has a long history, and was usually set locally which meant that times varied across longitudes. The time in the 'east' was 'earlier' than in the 'west' because dawn and midday arrived sooner in the east than in the west. This time difference presented no great difficulties given the speed of travel prior to the railway. Travelling by stagecoach, horse or walking, it was unimportant that Gloucester was a few minutes 'ahead' of Monmouth. The speed of the railway changed the importance of measured time. It was impractical for railway timetables to use local times as they varied considerably as trains crossed longitudes moving either in an east-west or west-east direction. Railway companies required the time to be the 'same' everywhere which presented two major challenges. Towns and cities across the region needed to be persuaded to abandon local time and adopt 'railway time' determined at Greenwich Observatory and secondly how this 'time' was to be communicated across the telegraph network and to local residents. 'Time' was no longer immutable outside of human agency. The Greenwich Observatory decided what the 'time' was.

Historiography

'Time' is an elusive and complex concept and no attempt is made here to define what time is. Instead, time is taken to be that which was measured by clocks as an everyday experience. There have been considerable debates between historians on how time has been conceived, as well as measured and its function within societies.[2] Debates around time within the context of industrialized Great Britain were initially prompted by E. P. Thompson's influential article on time as a work-force discipline

[1] *Cardiff and Merthyr Guardian*, 18 February 1862.
[2] N. Elias, *An Essay on Time* (Dublin: University College Dublin Press, 2007); Whitrow, *Time in History*; Siegfried Kracauer, 'Time and History', *History and Theory*, 6.6, History and the Concept of Time (1966), 65-78; Chester G. Starr, 'Historical and Philosophical Time', *History and Theory*, 6.6, History and the Concept of Time (1966), 24-35; Toulmin and Goodfield, *The Discovery of Time*; Landes, *Revolution in Time*.

as an important component within industrial capitalism and this theme has been pursued by, for example, by Mark Harrison.[3] Studies by Hans-Joachim Voth, Paul Glennie, Nigel Thrift and William Linnard have pointed to the difficulties in establishing clearly how influential measured time using clocks was in everyday life to the end of the eighteenth century.[4] Glennie and Thrift, in their study of Bristol, indicated that time-keeping was a factor in everyday life in the eighteenth century well before factory production, and that people used a variety of techniques to judge time when they could not rely on clocks, or did not have access to clocks or watches.[5] William Linnard has taken a similar view for Wales arguing that 'a clock-time precision of one hour was quite sufficient for most purposes up to the end of the eighteenth century.'[6] It has also been argued that clocks were a sign of 'modernity', as a way of leaving the past behind.[7] However, what is clear is that attempts to measure time were not new and were diverse from sun-dials to church bells.[8] What made the nineteenth century different was the urgency in publishing railway timetables which were only possible through standardized time.

The chapter considers how local towns responded to the implementation of standard time in the Bristol Channel region.[9] The process affected everyday life and the adoption was uneven. Many towns adopted standard time, while others resisted. There was also resistance within towns by some interest groups like bicyclists who argued that sunset in Bristol, for example, was a different 'time' to sunset in Greenwich as measured by clocks. The implementation of standard time and how it was received or resisted was illustrative of attitudes towards a distant centralized authority. Greenwich Observatory dictated local time which raised the questions about whether the measurement of time could be constructed by human agency or dictated by nature. The response within Bristol is compared with other areas in the region. Secondly, the chapter considers how railway companies attempted to

[3] Mark Harrison, 'The Ordering of the Urban Environment: Time, Work and the Occurrence of Crowds 1790-1835', *Past and Present*, 110 (1986), 134-168; David S. Landes, 'Debate: The Ordering of the Urban Environment: Time, Work and the Occurrence of Crowds 1790-1835', *Past and Present*, 116 (1987), 192-199; Thompson, 'Time, work discipline'.
[4] Glennie and Thrift, *Shaping the Day*; Voth, *Time and Work in England*; William Linnard, 'Shaping the Day in Wales: Indications of Awareness of Clock Time in Wales before 1800', *Welsh History Review*, 27.3 (2015), 479-502.
[5] Thompson, 'Time, work discipline'; Landes, *Revolution in Time*; Harrison, 'Urban environment'.
[6] Linnard, 'Clock Time in Wales', 502.
[7] M. Perkins, *The Reform of Time: Magic and Modernity* (London: Pluto Press, 2001).
[8] Lippincott, *Story of Time*.
[9] Caitlin Homes, 'The Astronomer Royal, the Hydrographer and the Time Ball: Collaborations in Time', *The British Journal for the History of Science*, 42 (2009), 381-406; Alan C. Davies, 'Greenwich and Standard Time', *History Today*, 28.3 (1978), 194-199; Ian R. Bartky, 'The Adoption of Standard Time', *Technology and Culture*, 30 (1989), 25-56.

communicate the 'correct' time using the electric telegraph and how this time was communicated to local residents. These issues illustrated the problems of using technologies which were inadequate at the time in implementing change. In 1847 when the railway companies decided they would only use Greenwich Time, accuracy in time-keeping was frustrated by the inability to communicate this time to residents when personal time-pieces and public clocks were unreliable in giving Greenwich Time, let alone local time. The chapter considers how these difficulties unfolded in two contrasting areas within the region, north Devon and Swansea, and how Swansea attempted to resolve some of the difficulties with its ill-fated 'time-gun'. Most towns attempted with varying successes to communicate time using public clocks which became a feature of the built environment in the late nineteenth century. The issues surrounding the measurement of time and its accuracy as shown by time-pieces persisted into the twentieth century.[10]

'Time' as a human construct: Greenwich Time and local time

Prior to the railway, time was an astronomical measure and usually measured at midday, taken to be the highest point of the sun, which also indicated the start of the day. Therefore as the sun appeared to move in a westerly direction, all points west of any given point measured midday 'later' and the further away from the starting-point, the greater the time lapse. Each town, therefore, had its own local time and different points of longitude showed different times.[11] The Great Western Railway timetable of 30 July 1841 estimated that 'London time is about four minutes earlier than Reading time, seven and a half minutes before Cirencester and 14 minutes before Bridgwater'.[12] This also meant that it was possible to send a message by telegraph from London to Bridgwater and it would arrive in Bridgwater before it was sent, according to the local clocks. The time in Exeter was twenty minutes 'behind' that in London, Bristol fourteen minutes and Gloucester ten minutes.

Railways adopted a standardized time based on the time at Greenwich Observatory in 1847 which meant that many towns connected to the railway actually operated two sets of time - local time and 'railway' time and trains from London carried clocks with 'railway' time to update across the network the time in each town

[10] Hannah Gay, 'Clock Synchrony, Time Distribution and Electrical Timekeeping in Britain 1880-1925', *Past and Present*, 181 (2003), 107-140; Hunt, 'Early Cable Telegraphy', 155-169; Bruce J. Hunt, '"Practice v. Theory": The British Electrical Debate, 1881-1891', *Isis*, 74.3 (1983), 341-355.
[11] Henry Booth, *Uniformity of Time* (London: J. Weale, 1847).
[12] Bagwell, *Transport Revolution*, p. 127.

they visited.[13] It was not uncommon in the 1850s and later, for public clocks to have two minute hands - one showing local time, the other showing railway time. Newspapers would routinely publish local and Greenwich Time until late into the century. In publishing tide times for Sharpness in 1877 the times for high tide were expressed as Greenwich Time with the advice to subtract ten minutes 'if local time required'.[14] Once the telegraph network had been constructed, however, Greenwich Time could be transmitted instantly, at least in theory, across the network and, given this instant transfer of information, clocks with access to this network could show the same time.

The speed of the telegraph could therefore 'beat time', as could the railway, by travelling west and newspapers took a delight in demonstrating contradictions in time and space as measured by clocks that were exposed by speed. This was a new experience - the idea that time could be constructed and manipulated and was not a distant 'something' outside of human control. An incident in January1845 where a railway superintendent in Paddington telegraphed his brother in Slough wishing him a happy new year and was received by his brother who was still in 1844 was widely reported in local newspapers.[15] The region's newspapers had fun in playing with time as shown by clocks coupled with the speed of the telegraph.

> If a dispatch from England to America gains on the sun so as to reach America 4½ hours by the clock before it leaves England, at what time would it arrive at the point of departure were a cable carried round the world? Would it not arrive the day before it left, less only the time exhausted in making the circuit? If so, then with a continuous telegraph line round the world, why not send a dispatch round and round until it reached back and back to Adam to let him know what his children are about in these days?[16]

The application of a uniform, standardized time, however, ran into a number of practical difficulties. Unsuccessful efforts were made to implement uniform time in 1851 through the railways and in 1870 through a government initiative (using exactly the same process as with 'railway' time) before Greenwich Time was made legally enforceable in 1880. However, even by the early twentieth century, timekeeping was erratic and most public clocks were provided by public subscription or legacies. It was common for public authorities to construct clock towers but without the clocks

[13] Joseph Lovering, 'On the Determination of Transatlantic Longitudes by Means of the Telegraphic Cables', *Memoirs of the American Academy of Arts and Sciences*, New Series, 9 (1873), 437-477.
[14] *Gloucester Journal*, 13 January 1877.
[15] *The Welshman*, 9 May 1845.
[16] *Cardiff Times*, 18 January 1859.

because of the financial implications of managing clocks and their accuracy. Time had invaded everyday lives and became a form of social discipline in the regulation of behaviour, but as people came to terms with 'what time is it?' as a daily event, finding a definitive answer was elusive. Replacing local time with uniform time was sometimes resisted by civic authorities and compromises were sought whereby local clocks would show the 'true' (local) time and uniform time by using two minutes hands. The minute hands on the clock at the Bristol Corn Exchange showed the 'early' time at Greenwich and the 'later' time in Bristol (see Figure 38). Timetables were often shown with guidance on how local time could be calculated by deducting a set number of minutes. The clock was actually installed in 1822 which may go some way in explaining Bristol's delay in not adopting standard time until 1854. Bristol was used to two time zones and possibly was an aspect of civic pride.

Figure 38 Bristol clock at the Corn Exchange denoting local and Greenwich Time[17]

Bristol, Bath and Exeter were deemed to be particularly slow in adopting uniform time, according to the Ellis map produced in 1851 by watchmakers from Exeter which surveyed the implementation of standard time, which appeared in a number of the region's newspapers.[18] As late as 1870 Pembroke's town clock had two hands showing 'Pembroke' and 'Greenwich' time separately.[19] Even in cities that had adopted Greenwich Time, the practice often continued of operating both times but irrespective of local practices, railways uniformly applied Greenwich Time. The *Gloucester Journal* felt it necessary to pointed out before Gloucester had adopted 'London time' that railways ran on a different time.

[17] Dreamstime <https://thumbs.dreamstime.com/z/clock-corn-exchange-bristol-uk-clock-corn-exchange-bristol-uk-clock-has-two-minute-hands-showing-137987208.jpg> [accessed 8 July 2017].
[18] *Taunton Courier*, 10 December 1851.
[19] *Pembrokeshire Herald and General Advertiser*, 18 August 1870.

> LONDON TIME ON THE RAILWAYS - All the railways have now adopted London time. This being ten minutes faster than Gloucester time will make it necessary, of course, that parties travelling from this city should bear the difference in mind, and take care to be at the station ten minutes earlier than the time indicted by the town clocks.[20]

It was up to individual residents to work out which clock showed which time if there was just a single minute hand and if they had a watch or clock that kept time accurately, they needed to decide which time it would keep. It became a matter of opinion on what was the 'real' or 'true' time and most seemed to consider local time to be 'true', but adopted Greenwich Time from practical necessity. For a city that considered itself to be a leading maritime port, dependent upon trade and communications, Bristol was slow to adopt uniform time, preferring to retain both times initially. An additional hand was added to the public clock in Bristol's Commercial Rooms in 1844, for example, in order to accommodate both times, rather than implement the single, uniform 'national' time.[21] The region's leading ports, including Gloucester, had introduced Greenwich Time by the 1850s. Bristol's laxity in adopting Greenwich Time (as shown by the Ellis map) did not go down well with one reader who wrote to the Bristol Mercury in 1852.

> SIR - An argument used in favour of continuing local time is, that any alteration would seriously interfere with the tidal regulations of our seaports... Yet it is a fact that no disadvantages have arisen from this cause at Newport, Swansea, Southampton, Liverpool or Glasgow... Why should Bristol be behind other large cities and towns in a question as important as time?'[22]

The *Gloucester Journal* considered Bristol's laxity to be 'evil' and 'absurd', and called upon the government to intervene.[23] However, Bristol was not alone in its stance. Loyalty to local time appears to have been more common in the western counties in England who were accused of delaying the national network. It would appear that the further west from Greenwich towards Cornwall, the greater the resistance. The *Exeter Flying Post*, for example, considered standard time to be 'an absurdity' and listed Plymouth, Falmouth and Exeter as some of the towns who resisted the change.[24] This may indicate the impact of distance upon some local mentalities in line with Tobler's Law. One Welsh newspaper noted that

[20] *Gloucester Journal*, 4 December 1847.
[21] *Taunton Courier*, 24 July 1844.
[22] *Bristol Mercury*, 20 March 1852; *Bristol Times and Mirror*, 20 March 1852.
[23] *Gloucester Journal*, 20 December 1851.
[24] *Exeter Flying Post*, 1 January 1852.

> The electric telegraph is now complete to Plymouth. By the agency of the electricity a "National Time," Greenwich time, has been adopted in the towns near all the trunk lines in the United Kingdom, with the exception of those near the Great Western, Bristol and Exeter, and South Devon railways. If Bath, Bristol, Exeter, and Plymouth were now to adopt Greenwich time, the uniform time system would be complete.[25]

Conflicts were sometimes played out over which time should take precedence. For some years, local publicans operated local times for their opening and closing leading to prosecutions and fines, some of which were later revoked on appeal as local time was upheld. However, despite differing rulings by magistrates on what 'time' to use, there was a tendency for local magistrates to favour local time, In 1875, for example, Barnstaple local magistrates ruled in favour of local time 'so that they (publicans and police) might know in all cases brought before them the Bench should be governed by the town clocks of Barnstaple, as they were not bound to follow Greenwich Time.'[26] The statement from the magistrates implied that Barnstaple's clocks followed local time, rather than Greenwich, but in the same edition of this newspaper, a letter was published from a local publican arguing for Greenwich Time. The confusion over 'which time?' appears to have been resolved by the 1880s, probably as a consequence of the Definition of Time Act which required that any 'expression of time' must be taken as Greenwich Time. However, Greenwich as the arbiter for measured time was to be challenged in the courts later in the century by the bicyclists' lobby.

From the 1880s, bicycles and tricycles enjoyed considerable and increasing popularity as a means of transport and for leisure, as well for professional sport. *Baedeker's* review of sports and pastimes in 1890 considered that cycling 'prospers to an amazing degree in Britain where it is estimated that there are about 500,000 cyclists, men and women, while about 50,000 hands derive employment, directly or indirectly, from the manufacture and sale of bicycles and tricycles.[27] *Whitaker's Almanack* did not mention cycling as a sport or a leisure activity in its 1869 edition, but listed it as a major sport in the 1899 edition. The National Cyclists Union (NCU) founded in 1878 was made up of amateur and professional cycling clubs with a membership of 70,000 in 1899, while individual cyclists could join The Cyclists' Touring Club (CTC), also founded in 1878 initially as the Bicyclists' Touring

[25] *Cardiff Times*, 21 August 1852.
[26] *North Devon Journal*, 18 February 1875.
[27] *Baedeker's Great Britain 1890: A Handbook for Travellers* (Moretonhampstead: Old House Books), p. xxv.

Club.[28] The change of name in 1883 reflected the popularity of tricycles and it became common in the 1880s to refer to 'cyclists' to encompass both bicycles and tricycles. The CTC was active in promoting the interests of cyclists and had a number of successes in securing access to royal parks for cyclists (1885) and the right to use roads with cycles being defined as 'carriages' (1888). In 1899 the CTC turned its attention to the time for lighting up cycles after dusk. The Local Government Act of 1888 specified that lighting-up time for cyclists was one hour before sunrise and one hour after sunset - the question that this posed, however, was 'what time was sunset?' which the Act did not define.[29] Was 'sunset' the setting of the sun, wherever the sun happened to be relative to the observer, or was it 'timed' by Greenwich irrespective of the observer, or, in this case, the cyclist? The CTC argued that the time at dusk was locally determined, rather than by Greenwich, for it was the setting of the sun that determined dusk. Sunset was also affected by the seasons as a correspondent to the *Gloucester Citizen* pointed out.

> In your paper published at Gloucester you give the lighting up time for drivers and cyclists, the same as that of the London papers. It may be pointed out that owing to differences of longitude and latitude this is hardly correct... As to Gloucester we may allow from Greenwich time from six minutes in December to twelve minutes in June. So when London papers say "light up at 9.19" we need not light up until 9.31...[30]

By the 1890s, there had been a series of conflicts between police and cyclists in the region, mostly played out with good humour on both sides, not only over lighting up times, but also over the speeds at which cyclists used public highways. Prosecutions of cyclists for a variety of transgressions were common by this time. The debates and legal judgements over clock times reflected a growing importance of knowing what the 'right' time was, but it also reflected a fascination with the nature of measured time. 'Railway time' proposed altering the 'natural' way of measuring time and led to great debates in the correspondence columns of newspapers as well as in editorials. Potential contradictions between the 'real' time and Greenwich Time were exposed by astronomical events such as tidal flows and the clock times at sunset and sunrise.

[28] Whitaker, *Almanack 1869*; Whitaker, *Almanack 1900*, pp. 644-647.
[29] *Bristol Mercury*, 25 July 1898.
[30] *Gloucester Citizen*, 4 August 1898.

Figure 39 Police v. Cyclists[31]

Published tide tables and times for lighting-up bicycles and vehicles usually showed local and Greenwich Time for the same event. Like most newspapers, The *Western Daily Press* hedged its bets by giving lighting-up time in May 1899 as 8.47 pm for Greenwich Time and 8.57 pm for Bristol time and cyclists could take their pick and run the risk of prosecution if they elected for Bristol time.[32]

For cyclists, the legal battleground between Greenwich and local time was played out in Bristol where a local cyclist, Mr. George Gordon, was riding his bicycle with his wife at 8.15 p.m. without lights on August 19th 1899 and was requested by a P. C. Robinson to light up his bicycle. Mr, Gordon declined, stating that lighting-up time in Bristol was 8.20 p.m. and not 8.13 p.m., the latter being the view of the police officer. Mr. Gordon subsequently wrote to the Chief Constable stating that he intended to continue to observe Bristol time and invited the Chief Constable to summons him. In its reporting of the case, the *Bristol Mercury* headlined its report as 'Greenwich v Bristol Time' in setting out the lines of engagement between central and local authority.[33] The Chief Constable, Superintendent Cann, duly issued the summons, stating that 'the summons was issued with no vindictive feeling but only to settle the point. The police had adopted the Greenwich time, and they desired to know whether they were right or not.' The Cyclists' Touring Club had engaged a Mr. Gilmour to conduct the defence who argued that the 1888 Act regarding the 'time' at sunset:

> referred to the time of the clock, not to the time of the day... the Act meant one hour after the actual setting of the sun in the particular portion of the country where the cyclist was riding, and it was never intended at all that it should be that particular time when the sun was setting on the east coast of England.[34]

Mr. Gilmour had separated 'time' from that shown by clocks. In the counter argument, the prosecution took the view that 'sunset' was 'an expression of time' and

[31] *Bristol Magpie*, 14 May 1892.
[32] *Western Daily Press*, 18 May 1899.
[33] *Bristol Mercury*, 10 September 1898.
[34] *Bristol Mercury*, 10 September 1898.

therefore was covered by the Act which stated that an expression of time had to be Greenwich Time, and this view was upheld by the court.[35]

The Cyclists' Touring Club appealed the decision 'in order to settle whether the Local Government Act refers to Greenwich Time, or if deductions were to be made according to the longitude and latitude of the different towns.' The Club had consulted a Mr. Glen, described as an expert on highway law, who was clear that the 'time' was determined by the setting of the sun and not Greenwich, and which was the basis of the appeal.[36] The case was heard in January 1899 by the High Court which upheld the views of the Cyclists' Touring Club that Greenwich did not determine when the sun rose and set and that the Act specified a time period (one hour) before sunrise and after sunset but did not specify what time these events occurred. As the correspondent to the *Gloucester Citizen* had pointed out, there was no set time delay between Greenwich and Bristol. It depended upon the seasons and could vary from seven minutes to ten minutes. The decision was widely reported in the region's newspapers and the extensive coverage was an indication of the growing popularity of cycling, and of the power of the Cyclists' Touring Club, as well as the fascination with time and resistance to a distant authority. The *Weston Mercury* gave the definitive position for the benefit of cyclists.

> For many years, riders have been in doubt as to the legal time for "lighting up", some believing Greenwich time to be the standard, while others maintaining that it should be an hour after the sun sets in the district where the wheelman may be. The latter has been ruled to be correct... The (Divisional) Court decided that... as sunrise and sunset meant the time of those events in that particular locality where the cyclist happens to find himself.[37]

The *Bristol Mercury* could hardly contain itself in reporting the judgement.

> Bristol is not the only place in which magistrates may harbour a notion that sunset at Greenwich is identical in point of time with sunset, let us say, at Timbuctoo. Mr. W. Gordon, of Bristol, being accused of the heinous offence of riding a bicycle after sunset, without a light, wanted to know whether it was the Greenwich sunset or the Bristol sunset that was implied.... How nice it would be if there were one generally accepted time for lighting! Yes, but unfortunately the earth is round, and its axis is, moreover, inclined at an angle of some three and twenty degrees from a perpendicular drawn to the plane of its orbit... The law was made not to annoy cyclists, but to protect the public, and the judges took that view and allowed Mr Gordon's appeal.[38]

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[35] *Bristol Mercury,* 10 September 1898.
[36] *Carmarthen Weekly Reporter*, 20 January 1899.
[37] *Weston Mercury*, 11 February 1899.
[38] *Bristol Mercury*, 28 January 1899.

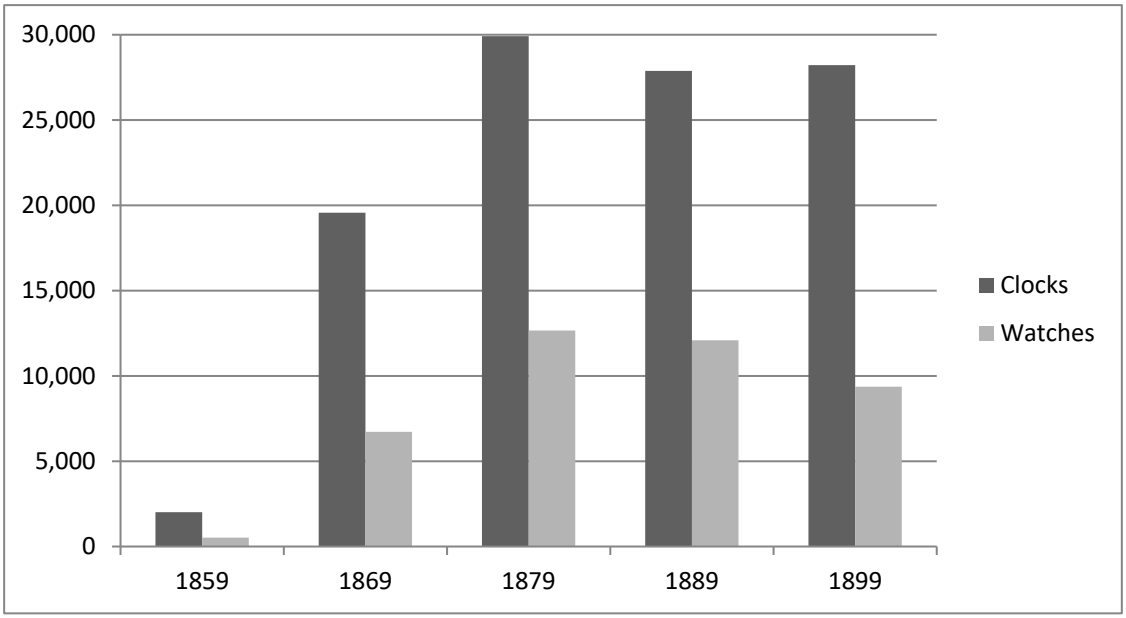
The newspaper had initially set out its stall over the issue by interpreting it as a confrontation between Bristol and Greenwich and the judgement was taken as a victory for Bristol. Its tone in reporting the results of the case indicated something about Bristol and the reasons why cities like Bristol, Bath and Exeter delayed in adopting 'Greenwich' time. Bristol had experienced a relative decline in its power and prestige since the eighteenth century. Bristol's Merchant Venturers Company had opposed the monopoly of London's Royal Africa Company established by the Stuart monarchy which favoured London merchants in African trade and the counties of Gloucestershire and Somerset had been active in Monmouth's rebellion and the 'revolt of the west'. Bristol may have had an ambivalent attitude toward the 'metropolis', and the victory of 'Bristol time' was one way of asserting its identity.[39]

Telegraphy: telling the 'right' time

The issues surrounding the measurement of time and its accuracy as shown by time-pieces persisted into the twentieth century.[40] The acceleration in the advertisements for time-pieces in the region's newspapers from the 1860s reflected the growing importance of time in everyday life. The advertisements for clocks and watches in the selected newspapers in the region shown in the following graphs demonstrate a substantial increase from the 1860s onwards (see Figures 40-42). Data is shown by decade and, for example, '1859' represents the decade 1850-1859. The *Western Daily Press* was a daily newspaper covering Bristol and the western counties of England and therefore the number of advertisements was significantly greater than in the weekly newspapers. The increase in advertisements more closely follows the advent of railways and increasing urbanization (see Figure 40). The demand for watches probably reflected the increasing mobility of the population as rail travel underlined the importance of time as shown by clocks.

[39] Patrick McGrath, *The Merchant Venturers of Bristol: A History of the Society of Merchant Venturers of the City of Bristol from its origin to the present day* (Bristol: Merchants Hall, 1975); Minchinton, 'Bristol: Metropolis'.
[40] Gay, 'Clock Synchrony'; Hunt, 'Early Cable Telegraphy'; Hunt, 'British Electrical Debate'.

Figure 40 Advertisements for clocks and watches in the *Western Daily Press* by decade, 1850-1899



The increased focus upon time-keeping and punctuality from the 1860s onwards was clearly an aspect of increasing social discipline during the nineteenth century and as David Rooney has pointed out, time-keeping was a form of Victorian regulation but which presented difficulties in two aspects: knowing what the actual 'time' was, but also knowing whose 'time' was to be kept.[41] The 'industrialization' of time is not supported by the number of advertisements for clocks shown in Figures 41 and 42. Bristol during this period had the greatest population but far outstrips 'industrial' Cardiff or Swansea for clock and watch advertisements. Advertisements in the *North Devon Journal* were at a similar level to those in the *Cardiff Times*. This suggests that the importance of measured time was shared across the region.

[41] Rooney and Nye, 'Networks of Regulation'; R. A. Church, 'Nineteenth-Century Clock Technology in Britain, the United States, and Switzerland', *The Economic History Review*, New Series, 28.4 (1975), 616-630.

Figure 41 Advertisements for watches in selected newspapers by decade, 1830-1899

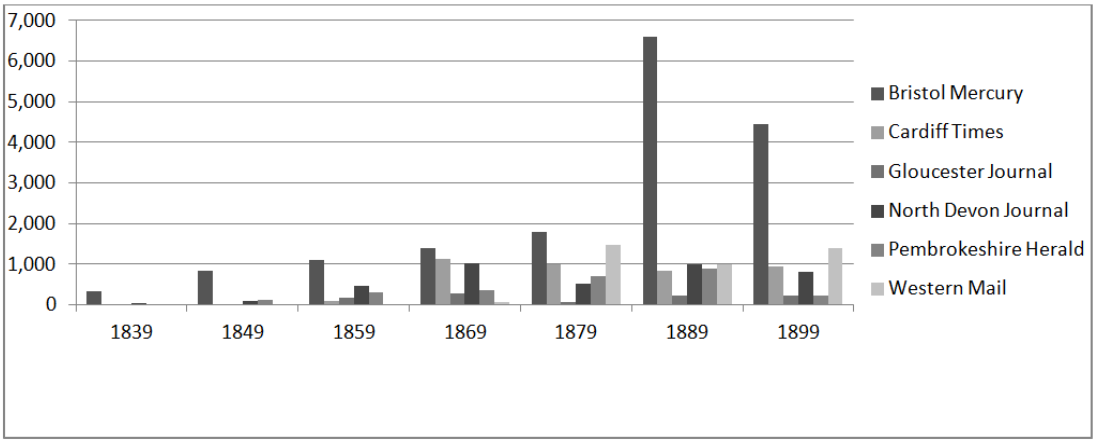
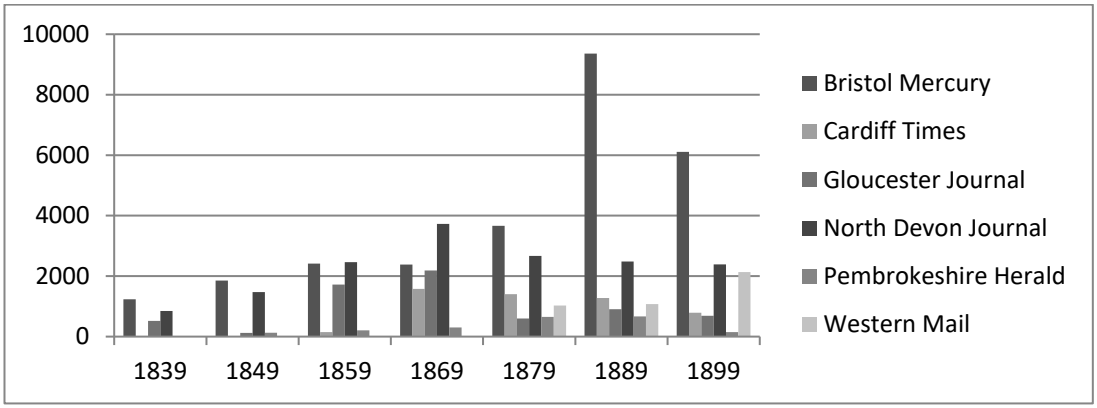


Figure 42 Advertisements for clocks in selected newspapers by decade 1830-1899



The management of clock time was a novelty and a subject for curiosity and amusement, but it also had a serious aspect with the attempt to standardize time uniformly throughout Britain by the adoption of 'railway time', synchronized with the time at Greenwich Observatory. The adoption of standardized time was a convenience for railways and passengers, but had no legal authority until 1880 with the passing of the Definition of Time Act which established two formal time zones within the British Isles, one at Greenwich and the other at Dublin.[42] It was important for the railways, in concert with the Astronomer Royal at Greenwich, to implement Greenwich Time nationally using the electric telegraph network to synchronize time and make railway timetables practical. It was envisaged that the time of one o'clock in the afternoon would be transmitted along the network to post offices which would

[42] Definition of Time Act, 1880. Joseph Myers <https://www.polyomino.org.uk/british-time/1880c9> [accessed 13 April 2017].

then alter their clocks and give the 'true' time for the local population. The intended process launched in 1847 was described by the *North Devon Journal*.

> It is now the daily practice, at one o'clock, to indicate the true time by dropping a ball from the upper part of the (Greenwich) observatory... which should strike a ring, which, connected with various lines of electric wires of the Company, will instantly strike a bell at every station... in this way, the true time at Greenwich may be kept by every Railway Company and every large town in the kingdom.[43]

Irrespective of issues relating to what time to use, the other significant challenge presented by clocks was their accuracy, or lack of it, whether they purported to show local or Greenwich Time. Even if Greenwich Time could be shown precisely in a telegraph office or post office, there was no reliable method of communicating this time across urban areas and in rural areas the problem was multiplied if there was no easy access to the telegraph. Evidence suggests that time-pieces were unreliable at least until the early twentieth century and needed to be corrected regularly. 'Tempus' proposed in 1891 that Cardiff should have a time-gun as a means of updating time for residents.[44] Two potential solutions were suggested late in the nineteenth century as a means of communicating time accurately to residents. One was the funding of public clocks that chimed and were illuminated and the other was a time-gun connected electrically to the Greenwich time ball and 'fired' at a set time, or connected to a local observatory. The experience of communities in Swansea and north Devon in attempting to provide public clocks as a means of communicating time reflected experiences more generally in the region, and Swansea's attempts to use a time-gun for the same purpose was a unique experiment for the region. However, the search throughout the region for a reliable means of communicating time was principally through public clocks which became a feature in the late nineteenth century of the built landscape in town and country.

The growth of timetables later in the century and increasing rates in the ownership of clocks and watches pointed to the importance of time in everyday lives.[45] However, telegraph offices in post offices showed little interest in communicating Greenwich to the local populace. The post offices later in the century tended to be extensive buildings performing a central role in public and corporate communications and were envisaged from the 1840s as the means for

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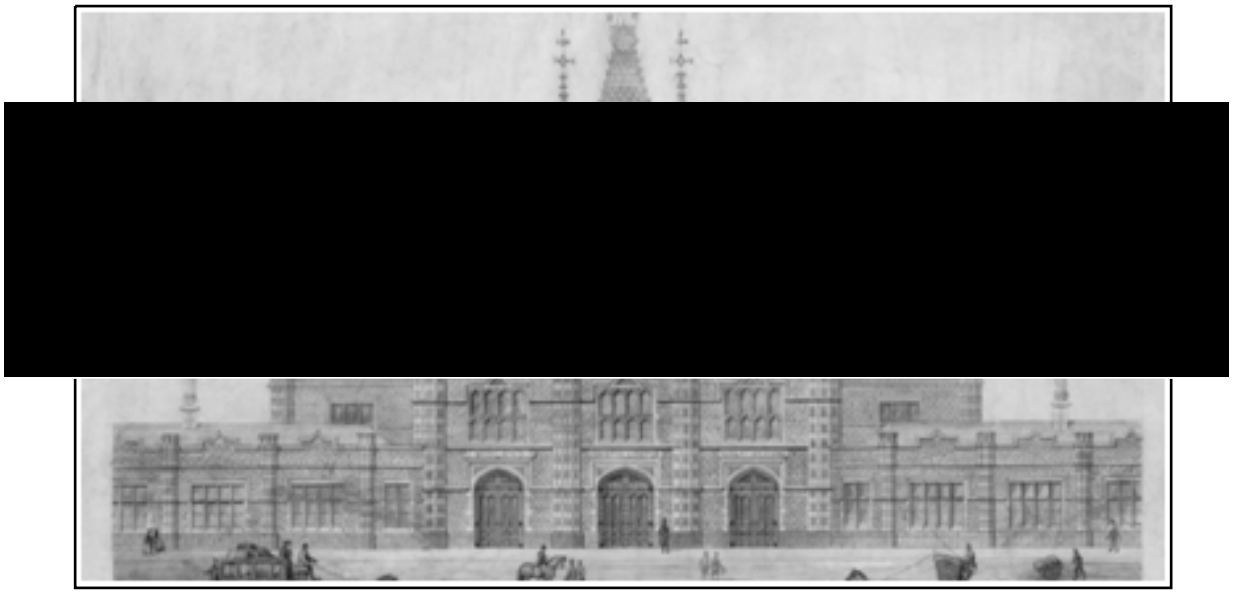
[43] *North Devon Journal*, 19 August 1847.
[44] *South Wales Daily News*, 29 August 1891.
[45] Paul Glennie and Nigel Thrift, 'Clock Times in Medieval and Early Modern Bristol', in Glennie and Thrift, *Shaping the Day*, pp. 100-134; *Western Daily Press*, 19 June 1882.

communicating accurate uniform time throughout the nation. The Cardiff post office of 1897 was a grand building, not untypical of post offices at this time, but lacked a public external clock.[46] 'J. L.' had made the same point in 1876 in appealing for a public subscription to install a public clock in Swansea's post office.[47] Post offices did not take time-keeping seriously despite their strategic role in communicating Greenwich Time which reflected a lack of urgency by both the local and national state in communicating accurate time. The main thrust for accuracy in a uniform, standardized time came principally from railways and Greenwich Time was known commonly as 'railway time'. The railways' use of the telegraph was not reflected in the practices of the post offices and it was probably railways that pioneered the innovation of the public clock as a means of communicating nationalized time and thereby making their timetables useful.

In contrast with post offices, railway companies took time seriously and invariably incorporated an illuminated public clock tower in their stations (see Figure 43). The railway station provided the most reliable source of Greenwich Time because trains ran according to Greenwich timetables. The Temple Meads station in Bristol opened in 1878 which was a mock Tudor structure, similar to Paddington. The central clock tower was a striking feature of the design, demonstrating the importance of time to the railway companies and each clock face was eight feet in diameter. Apart from the Tudor facade, the style of Bristol Temple Meads was replicated in stations across the region, each with a clock tower and prominent clock.[48]

[46] *E*vening Express 9 April 1897.
[47] *The Cambrian*, 30 June 1876.
[48] Network Rail <https://www.networkrail.co.uk/who-we-are/our-history/iconic-infrastructure/the-history-of-bristol-temple-meads-station> [accessed 5 February 2017].

Figure 43 Bristol Temple Meads Railway Station and Clock Tower



In the absence of any concerted effort by public authorities to communicate Greenwich Time accurately, communities were left to their own devices in seeking solutions and the most common response was to construct clocks accessible to the public, often using discrete clock towers, or incorporated into existing buildings such as churches, or in new buildings such as markets, hospitals and libraries. The funding of an illuminated public clock in St. David's Church in Swansea in 1871 by a Mrs. Jenney Morgan, for example, was not an unusual example of civic philanthropy and the town expressed its gratitude to Mrs. Morgan which in this case involved the presentation of an embossed parchment.[49]

When the Abergavenny Market Buildings were opened in October 1871 provision was made for a public clock with an appropriate clock tower, but without the clock which was provided by a local resident.[50] Residents in Swansea launched a subscription to provide a clock in the tower in memory of Pascoe St. Leger Grenfell (1798-1879) 'who during his lifetime did so much for his fellow citizens and to develop the industries of the district. The clock will have four dials. It will be placed at a height of 100 feet...'[51] Grenfell was a copper magnate, a member of the Grenfell family who originated in Cornwall, public benefactor and Liberal M.P. for Swansea. Celebrations of the Queen's Jubilees in 1887 and 1897 were often marked by launching subscriptions for public clocks and gifts of public clocks from wealthy

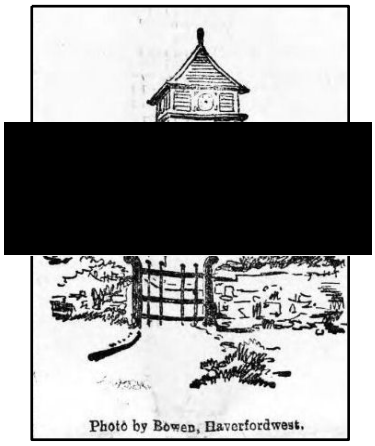
[49] *The Cambrian*, 22 December 1871.
[50] *Cardiff Times*, 14 October 1871.
[51] *South Wales Daily News*, 22 June 1889.

benefactors became a mark of civic responsibility.[52] In Caerleon in 1887, for example, a subscription was launched for a public clock to commemorate the Jubilee and the Prince of Wales was invited to chair the committee.[53] Smaller towns and villages like Caerleon and Talgarth often used the opportunity to raise funds for a town clock and the 'opening' of the clock at Talgarth in 1887 was a cause for celebration.

> Mr J. P. W. Gwynne Holford, of Buckland, set a-going a jubilee memorial clock at Talgarth, which has been erected over the assembly rooms at a cost of something like £150. Much interest was taken in the event, and the streets of the town were paraded by a procession consisting of volunteers, foresters, and the inhabitants generally...[54]

Clock towers were sometimes built as discrete edifices to house a clock as a memorial and provide a public service at the same time. One was constructed in memory of Lord Kensington, a Gladstonian Liberal from Pembrokeshire (see Figure 44).

Figure 44 Kensington Memorial Clock[55]

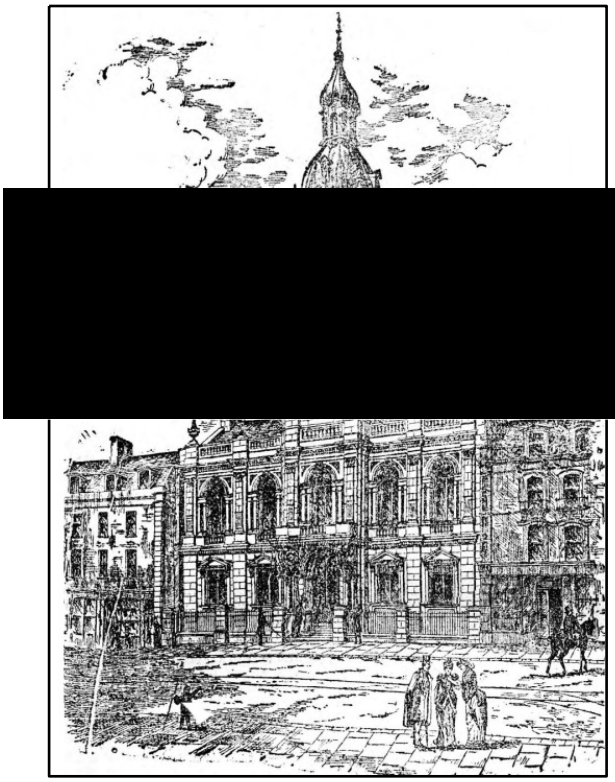


The recognition by public authorities of the value of public clocks was also common, but councillors often declined to use public funds to support public clocks, because of the financial implications, but would make contributions as private residents. For example, in 1887 the Horfield Local Board in Bristol refused an application for £3.00 per annum to fund the Chapel clock, but individual members agreed to contribute to the clock's expenses and ten shillings were collected at the meeting.[56] No town hall worth its name would be constructed later in the century without a clock tower, when the provision of public clocks was usually reliant upon public subscriptions. Town Halls constructed during this period took time seriously and the 'town hall clock' became something of a landmark in the built environment as a point of location within local geography. Newport Town Hall which opened in 1885 was fairly typical of town halls at this time with an imposing clock tower and clock with a number of dials (see Figure 45). There are frequent references in the region's newspapers to the 'town

[52] *Bristol Times and Mirror*, 9 October 1868; *Pembrokeshire Herald and General Advertiser*, 28 January 1887.
[53] *Western Mail*, 3 March 1887.
[54] *Cardiff Times*, 13 August 1887.
[55] *Cardiff Times*, 4 June 1904.
[56] *Bristol Magpie*, 23 April 1887.

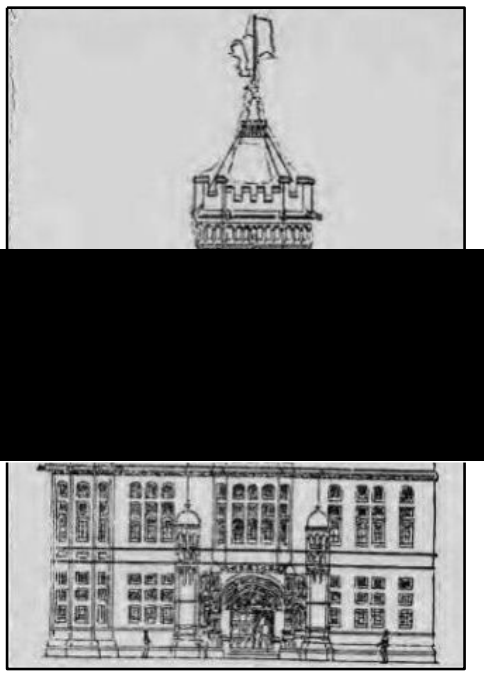
hall clock' as a point of reference. Town hall clocks may be seen as an essential element in the profile of town councils as being at the centre of their communities and as a focus for public interest and benefit. Local councils and boards of health, however, tended to avoid financing other forms of public clocks and it was left to corporate donors, philanthropists, wealthy benefactors and the general public through subscriptions to provide clocks as public utilities. Local Boards of Health usually dealt with issues relating to public clocks as they were empowered under a Public Health Amendment Act 1890 to fund public clocks.

Figure 45 Town Hall Clock, Newport[57]



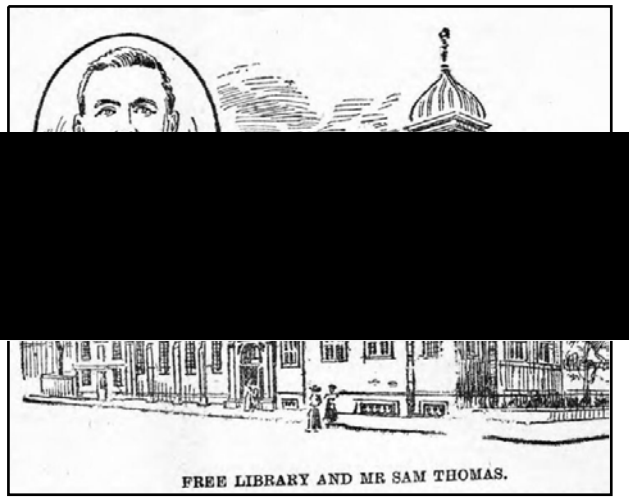
[57] *South Wales Echo*, 24 August 1885.

Figure 46 The Bute Offices Clock Tower[58]



The Bute offices which opened in 1893 in Cardiff were an example of a corporate donor providing a public utility in the form of a clock, which the company constructed and maintained at its own expense. The clock tower was very prominent, given the overall structure, and conveyed a sense of power and authority as well as identifying with the local community and the public good. In a similar vein, in 1882 W. D. and H. O. Wills constructed in Bristol 'a very fine projecting double-dialed clock in front of their large warehouses and manufactory in Redcliff-street. It is intended to record Greenwich Time, and it will be regulated by the electric current.'[59] Free libraries were funded mainly by public subscription, or by wealthy patrons, as were many public clocks, and it was in keeping with their philosophy for these libraries to incorporate clocks in their design as public utilities (see Figure 47).

Figure 47 Penarth Free Library Clock Tower[60]



The practice underlined the importance of public clocks at the end of the nineteenth century and into the early twentieth century as they became a feature of both urban and rural landscapes. Penarth Free Library was funded by Andrew Carnegie and the land donated by Lord Windsor. Sam Thomas was the chair of the Library Committee. The St. Phillips Free Library in Bristol also displayed a public clock in a clock tower.[61]

Clocks were valued as public utilities, but they also became marks of esteem to individuals and it became common-place for important events in individual lives

[58] *Western Mail*, 18 May 1893.
[59] *Bristol Mercury*, 13 March 1882.
[60] *Cardiff Times*, 17 September 1904.
[61] *Western Daily Press*, 26 June 1895.

to be honoured by the presentation of time-pieces, including watches. The presentation of a gold watch made by the staff of the Somerset Manufacturing Company to Mr. Samuel White was not unusual.

> They wished to show their regard for him and their pleasure at his restoration to health... and in a very short time the sum of £50 was collected ... With this amount a splendid gold English lever watch, Albert chain, and gold sovereign purse were obtained...[62]

Clocks and watches were often presented to individuals or couples to mark engagements, weddings, retirements, promotions and other noteworthy events in the lives of individuals.[63] Such presentations reflected the growing importance of time and its measurement and, consequently, the value placed upon time-pieces. Personal time-pieces were also prized for their aesthetic value as jewellery and as household features and this was reflected in the public sphere as public clocks were seen as enhancing local architecture and public spaces, as well as being of practical value in everyday lives.[64] The practice endured well into the twentieth century and beyond.

Despite evidence that accurate clock time was becoming more and more important in daily life, and more and more intrusive in the personal and public domains, accuracy in time-keeping was elusive. Inconsistencies in nationalizing clock time continued throughout the century. The rather simplistic descriptions of the Greenwich time ball sounding throughout all telegraph offices at 1.00 p.m. thereby ensuring that the national, 'true' time was shown everywhere became more of an aspiration than a reality. It appeared that problems of synchronizing time had persisted to such an extent that in 1870 a similar system was being proposed that had been proposed in 1847.

> Greenwich time is telegraphed daily to all telegraph stations in England, Scotland and Wales. Dublin time will be telegraphed all over Ireland in the same way; and the Post-office clocks will be regulated by these telegrams... and it is hoped that the Post-office clocks will be better regulated under the new arrangement than they have been under the old one.[65]

The time would be set at 10 a.m. and telegraphed to all post offices which the *Cardiff Times* hoped would:

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[62] *Taunton Courier*, 14 June 1893.
[63] *Cheltenham Journal*, 23 November 1892; *The Cambrian*, 3 December 1909; *Gloucester Journal* , 3 April 1875; *Monmouthshire Merlin*, 21 November 1879; *Pembrokeshire Herald and General Advertiser*, 7 October 1887; *Western Daily Press*, 10 July 1893.
[64] *Cardiff and Merthyr Guardian*, 21 December 1867; *Cardiff Times*, 14 October 1871; *Western Mail*, 18 May 1893; *Weston-super-Mare Gazette*, 16 April 1898; *The Welshman*, 20 March 1886.
[65] *Taunton Courier*, 5 January 1870; *Pembrokeshire Herald and General Advertiser*, 14 January 1870.

> end the dispute which necessarily arises in so many places as to which shall be regarded as the standard of time—the railway station clock, the post-office clock, the parish church clock, or the town clock. The clocks at the new post-office at Cardiff, will be regulated at 10 o'clock every morning.'[66]

However, the issues facing the public in knowing the time were not simply that different clocks showed different times, but that they showed different times for both local and Greenwich Time. Two or more clocks reputing to show Greenwich Time would show different times. The *Weston Gazette* displayed the fatalistic humour often shown by newspapers when it came to time and its accuracy in its account of two birds trying to find the right time in Weston. The Emmanuel Church clock, the station clock, the Parish clock and several clocks on display in the shops of watchmakers all told different times. They met a third little bird who advised them not to try and find the true time in Weston. but to keep two watches - one that synchronized with the post office clock 'as not to lose the post, and another to tally with the Station clock, so never to miss the train.'[67]

Problems with accuracy in timekeeping were reported across the region and with increasing frequency as the century progressed. The reports, combined with the letters columns in newspapers, gave a strong indication of the importance of public clocks in indicating accurate time to local inhabitants while towns and villages not connected to the telegraphic network were in a particularly difficult position. Maintaining accurate clock time according to Greenwich was very difficult if they were not connected to a telegraph.[68] The newspapers for Bristol and Gloucester lacked the debates around public clocks and time-keeping evident in other newspapers in the region, although the newspapers clearly identified issues around clocks that were experienced throughout the region. 'One Who Would Be Punctual' in a letter to the *Western Daily Press* in 1867 wished to draw attention to

> one of Bristol's great wants, viz., the necessity for having a public clock that can be depended upon. In almost every town and city throughout the country there is a town clock, several of which are in electrical communication with Greenwich. Surely the "Metropolis of the West" ought to have a town clock... [69]

[66] *Cardiff Times*, 8 January 1870; *Taunton Courier*, 4 January 1870; *Bristol Mercury* 8 January 1870.
[67] *Weston-super-Mare Gazette*, 29 July 1876.
[68] *Cardiff Times*, 27 December 1879, 28 May 1887, 7 September 1907; *Gloucester Citizen*, 26 August 1871, 18 September 1880, 25 July 1896.
[69] *Western Daily Press*, 9 March 1867.

By 1873, and after the second system of regulation by telegraph was to have been implemented, problems persisted. According to one editorial in the *Western Daily Press*, some Bristol clocks were still keeping local time (inaccurately) and the Greenwich clocks did not synchronize.

> Does anybody in Bristol know what o'clock it is? Paterfamilias sets his watch by the clock at the Exchange and on arriving at the railway station he finds that he is three minutes late... If he takes his time from the clocks at the station he is wrong when arrives at Bristol Bridge.

Even if 'Paterfamilias' had had an accurate time-piece, there was no way of telling which public clock was correct by which to set the time. 'Some of them apparently keep local time, others keep Greenwich time; and the result is that they strike the hour on independent principles.'[70]

The electric telegraph was completed to Taunton in July 1852 and the *Taunton Courier* looked forward to the adoption of standard Greenwich Time throughout the west country, and expected 'to hear that all the towns connected with the lines of the Great Western, Bristol and Exeter, and South Devon Railways, will also adopt Greenwich Time.'[71] The *North Devon Journal* expressed similar hopes but reported from the 1850s onwards problems in smaller towns and villages, in particular, on issues relating to accurate time-keeping of public clocks. Problems were reported in South Moulton, Torrington and Barnstaple during 1854 and in a letter to the newspaper in November 1854, the correspondent 'Christopher Chronos' outlined the problems in South Moulton. He pointed to the importance of public clocks because of a need to regulate personal clocks and watches on a daily basis.

> SIR - If our Town Clock goes "like a new one", the sooner we barter it away for some old trudger more acquainted with the rounds the better. Between Thursday and Saturday morning last, the fellow started ahead ten minutes, then finding he had, like the cavalry at Balaklava, charged the minutes too far advanced, he beat a retreat and has long since been trying to find the true equation.[72]

By the 1860s, Barnstaple was using Greenwich Time, but with allowances being made for local time. In the *North Devon Journal*, the railway timetable showed standard time along with the tide table but with the rider that if the reader wished to know the local time to subtract seventeen minutes from the time shown.[73] There was a continuing debate about opening and closing times for taverns. In 1867

[70] *Western Daily Press*, 14 July 1873.
[71] *Taunton Courier*, 18 August 1852.
[72] *North Devon Journal*, 23 November 1854.
[73] *North Devon Journal*, 15 September 1864.

the newspaper reported on a decision in Liverpool to use local time for publicans and in 1872 a letter to the newspaper questioned whether Greenwich Time was legal.[74] In 1875, the *North Devon Journal* printed a letter from a local publican which stated that local time was 'true' time, but the public clocks kept Greenwich Time and it is this time that should be observed. The publican made a distinction between what the 'true' time was i.e. local time and Greenwich Time which, by implication, was not the actual time in Barnstaple, but which needed to be followed regardless.[75]

Problems in the village of South Moulton continued throughout the century. In October 1878, a correspondent wrote to the *North Devon Journal* implying that the town clock was unreliable and as the church clock was 'worn out... No funds are forthcoming to purchase a new one; so we are in a fix as to time on the borough of South Molton.'[76] In the same month, it was reported that the town council had agreed that the town clock would be illuminated but in January 1888, the clock had not been illuminated 'and there is considerable grumbling thereat'.[77] On 8 March 1900, the newspaper reported that the town council agreed to illuminate the clock but it remained without illumination three years later.[78] In June 1903, a tender was accepted to illuminate the clock and the town clock in South Moulton was finally illuminated in October 1903.[79]

However, problems with public clocks were not limited to rural areas. As late as the 1890s, fifty years after the initial expectation that the telegraph would regulate Greenwich Time nationally, Taunton residents were expressing frustration at the inconsistencies shown by public clocks and their apparent inability to show the correct time. These frustrations stimulated some debate in the correspondence columns of the *Taunton Courtier*. The debates in Taunton continued well into the twentieth century. In 1907, a correspondent, 'Greenwich', suggested the equivalent of a 'time-gun' to sound at an agreed time daily in order to synchronize Taunton's clocks.[80] Two weeks later there was a response from another resident, 'Punctuality'.

> l was very much pleased to see a recent issue of the ''Courier" a forcible plea for the obtaining of Greenwich time in our borough. Unfortunately, at the present time, one is in a dilemma as to which of the various clocks one sees in the town has the right time.

[74] *North Devon Journal*, 16 December 1869 and 4 January 1872.
[75] *North Devon Journal*, 18 February 1875.
[76] *North Devon Journal*, 31 October 1878.
[77] *North Devon Journal*, 27 October 1887 and 5 January 1888.
[78] *North Devon Journal*, 8 March 1900 and 19 February 1903.
[79] *North Devon Journal*, 11 June 1904and 15 October 1903.
[80] *Taunton Courier*, 27 February 1907.

'Punctuality' suggested regulating clocks without using a fire siren, preferring to regulate the clock in the Parade 'and if all the clocks in the town, both public and private, were in keeping with this one there would not be the uncertainty as to the correct time as there is at present.'[81] In the same edition of the newspaper, 'Correct Time' also responded to 'Greenwich' who did not support the ideas of a siren, suggesting a peal from St. Mary's bell tower. 'At all events, I should like to have Greenwich time daily, as most of our public clocks are deceitful in their announcements... A correspondent suggests an electric gun! Not a bad idea.' There was also a plea from the district of Rowbarton in the north of Taunton for accurate public clocks, pointing out that the clock in the former prison could not be seen because of the high walls and 'can only be heard according to the direction of the wind'. 'Old Humphrey' supported the notion of regulating the clock at St. Andrews Church and because of its proximity to the railway station clock, 'there would be no difficulty in keeping it from telling falsehoods!'[82]

In 1911, Taunton opened its new post office which prompted further debate on public clocks. The *Taunton Courier* reported that the town council would contribute £10 towards the estimated £60 for the installation of a double-faced clock outside the post office which would 'set the correct time every morning and they would have the advantage of one reliable clock.'[83] The Taunton clock would be electrically lit and controlled to show Greenwich time and sometimes town councils or local health boards contributed to the costs of public clocks, raising the remainder from public subscription. Although they were empowered to provide reliable public clocks, very few did so and it was common practice that these were funded by voluntary donations with possibly contributions from public authorities. As in this case with Taunton, individual councillors often made personal contributions.

The *Taunton Courier* warmly welcomed the new clock as meeting 'a long public want' due to the previous variance of public clocks that made it difficult to ascertain the correct time. The newspaper expressed pride in the fact that Taunton had the first post office in the west country with an electrically controlled clock which did not require winding and which, in turn, was connected to a further fourteen clocks in the post office controlled by the 'master' clock. Taunton was deemed 'a pioneer in matters electric.' The clock did not chime and it was suggested

[81] *Taunton Courier*, 13 March 1907.
[82] *Taunton Courier*, 19 June 1907.
[83] *Taunton Courier*, 11 January 1911.

that the post office clock be connected to the clock at St. Mary's church which did chime 'which would be an immense advantage to those living within the sound of the chimes and the striking of the hours, and would obviate the necessity of visiting North-street to ascertain Greenwich time'.[84] On 31 May 1911, 'True Greenwich' welcomed the clock and supported the proposal of connecting the clock with St. Mary's - 'the striking of the hour and the chiming of the quarters would prove an immense advantage to all those within hearing, who would thereby be able to adjust their watches and clocks without paying a visit to North-street.'[85] A second correspondent's letter published on the same day supported synchronization between the post office clock and St. Mary's clock:

> it is very confusing to have one clock indicating one time and another different. People going to work do not know which clock to go by, and the outcome is much inconvenience is caused. Many people set their watches by the St. Mary's chimes, with the result that they find they are wrong when they come to look at the Post-office clock.

The electric clock, however, was not without its problems. In a letter to the newspaper, A. D. Crossman complained that the clock was not illuminated from 5 p.m. until 8 a.m. and during that time 'the clock is useless to the public. In fact it is worse than useless, it is a nuisance for one looks for the time and can't see it.'[86]

Issues around the accuracy of clocks and the implementation of standard time throughout the Bristol Channel region were not confined to rural areas like north Devon but were experienced in similar ways in urban, industrialized south Wales. The correspondence columns of *The Cambrian* recorded the tribulations of Swansea's public clocks in the latter half of the nineteenth century. In 1876 Swansea's post office had a clock tower, but no clock and a correspondent made an appeal to raise the estimated £200 for the purchase of a reliable clock because 'the Market, Castle, and Brewery Clocks are so erratic in their movements that no one desirous of catching a train would dream of depending on the time of one or the other..'[87] In November, another correspondent, 'Tempus', pursued the same theme, requesting that the newly-elected mayor could provide an illuminated clock in the post office tower which would chime half and quarter hours. 'We are wretchedly off in Swansea for public clocks keeping correct time, whilst we cannot boast one which

[84] *Taunton Courier*, 24 May 1911.
[85] *Taunton Courier*, 31 May 1911.
[86] *Taunton Courier*, 15 November 1911.
[87] *The Cambrian*, 30 June 1876.

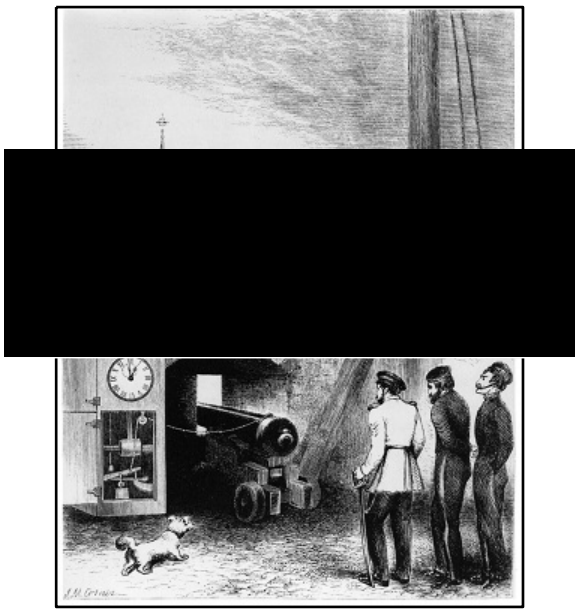
is illuminated, and which chimes...'[88] The appeal failed to raise sufficient funds for the clock and what had been raised was donated towards another effort to provide a public clock at Swansea's hospital.[89]

Towards the end of the century, an appeal to install a clock in the newly constructed tower at St. Mary's church produced a significant response in a short time and this appeal underlined the unreliability of public clocks, even at the end of the century. As one correspondent put it,

> Swansea is most unfortunately placed in regard to public clocks. There is not one which can with any truth be said to be absolutely reliable. Indeed, the clock at the Post Office in Temple-street is responsible for much that is naughty in men's minds and speech. Swansea needs a new public clock, one that can be relied upon in all weathers, and that can be seen from east, north, west and south.[90]

In an attempt to surmount the considerable technical difficulties in communicating Greenwich Time prior to the electrification of clocks and wireless telegraphy, some towns and cities experimented with time-guns as a means of communicating time across an urban area. A time gun was a conventional cannon which was electrically connected to an observatory. In Edinburgh, the observatory would send an electrical impulse to a clock which triggered a mechanism attached to the gun which would then fire at set times (see Figure 48).[91]

Figure 48 Edinburgh's Time-Gun, 1861



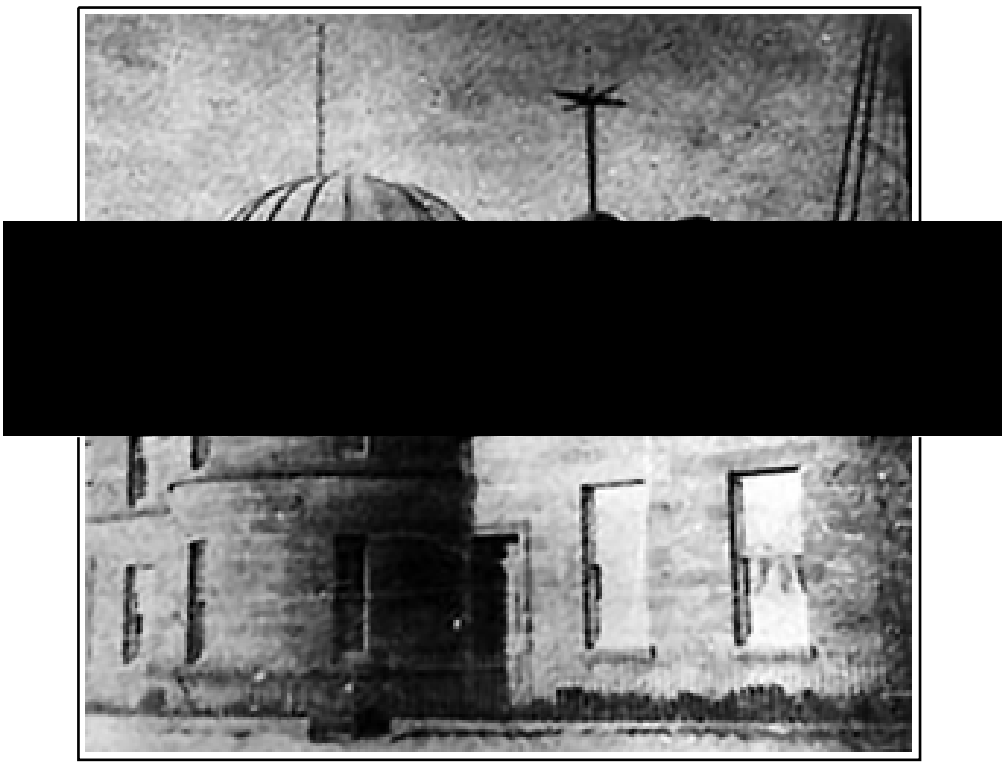
[88] *The Cambrian*, 17 November 1876.
[89] *The Cambrian*, 28 November 1879.
[90] *The Cambrian*, 3 December 1897.
[91] The One O'Clock Gun <https://www.1oclockgun.org.uk> [accessed 23 November 2017]; *Illustrated Usk Observer*, 2 February 1861.

Time guns were used at Greenwich, Liverpool, Glasgow and Edinburgh, each with its own observatory which would trigger the gun.[92] Cardiff had used a time ball similar to the time balls at Greenwich and Liverpool which was lowered at 1.00pm to signal the time, but it was not connected to a gun, and therefore was entirely visual and dismissed as having little public value.[93] Swansea was unusual in experimenting with a time gun because it lacked an observatory and depended upon the electrical connection with Greenwich, although Bristol, Taunton and Newport as well as Cardiff also considered using a time-gun.[94] However, by 1879, Glasgow had implemented an electrical system which linked one hundred clocks using twenty miles of wire that were synchronized daily at 10.00 a.m. from the Greenwich signal. Glasgow had demonstrated that such an electrical system could work successfully without a local observatory.[95] Liverpool and Glasgow were complimented by the Astronomer Royal as 'having the best regulated clocks in the world' and the solutions to clock accuracy had clearly been demonstrated at Greenwich and in Liverpool, Glasgow and Edinburgh.[96]

Time balls were originally intended as visual checks for mariners to adjust their chronometers, but they could also provide a signal for the telegraph network and a time gun as a means of sounding the time to the public. The time ball at Liverpool's Observatory (1845) provided a visual and a sound check (see Figure 49).

[92] Roger Kinns, 'Time balls, time guns and Glasgow's quest for a local reliable time service', *Journal of Astronomical History and Heritage*, 13 (2010), 194-206; Liverpool Picture Book <https://www.liverpoolpicturebook.com/2012/08/OneOClockGun.html> [accessed 20 September 2017].
[93] *South Wales Daily News*, 27 August 1891.
[94] *Pembrokeshire Herald and General Advertiser*, 6 August 1869; *Taunton Courier*, 13 March 1907; *Western Daily Press*, 14 July 1873; *Western Mail*, 13 May 1874 and 2 December 1884.
[95] *Pembrokeshire Herald and General Advertiser*, 7 March 1879.
[96] *Western Daily Press*, 27 October 1873.

Figure 49 The time-ball at Liverpool Observatory, 1845[97]



However, as Morus has pointed out, there were significant difficulties in making theories on electrical communication work in practice.[98] The theory for implementing uniform time using the electrical telegraph network was quite sound in itself. The time ball at Greenwich would trigger an electrical signal to be transmitted instantly (in terms of the perception of time) across the network so that each telegraph station knew the time at the same 'time', determined by the Greenwich meridian. Time could therefore be used to regulate behaviour through the publication of timetables for railways, the mail, steamships, urban transport, factories, shops, events, schools, leisure activities, public houses, church services, christenings and funerals, tides and lighting up times for cyclists. Distance was increasingly measured by time - 'how long does it take?' as opposed to 'how far is it?', which has been discussed in Chapter 3. Train arrivals and departures were measured by the minute. When the post office effectively nationalized the telegraph network in 1870, then, in theory at least, every post office clock displayed the correct time as measured by Greenwich.

Such solutions in clock connectivity, however, were unusual and when Swansea attempted to resolve the issues of communicating time accurately by

[97] Liverpool Picture Book <https://www.liverpoolpicturebook.com> [accessed 20 September 2017].
[98] Morus, 'nervous system'.

adopting a time-gun, it provoked a heated exchange through the correspondence columns of *The Cambrian*. The *Taunton Courier* had dismissed time-guns as 'expensive luxuries' in 1870 and appeared confident that the electric telegraph would resolve issues of time synchrony under Lord Kincaid's initiative to implement a uniform time through the telegraphic network located at post offices.[99] The confidence in the telegraph appeared misplaced in the light of experience, and its assessment of time guns seemed premature given the success of time guns in Liverpool and Edinburgh.

The Cambrian was optimistic about the prospects for Swansea's time-gun, anticipating that the various versions of time given by different clocks 'will soon be changed and however novel the announcement may appear we shall shortly be able positively to know the time in Swansea.' According to the newspaper, this was to be achieved by an electrical connection between the time-gun to be sited at Swansea Docks and Greenwich that would be fired precisely at 1.00 p.m. daily on receipt of the electrical signal and as such was the 'triumph of modern science made subservient to the will of man'. The anticipated triumph would solve Swansea's problem with clocks which 'refuse to recognise any general head' and with clock makers who 'has each kept time for itself irrespective of public convenience.'[100] *The Cambrian*'s criticisms of Swansea's clocks and their makers brought a swift response the following week from Mr. W. H. Mill, a local jeweller and watchmaker who considered the article to be a slight on his craft. The correspondence that followed indicated that watchmakers did not appear to be particularly popular with the public for reasons suggested by *The Cambrian*, namely that watchmakers kept the time to themselves to the detriment of the public.

> In insinuating that each of us had a time of our own, you paid the craft but slight compliment. I am constrained to believe you did so in no malicious spirit, but in ignorance of what was the fact. You will allow me to state that I (for I would leave my brethren to speak for themselves), keep, and have always kept, Greenwich time. I will not speak of our public clocks... but before making the sweeping assertion that "no correct time has been known," and that "each (watchmaker's clock) kept time for itself irrespective of public convenience,"'[101]

[99] *Taunton Courier*, 5 January 1870.
[100] *The Cambrian*, 15 May 1874.
[101] *The Cambrian*, 22 May 1874.

Mr. Mill, in his response, had avoided the issue of public clocks but tacitly acknowledged that the accuracy of watchmaker's chronometers was not transmitted across the town, and in this sense, he welcomed the time-gun.

The time-gun was installed in September 1874 in the North Dock and in its article of 16 October *The Cambrian* ruefully observed that while the gun did fire at 1.00 p.m., Swansea residents would only have been made aware of the time-gun from newspaper reports because 'scarcely a tithe of the population have heard it... the cannon goes off to the discomfort and terror of the sea-fowl that congregate on the mud flats' but someone standing in Wind-street (the central street in Swansea) 'might be there for many days without having his attention attracted to the time of day.' It deemed the time-gun a failure.[102] Two weeks later, Mr. Mill, watchmaker, 'fully endorsed' the article, stating that the gun was in the wrong place and also noted that the firing was inaccurate, ranging from one second to one minute and a half in error and could also fire in advance of Greenwich Time. He remarked that a friend had suggested that the gun was marking 'Swansea' time instead of Greenwich. Despite checking with officials, he could not account for the inaccuracies given that these officials had confirmed that the firing was set electrically by Greenwich.[103]

Mr. Mill's assessment of the inaccuracies of the time-gun was questioned by two correspondents published in *The Cambrian* on 6 November; both made a similar point and took the opportunity to belittle Mr. Mill and the accuracy of his time-keeping. Neither 'Tempus Fugit' nor 'F. E. P.' could understand how the gun could be in advance of Greenwich and questioned the accuracy of Mr. Mill's observations. 'Tempus Fugit' also pointed out that the delay between the firing and hearing the firing would also make the timing later rather than earlier and he was 'rather inclined to think Mr. Mill's observations are at fault... his clock, I doubt is too slow or, possibly, he is too fast', while 'F. E. P.' considered that it was a question of whether Mr. Mill should correct Greenwich, or Greenwich should correct Mr. Mill.[104] Although Mr. Mill attempted a spirited defence of his chronometer pointing out that he timed the gun by the flash of the gun and not the sound and therefore there was no delay in his recording of the gun's time, other correspondents joined the debate at his expense.[105] 'Diamond' was also rather dismissive of Mr. Mill's claims taking exception to the 'impudence' of Mr. Mill in challenging Greenwich and was puzzled

[102] *The Cambrian*, 16 October 1874.
[103] *The Cambrian*, 30 October 1874.
[104] *The Cambrian*, 6 November 1874.
[105] *The Cambrian*, 13 November 1874.

by the 'ingenious imagination of the man who would wish to be considered as the only one who keeps the "kerrect time".' In the same edition, R. W. Cousens considered that the discussions around the time-gun 'have not been of the most intelligent character'. He proceeded in a very lengthy letter to explain to *The Cambrian*'s readers how solar time is defined, the difference between Solar and Sidereal Time, the importance of using the telescope to measure distance and promised to explain in a future edition issues around the transmission of time signals.[106]

This introduction of the science of time through astronomy prompted 'Student' to join the debate, claiming the debate had been 'caused by an individual whose knowledge of time and of the above subject was nil', that the Astronomer Royal 'abominated... telegraphic longitudes' and preferred instead to rely upon lunar readings and suggested that Mr. Mill acquaint himself with the 'new laws of Magnetic Electricity and Mechanics'. In the same edition, 'Tempus Fugit' made another intervention at the expense of Mr. Mill, at which point the editor of *The Cambrian* attempted to bring the debate back to street level by pointing out that 'the Time-Gun is correct enough for all practical purposes of daily life if it could be heard, but as it cannot in its present position, suggestions to remedy the defect...'[107] The scientific reasoning behind time, its measurement and communication was a common source of discussion and instruction as correspondents and editors explained, sometimes at great length, how time was calculated and electro-magnetism worked in communicating time from the Greenwich Observatory. There was a particular interest on the speed of electro-magnetism. Discussions around the science and the methodology of communicating time persisted throughout the century.[108] The editor of *The Cambrian*, however, had attempted to stress the practicalities of time-keeping, instead of the science.

A new correspondent to the debate, 'Enquirer', followed a similar theme the following week by questioning the gun's utility if it could not be heard across the town; its accuracy was secondary. He also objected to the 'insulting, if not scandalous insinuations by correspondents' regarding Mr. Mill and suggested that *Student* must hold weekly correspondence with the Astronomer Royal and hoped that

[106] *The Cambrian*, 13 November 1874.
[107] *The Cambrian*, 20 November 1874.
[108] *Bristol Mercury*, 23 August 1845 and 20 March 1852; *The Cambrian*, 22 January 1875; *Cardiff and Merthyr Guardian*, 21 November 1846 and 17 July 1847; *Pembrokeshire Herald and General Advertiser*, 6 August 1869; *North Devon Journal* , 4 January 1872.

he would take a few more lessons from the Astronomer Royal before writing to *The Cambrian* again because 'his information so far seems only to be derived from the Nautical Almanack.'[109] 'Gower' had made a similar point regarding the tone of the debate in an earlier edition, considering *Diamond* to be 'unwarrantably rude and insulting...'[110] On 27 November, another correspondent, 'Tempers Fudge It', considered that electricity was unreliable anyway in transmitting time over a long distance, and considered the time-gun 'to be quite unreliable'. In the same edition James Hulme attempted to bring the debate back to the everyday by stating that he could hear the gun in Neath, to which the Editor responded by hoping that Neath would therefore contribute to the costs of the gun. In the same edition, 'Observer', sprang to the defence of Mr, Mill believing that the gun was not accurate and would seek the cause 'from such a wiseacre as "Tempus Fugit"', but considered that the gun was adequate for daily life and the essential problem was its siting so that people in the town could hear it.[111]

There were further exchanges between 'Student' and 'Enquirer' but the debate had petered out by January 1875 without any apparent agreement on the science of electro-magnetism in communicating time, or how to ensure that the gun could be heard throughout the town, including Morriston. There was a complaint made against the town council about its treatment of Morriston and the failure to illuminate the Morriston clock. The discussion within the council made reference to the town's clocks, including the hospital clocks, which were not illuminated by the council: 'that there was in the Council a narrow-mindedness which seemed to begrudge anything to Morriston or the outlying districts.'[112] The Mayor reported that he could not hear the gun, which was located on the North Dock, in Brynhyfryd, but could at Margam which was further away from the gun. Morriston was an industrial suburb of Swansea which often expressed its discontent over how Morriston was treated by Swansea Corporation. The complaints over the clock mirrored similar complaints over street paving and lighting earlier in the century. The inability to hear the gun in Morriston or Brynhyfryd did, however, demonstrate the weakness of communicating time through sound in a large urban area.

In 1886, 'A Citizen' welcomed the time gun being relocated to the end of the Eastern Pier 'after frightening the good people of the Burrows out of their propriety'

[109] *The Cambrian*, 27 November 1874.
[110] *The Cambrian*, 20 November 1874.
[111] *The Cambrian*, 27 November 1874.
[112] *The Cambrian*, 15 June 1883.

and ‘electrifying grave Judges of Assizes’ and doubted that it served any practical purpose. The correspondent referred to a variety of hooters, whistles and ‘other noisy appliances which make early morning, midday and evening simply hideous’ and suggested saving money on the gun and installing instead a clock on the south dock.[113] In October 1904, the time gun was reported to still be on the Eastern Pier, but had not been connected to the post office for three months.[114] Finally, there was a reference in a Swansea auditor’s report of a payment of £39 ‘trying to make Swansea people punctual by time gun’ in 1907, but the reference to ‘trying’ in the report suggests that the success of the time gun was at best mixed. It did suggest, however, that even by 1907, there was no reliable means by which Swansea residents could accurately tell the time.

The correspondence columns and editorials of *The Cambrian* demonstrated that Swansea had no reliable method of communicating time accurately across the town, including the outlying districts like Morriston, but relied upon a series of formal and informal soundings to mark certain times of the day. The sarcastic nature of some of the correspondents’ language mainly over the science of time, electricity and astronomy did, however, indicate that the practicality of time measurement engaged at least some people to such an extent that they could exchange personal abuse over the issue, and reflected a wider interest in science. The pseudonyms that some of the correspondents in the region’s newspapers chose to use underlined the uncertainty around time and the importance of achieving an elusive goal in time measurement. The pseudonyms reveal a fatalist humour regarding clocks. ‘What’s the Time?’, ‘Tempus Fugit’, ‘Tempers Fudge It’, ‘Chimes’, ‘Pendulum’, ‘Greenwich’, ‘Punctuality’, ‘Correct Time’, ‘Alarm’, ‘True Greenwich’, ‘Christopher Chronos’, ‘Time Gun’, ‘The Clock’ and ‘One who would be Punctual’ are some examples. They indicated, of course, that few actually knew the time accurately and that the best that could be hoped for in the public sphere was an accuracy that would serve everyday purposes. Judging from the correspondence and also from the experience of Liverpool, Edinburgh and Glasgow in successfully notifying time through electrical cables, the time gun may have served its everyday purpose reasonably well, but only for those who could hear it, and the extensive discussions in Swansea at the time on the need for reliable public clocks would tend to support that view.

[113] *The Cambrian*, 22 January 1886.
[114] *The Cambrian*, 21 October 1904.

Conclusion

Attempts to implement standardized time across the telegraph network brought into focus the connection between time and space. Because of the speed of the railway, it was important to ensure that the time in Greenwich was the same as in Gloucester. The railway established an intimate relationship between time and space. Space was placed upon a time continuum.

The willingness to adopt standardized time varied within the region. For most of south Wales and much of Gloucestershire, Somerset and north Devon, the time was adopted quickly and virtually without debate. Bristol had recognised the difference in time in 1822 and had adopted a system with some public clocks displaying two minutes hands - one for Bristol time, the other for Greenwich. The reluctance of Bristol to adopt standardized time was illustrative of Bristol's consciousness of lost prestige which dated from the late eighteenth century. It was a means of asserting Bristol's status for which it was criticized in the region. For south Wales, in contrast, adopting Greenwich time was taken as further evidence that Wales was moving more closely into the life of the wider British nation, following on from the opening of the railway.

The railway revolution had created a need for synchronized time and in theory an opportunity for the electric telegraph to communicate synchronized time across the nation. Railway companies and Greenwich Observatory had the self-confidence to view time through a different lens from previous generations. 'Time' would not be sunset, dusk or midday wherever these happened to occur but would be set according to when they occurred at Greenwich and every other clock would follow. The electric telegraph would then tell all the other clocks what the time was. Theory and practice, however, proved to be two different things. The continuing unreliability of clocks to show Greenwich Time meant that people and communities throughout the nation had to devise strategies for dealing with time. Measured time had provided a new framework for social discipline and placed urban communities in slightly more advantaged position than rural areas because of the extent of the telegraph network.

Despite the increasing regulation imposed by time, there were continuing problems in the region on achieving accuracy in the measurement of time. If the electric telegraph could communicate Greenwich time instantly to all telegraph offices, there was no reliable system for communicating this time to all other clocks in the vicinity. Clocks showed different times as a result and even if residents had

reasonably reliable time-pieces, they did not know how to set the time unless they went to a telegraph office or railway station and there was no guarantee that clocks at these locations would synchronize. The technology did exist which could make standardized time practicable as demonstrated in Liverpool, Edinburgh and Glasgow using an observatory and electrical cables. These cities were exceptional, however, and there was no comparable system in the region with the possible exception of Taunton.

The issues relating to accurate time measurement demonstrated two important features regarding human agency and the natural world. It displayed confidence that an artificial system like time management could be imposed upon what had previously been a natural order. It also demonstrated a confidence that technology could make this possible, but, at least in terms of Greenwich Time, the rhetoric fell far short of practice. Electro-magnetism, however, had shown its effectiveness in communications despite the problems it had with time management. Later in the century, it would demonstrate that it was also a source of energy in transport to rival steam as it transformed urban mobility.

Chapter 6 The tram, personal mobility and urban space: the working classes as citizens and consumers 1870-1914

> The whole of the Neath, Britonferry and Skewen District was yesterday en fete on the occasion of the opening for traffic of the new system of tramways ... The new line unites different points of a somewhat scattered neighbourhood, where there is of necessity a considerable amount of going to and fro, and with the lowness of the fares and the number of cars running all day it cannot fail to add to the rising glories of Neath as a place of commercial importance.[1]

The tram, as the first form of mass transit in towns and cities, transformed urban space in the region from the 1870s with the horse-drawn tram and at the end of the century, the electric tram. The low fares and convenience of the tram made it accessible to most people and the tram was constantly on the move as part of a new urban landscape running for around 16 hours on weekdays from the early morning to late evening, with some reduction in hours on Sundays. For the first time, the working classes increased their access to employment, housing, leisure and household consumption beyond the spatial boundaries set by walking. With increasing population, the urban area expanded to cover a greater geographical area, but the distances covered by new forms of transport which made this possible, also shrank urban space. The tram effectively reduced urban size, integrating separate neighbourhoods and townships within the city area, as well as incorporating and stimulating suburban development. 'The circumference had been brought nearer the centre' as Dr. Sylvanus Thompson, a colleague of Lord Kelvin, observed at the opening of the electric tram to Kingswood near Bristol in 1895.[2] This shrinking had a significant social impact upon urban and suburban life. However, as with the steam railway in its initial stages, the tram was an urban project dependent upon a mass market and did not extend to rural areas. The impact of the tram was not therefore uniform in the experience and perception of mobility of all residents in the Bristol Channel region.

Historiography

The impact of this revolution has not been considered in any great depth in social or transport historiography. The significance of tramways has tended to be obscured by the steam locomotive on the one hand and motorized transport on the other, but mass

[1] *The Cambrian*, 19 November 1875.
[2] *Bristol Times and Mirror*, 15 October 1895.

urban transport did not originate with the steam engine or the internal combustion engine, but with the horse, street rails and electricity.[3] As a result, an important factor in urban life – mass mobility – in the late nineteenth century has not been sufficiently considered in urban history and the impact this mobility had upon social life across the themes of class, gender, employment, leisure and consumption. There is no comparable work to J. R. Kellett's study of railways in urban areas in assessing the impact of the tram, and studies that consider urban mobility are usually focused upon social structure.[4] While the impact of the steam locomotive on economy and society was fundamental in the nineteenth century, the advent of mass mobility provided by the tram had a greater impact on the direct experience of everyday life. There are a number of useful histories devoted to the tram which cover how tramways were constructed in different urban areas and the technology of electrical power, overhead cables, tracks and the cars, but usually they do not consider the social impact upon urban life.[5] There has been some acknowledgement that a significant source of energy in transport was not simply coal but the horse played its part.[6] Some research students have attempted to throw light on the social impact of changes in urban transport and John Hannavy has surveyed the diverse forms of movement from the nineteenth into the twentieth century.[7] The tram, however, has

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[3] Aldcroft and Freeman, *Transport;* Bagwell, *Transport Revolution*; Dyos and Aldcroft, *Transport*; Daunton, *Urban History*; Jackman, *Transportation*; Pratt, *Inland Transport*; Sherrington, *Inland Transport*.

[4] Kellett, *Railways*; *The Structure of Nineteenth-Century Cities*, ed. by C. G. Pooley and J. H. Johnson (London: Groom Helm, 1982), p. 19; , C. G. Pooley, 'Residential Mobility in the Victorian City', *Transactions of the Institute of British Geographers*, 4.2 (1979), 258-277; R. Lawton, 'Mobility in Nineteenth Century British Cities', *The Geographical Journal*, 145.2 (1979), 206-224; Harold Carter, 'The Structure of Glamorgan Towns in the Nineteenth Century', in Morgan, *Glamorgan Society*, pp. 151-172.

[5] Oliver Green, *Rails in the Road: A History of Tramways in Britain and Ireland* (South Yorkshire: Pen and Sword, 2016): Ray Wilson and Rob Jones, 'The Gloucester Horse Tram', *Gloucestershire Society for Industrial Archaeology*, (2003), 18-30; D. H. Beynon, *Swansea's Street Tramways: The Story of Swansea Improvements & Tramways Company Limited*. (Swansea: Swansea Maritime and Industrial Museum, 1994); Charles S. Dunbar, *Buses, Trolleys and Trams* (London: Paul Hamlyn, 1967); George Klapper, *The Golden Age of Tramways* (David and Charles: Newton Abbot, 1961); Charles E. Lee, *The Horse Bus as a Vehicle* (London: British Transport Museum, 1962) and *The Swansea and Mumbles Railway* (Oxford: Oakwood Press, 1988); R. H. Morgan., 'The development of an urban transport system: the case of Cardiff', *Welsh History Review*, 97.2 (1996), 178-193; D. B. Tomas and E. A. Thomas, *Trams and Buses of Newport: A Complete History of Street Public Transport in Newport, Gwent, South Wales* (Newport: Starling Press, 1982); Michael Barke, 'The middle-class journey to work in Newcastle-upon-Tyne, 1850-1913', *The Journal of Transport History*, 3rd ser., 12.2 (1991) 107-134.

[6] Thompson, *Victorian England*; Kathryn Miele, 'Horse Sense: Understanding the Working Horse in Victorian London', *Victorian Literature and Culture*, 37.1 (2009), 129-140; Ralph Turvey, 'Horse Traction in Victorian London', *The Journal of Transport History*, 26 (2005), 38-60.

[7] Fu-Chia Chen, 'Cab Cultures in Victorian London: Horse-Drawn Trams, Users and the City, ca.1830-1914' (unpublished doctoral thesis, University of York, 2013); A. D. Ochonja, 'Lines of Class Distinction: An economic and social history of the British tramcar with special reference to

been overshadowed by the steam railway and the motor car in the historiography of transport.

The chapter considers three aspects of tramway development which have been understated in transport and urban historiography and draws upon tramway development in the region's largest urban areas with a particular focus upon Bristol and Swansea as two contrasting urban geographical areas. Firstly, it considers the extent of mass passenger traffic on trams compared to railways and its impact upon urban mobility. Secondly, the tram would not have been economically viable without working-class participation and the routes of the tram to working-class districts were indicative of the importance of working-class consumers. Working-class suburbs were forceful in expressing a sense of entitlement to relatively cheap personal transport as citizens for leisure, consumption and employment. This had an impact on the urban boundary as it extended in Bristol to incorporate suburbs, bringing the boundary closer to the centre. Finally, the chapter considers how tramway routes extended horizons in working-class leisure as the tram made leisure destinations and sporting events more accessible.

The tram and urban mobility

The towns and cities of the Bristol Channel region embraced the tram revolution. In 1807, Swansea opened the world's first passenger horse-drawn tram, originally envisaged as an industrial tramroad, between the town and Oystermouth which closed in 1831. It re-opened in 1856 and provided access for Swansea's working classes to coastal recreation and transported large crowds of working-class day-trippers on weekends and particularly bank holidays to Oystermouth. In 1872, Cardiff opened the first specifically urban horse-drawn tram in the region, heralded as 'a revolution in our street locomotion' and in 1895 Bristol installed the first electrified tram service in the country.[8] This was copied by other urban areas across the region and the Imperial Tramways Company based in Bristol managed systems in other towns and cities, and opened the first electrified metropolitan system in west London in 1901. Wales's first electrified service was introduced in Swansea in 1900 having established a horse-drawn service within the urban area in 1878 which connected to the existing Oystermouth tram. All tram services throughout the region

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Edinburgh and Glasgow' (unpublished doctoral thesis, University of Edinburgh, 1974); John Hannavy, *The Victorians and Edwardians on the Move* (Oxford: Shire Books, 2011).

[8] *Cardiff Times*, 13 July 1872.

followed a similar arterial pattern connecting outlying districts with the town centre which, in turn, had a mixed impact on suburban development in the future expansion of the town or city. The ability of the electric tram to navigate hills made it particularly useful in connecting the eastern hilly districts of Gloucester and Bristol with the city centres and relieved horses of these onerous journeys which had stimulated numerous complaints and concerns about the treatment of horses.

Table 14 Chronology of tramway development in the Bristol Channel region[9]

Urban area	Horse tramway	Steam tramway/railway	Electric tramway
Bristol	9 August 1875		14 October 1895
Gloucester	24 May 1879		7 May 1904
Cardiff	12 July 1872		1 May 1902
Swansea	12 April 1878		30 June1900
Swansea-Oystermouth	25 March 1807-1831, 1856-1877	1877	
Swansea-Mumbles		1898	
Newport	1 February1875		9 April 1903

Prior to the advent of the tram, urban transport in the 1870s was divided by class. The expensive hansom cab was patronized by gentry and the wealthy, the omnibus by largely 'the middling sort' and some artisans while the bulk of the population, the working classes, walked or used carts and 'breaks'. The tram was distinctive because it was the first passenger vehicle to run on rails within urban areas, powered initially by horses from the 1870s and later by electricity from the 1890s. The cab, the omnibus and cart were powered by horses and ran on roads with no fixed route or fee structure but the introduction of the rail enabled horses to pull greater passenger numbers. The ride became smoother for the passenger and engaged a wider consumer market which included the working classes because of the

[9] *Bristol Times and Mirror*, 15 October 1895; *Bristol Mercury*, 4 November 1896; *Gloucester Journal*, 31 May 1879; *Gloucester Journal*, 7 May 1904; *Cardiff Times*, 13 July 1872; *Cardiff Times*, 3 May 1902; *The Cambrian*, 12 April 1878; *The Cambrian*, 6 July 1900; Charles E. Lee, *The Swansea and Mumbles Railway* (Oxford: Oakwood Press, 1988); *Monmouthshire Merlin*, 5 February 1875; *Western Mail*, 9 April 1903.

reduction in fares made possible by the greater carrying capacity of the tram. The horse tram could carry around twenty-two passengers, double the capacity of omnibuses. Eighteen passengers were carried inside and four on the two platforms, although overcrowding appeared common and passengers could be 'packed as thick as herrings in a tub.'[10]

A significant innovation in tramway traction was the introduction of electricity as the motive power from the 1890s in the region.[11] This reduced costs by increasing vehicle capacity and removed the reliance on horses. Speed was limited to around 6 m.p.h. and capacity doubled with 26 passengers inside and 18 outside on the upper level which was uncovered.[12] Although omnibuses continued to be used in urban areas as complementary to tram traffic, their use declined significantly with the introduction of the horse tram, although it is difficult to assess the extent of this decline because of the lack of data on urban transport prior to the tram. In welcoming Bristol's horse tramway in 1870, 'Progress' expressed a view common at the time that the 'great convenience afforded by this tramway is well-appreciated by the public, who get pleasant and cheap rides, vastly preferable to those under the old omnibus system.'[13] The cab continued as a mode of transport for élites until it was eventually replaced early in the twentieth century by the motor car.

The 1870 Tramways Act provided a statutory framework for the development of horse tramways although it allowed for other forms of traction as well as the horse. The Act was in response to widespread dissatisfaction amongst middle class travellers with the omnibus as a form of travel and a conviction by speculators that there was a demand from working classes for cheap travel to the town centre and to places of leisure in the countryside and the sea-side. The experience of the steam railway had indicated strongly that working classes would use mechanized transport if they could afford the fares. The success of the American entrepreneur, George Train, in running the first urban horse tramway in Birkenhead in 1860 reinforced that view.[14] The potential for exploiting demands for greater mobility was realised by companies like the Bristol Tramways Company, a subsidiary of the Imperial

[10] *Cardiff Times*, 18 July 1885.
[11] Robbins, 'Electric Traction'.
[12] *The Cambrian*, 22 November 1895.
[13] *Bristol Times and Mirror*, 6 December 1870.
[14] *Bristol Times and Mirror*, 7 December 1870; Charles E. Lee, 'The English Street Tramways of George Francis Train (1)', *The Journal of Transport History*, 1 (1953), 20-27; Charles E. Lee, 'The English Street Tramways of George Francis Train (2)', *The Journal of Transport History*, 1.2 (1953), 97-108; George Francis Train, *Observations on street railways* (London; Sampson Low, 1860).

Tramways Company in Bristol, which merged with the Bristol Cab Company in 1887 and the Swansea Improvements and Tramway Company (SITC). These companies held out the prospect of cheap and rapid travel, but they also undertook to improve the road system where the trams ran by straightening and widening some thoroughfares and improving the road surfaces, which was a requirement of the Act. The virtues of tramways were regularly promoted by newspapers and most people who commented at the time had a poor opinion of omnibuses and consequently welcomed the horse tram.[15]

Figure 50 Horse-drawn omnibus in Park Street, Bristol 1885[16]

For the correspondent 'W.H.', Bristol's omnibus system 'as compared with other large towns is expensive and so ill-conducted that business men who have not carriages will walk, and often a cost of time and strength, rather than be troubled with it.'[17] 'Viator' probably spoke for the bulk of the middle class travelling public who could not afford cabs on a regular basis in welcoming the tramway.

> Tramways always provoke opposition. Cabbies don't like them, as the trams are cheaper. With trams we should be able to travel from end to end of the city for less money than an ill-paid cabman would expect in addition to his fare... Trams will benefit trade and be useful to the public... Up to the present time the vehicle accommodation in Bristol has been bad and dear. Give us the trams... [18]

[15] *Bristol Times and Mirror*, 16 May 1870.
[16] Pinterest <https://i.pinimg.com/originals/30/99/b8/3099b8f95fc1017adfb4c45c5dbeda4f.jpg> [accessed on 9 September 2020].
[17] *Bristol Times and Mirror*, 2 December 1870.
[18] *Western Daily Press*, 30 March 1875.

Newspapers and their correspondents tended to refer to omnibuses when discussing passenger transport as the principal form of urban travel, providing insight into the trials of omnibus traffic as they welcomed their potential demise. However, the bulk of the population used carts or 'breaks' and not cabs or omnibuses which were horse-drawn wooden vehicles similar to the goods waggon but with seats facing each other lengthways along the cart. They were bulky, uncomfortable and slow. An observer in Swansea in 1875, 'Hafod', on Hafod Bridge which crossed the Tawe between the industrial suburb of Landore and Swansea's town centre gave some indication of this traffic as viewed outside the 'Bird-in-the-Hand' in the High Street. 'Hafod' reflected on the expansion of the working-class suburbs of Morriston and Landore, the cruelty inflicted on horses and the dangers to both passengers and pedestrians of travel by cart. Readers were advised that an hour's observation near Hafod bridge would find four or five carts 'for the conveyance of passengers to and from the outlying districts ... but he would have to be told that they were intended for the transportation of human beings, for anything less resembling a passenger vehicle can hardly be conceived.' Twelve or fourteen occupants would be crammed into the two-wheeled one-horse cart. The 'poor animal' struggled to reach the top of Hafod Bridge followed by 'a scene of cruelty to animals' as the horse was forced downhill 'terribly shaken and perspiring by the heavy load that forces him down. ... the conduct of the people forms a striking contrast to the painful struggles of the horse. Whistling, shouting, singing, interspersed with here and there a female shriek.' At the middle of the descent, 'the animal is driven at a fast trot - often a gallop - down the remainder of the incline to the imminent danger of pedestrians who pass and repass the narrow bridge...' Pedestrians 'get bespattered with the mud thrown up by the horses feet whether or not their persons are placed in jeopardy, away scuds the cart with its jubilant freight, apparently unknowing, certainly unconcerned.'[19] 'Hafod' was not the only resident who considered the speed at which carts were driven disregarded the safety of other road users. 'T. F.', a correspondent to *The Welshman* in 1888 expressed what appeared to be a common view of horse-drawn traffic prior to the tram. The roads were 'infested' by a 'collection of ramshackle breaks' and 'T. F.' welcomed the 'healthy competition' provided by trams. Referring to the omnibus, it cost sixpence

[19] *The Cambrian*, 26 February 1875.

'for the privilege (?) of riding in a bone-shaking break from Porth to Pontypridd, and the times of starting are so uncertain that one never knows them.'[20]

It has been claimed with justification that the steam locomotive provoked a revolution in economic and social life by establishing rapid means of communication between urban areas, as well as improving rural-urban links within a unified national passenger transport system.[21] The horse tram which was succeeded by the electric tram in the 1890s could equally claim to have revolutionized urban life, not least in its social context, by establishing a convenient and accessible form of urban transport which engaged, in a similar way to the railway, a mass market. Unlike stage coach traffic between towns, no figures were published on urban passenger transport before the 1870 Act and therefore it is a matter of speculation on what the volumes of passenger traffic were. However, there is anecdotal evidence to suggest that traffic volumes were considerable, particularly traffic using carts. In 1878, at a half-year meeting of the Swansea Improvements and Tramway Company, the chairman referred to an 'enormous population deriving their supplies from the town of Swansea, and who now had, after a hard day's work, to toil on foot or by carts and wagons, which had been for some years past remunerating their owners' along the Morriston and Landore roads shortly before the opening of the tramroad between the working-class suburbs of Morriston and Hafod.[22] On the opening of the line, *The Cambrian* expressed the hope that it would 'both facilitate communication between the town and the important districts of Landore and Morriston, to the great benefit of all, and ... sweep away the unsightly and dangerous carts, which have so long and so inefficiently monopolised the passenger traffic there.'[23]

The traffic that existed in the early 1870s gave a clear indication that people, even from the relatively distant suburb of Morriston, used carts regularly to transport goods and consumables from Swansea and patronized Swansea's public houses. Those numbers must have been substantial if they were seen as monopolizing passenger transport. When the Redland line of the horse tramway in Bristol carried 115,193 passengers in its first month *The Cambrian* found the volume of traffic 'exceedingly astonishing'.[24] The available evidence suggests that not only did much of the existing passenger traffic transfer from omnibuses to trams, but that there was

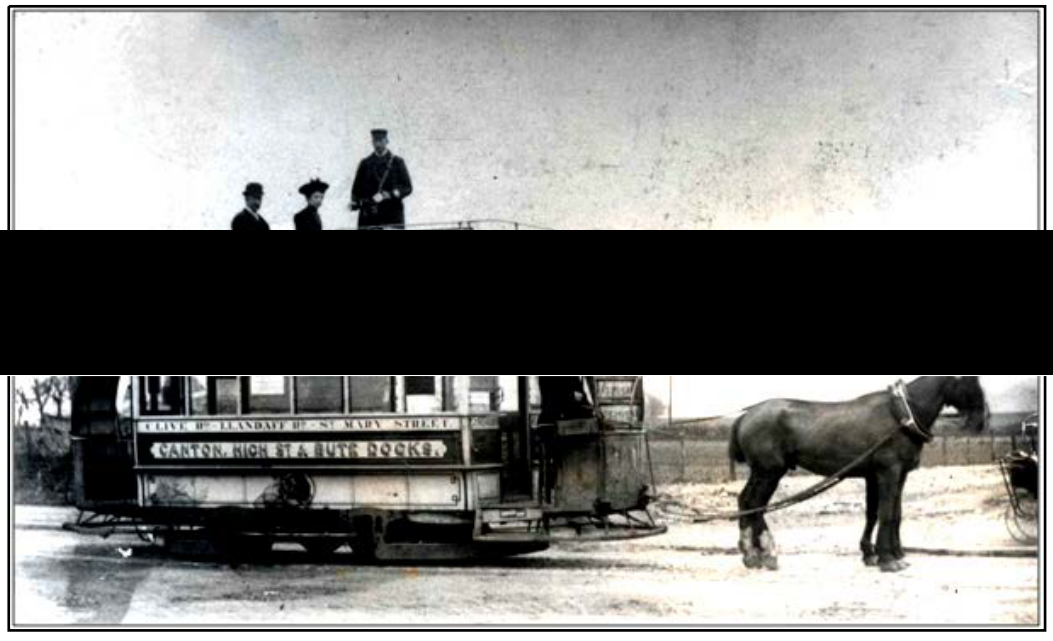
[20] *The Welshman*, 11 February 1888.
[21] Simmons, *Victorian Railway*; Perkin, *Age of the Railway*, p. 101.
[22] *The Cambrian*, 15 February 1878.
[23] *The Cambrian*, 12 April 1878.
[24] *The Cambrian*, 10 September 1875.

a substantial increase in the number of passengers. Within five years of the opening of the electric tramway which connected Pontypridd with the Rhondda valleys in 1905, the tramway was carrying five million passengers annually. The tram became an integral part of the urban landscape.

Despite the speed restriction on the urban tram, it was consistently referred to by contemporaries as 'rapid' which may have referred to its convenience as well as its speed. Its regularity from the early morning to late evening facilitated comparatively 'rapid' transit compared to the omnibus. In a commentary on a petition from residents in Westbury-on-Trym in 1899 supporting the extension of the electric tram to their suburb, the *Western Daily Press* considered that 'rapid, cheap, reliable, and regular inter-communication not only between the widely-separated intra-urban districts, but between the suburbs and the city, is one of the indispensables...'[25]

By the turn of the century, annual passenger traffic on tramways in Cardiff and Swansea was comparable with all passenger traffic on the Welsh railways at just over 21 million journeys, which was carried by the horse tram (see Figure 51).

Figure 51 Cardiff Horse Tram, Canton-High Street-Docks, c.1900[26]

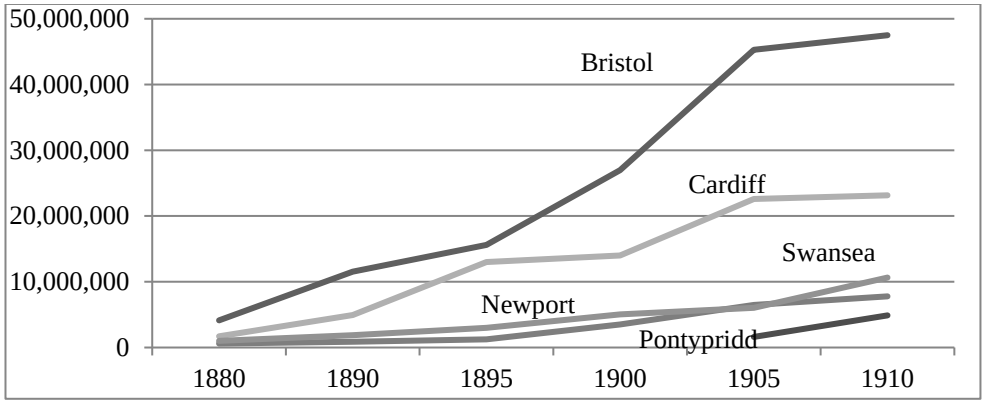


Bristol's traffic alone was more than double the Welsh rail traffic, and almost half of total GWR traffic using a combination of horse and electric tram. (see Figures 52-54). Tramway passenger traffic by 1910 would have exceeded 100 million

[25] *Western Daily Press*, 9 August 1899.
[26] *Wales Online*, 16 September 2014 <https://www.walesonline.co.uk> [accessed on 8 August 2020].

passengers if all urban areas in the region were counted.[27] However, the calculation of passenger traffic and the average fares is not straightforward. Bristol newspapers produced regular half-yearly and yearly reports on the Bristol tramway from the 1880s and therefore it is possible to track passenger traffic accurately from 1880 to 1910 in Bristol. Tramway returns included omnibus traffic and not just horse and electric tram traffic. Up to and including 1890, the Welsh newspapers also reported on annual and half-yearly meetings, but after 1890 the reporting of tramway returns was ad hoc in Welsh newspapers. Estimates have been made for Welsh traffic on the basis of selected weekly reports avoiding holiday periods because of the substantial increase in traffic during those periods which would have unduly distorted the annual totals. Therefore the totals for Welsh traffic are underestimated because they do not take sufficient account of holiday periods. The difference between holiday and non-holiday weeks could be as much as 90,000 passengers in any one week. It was also common practice later in the century for Welsh newspapers just to show the fee income and passenger traffic has been calculated from the fee income using estimates of the likely average fare based upon similar returns been where passenger traffic and income was shown. Passenger traffic for Swansea is underestimated because it does not count rail traffic for Morriston and Oystermouth. The average fare is estimated and reports are shown to the nearest decade.

Figure 52 Tramway passengers for selected urban areas in the region c.1880-c.1910[28]



[27] Mitchell and Dean, *Historical Statistics*, p. 226; *Cardiff Times*, 16 January 1909.
[28] For 1880, *Bristol Mercury*, 13 September 1890, *Cardiff Times*, 4 December 1880; for 1890, *Bristol Times and Mirror*, 11 February 1891, *The Cambrian*, 4 January 1889; for 1895, *Bristol Mercury*, 21 February 1896, *Evening Express*, 24 January 1896; for 1905, *Clifton and Redland Free Press*, 16 February 1906, *Pontypridd Chronicle and Workman's News*, 4 November 1905, *The Cambrian*, 28 April 1905 and 20 October 1905; for 1910, *South Bristol Free Press*, 20 February 1911, *Evening Express*, 15 June and 24 November 1910, *The Cambrian* 9 December 1910.

Figure 53 Comparison between tramway traffic in Bristol, Newport, Cardiff and Swansea and Great Western Railway passenger traffic 1880-1910[29]

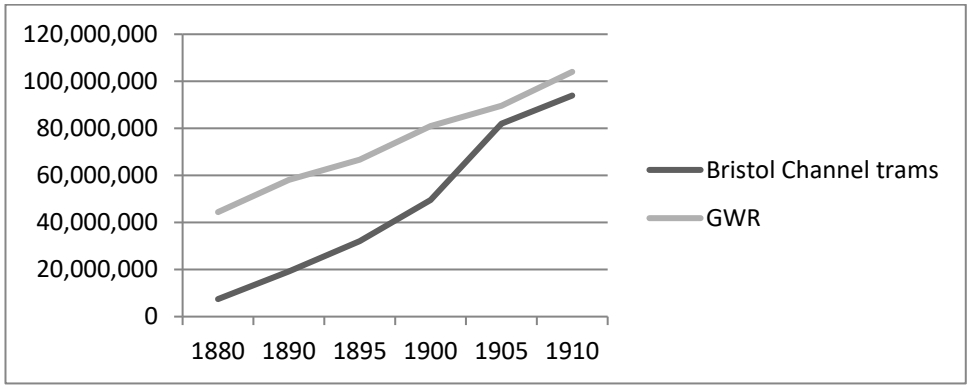
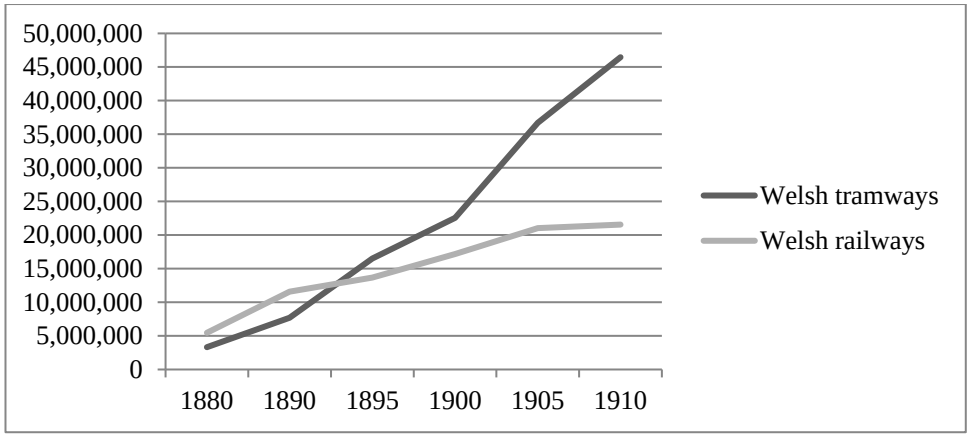


Figure 54 Comparative usage of railways and trams in Newport, Cardiff and Swansea, 1880-1910[30]



Although comparisons with personal mobility prior to the tram are to some extent speculative, the tramway returns from 1880 show a remarkable expansion in mobility. By 1900, tramway traffic far exceeded that on railways with nearly 50 million journeys recorded in Bristol alone. The working classes experienced the greatest impact of increased mobility given their previous relative exclusion from mechanized transport. Most tram routes followed lines to working class suburbs and debates over routes demonstrated both the importance of working classes as consumers to tramway companies as well as a sense of entitlement that was expressed by working-class suburbs in Bristol, in particular. The extension of tram lines to relatively distant suburbs facilitated the extension of the urban boundary.

[29] Williams, *Welsh Historical Statistics*, 2, pp. 38-39.
[30] Williams, *Welsh Historical Statistics*, 2, pp. 32-33.

The continuing expansion in volumes of traffic carried by the both the horse and electric tram later in the century suggest that tram travel had extended to most of the working classes as real incomes rose.[31] The returns published by the Board of Trade for tramways in south Wales for 1889 demonstrated increasing volumes of traffic by the second decade of the horse tram which must have included substantial numbers of working-class travellers because of the tram routes to working-class suburbs.

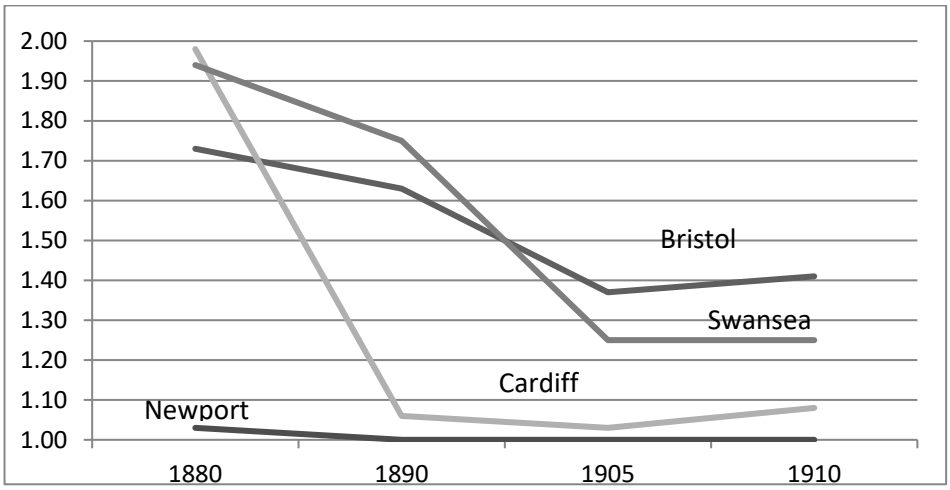
Table 15 Horse tramways in selected south Wales districts 1889[32]

	Cardiff	Swansea	Newport	Llanelli
Length of tramway	6m 14ch	5m 39ch	1m 13ch	75ch
Passengers carried	4,934,618	1,878,358	885,830	219,994
Number of horses	414	95	40	
Number of cars	33	56	8	

The expansion in traffic from the 1880s was at least in part due to decreasing fares. Omnibuses did not have set fares but they were considerably higher than horse tram fares which were published for each route. A 'Commercial Traveller' in Bristol was charged 4s with three friends for omnibus travel between the railway station and the Drawbridge in the city centre which he considered to be an 'exorbitant sum'.[33] In 1907, the omnibus fare from Park Street to the Black Boy in the city centre was reported as 6d.[34] However, the continued increase in tramway passengers after the introduction of the electric tram in the early 1900s cannot be attributed solely to lower fares. The increase in traffic may have been due more to increases in the disposable incomes of the working classes from the 1880s onwards, as well as the increase in population. Fares tended to flatten from 1905. Swansea's traffic increased considerably from 1905, but this was due to the doubling of tramway lines rather than fare reductions.

[31] John Burnett, *A History of the Cost of Living* (Penguin: Harmondsworth, 1969), p. 254.
[32] *The Cambrian*, 4 January 1889.
[33] *Western Daily Press*, 22 February 1871.
[34] *Bristol Times and Mirror*, 15 April 07.

Figure 55 Average tram fares in pence 1880-1910[35]



The electric tram was a signal of progress and improvement for an urban area that involved the town or city and their people as a whole – it was 'modern' and 'progressive' and altered the physical landscape as a mark of this progress. Newport's first electric tram, for example, shown in Figure 56 had a double track so that trams going in opposite directions could pass without having to use a siding. The tramway company paved the road creating a smooth surface for other road users and introduced electric lighting in their vehicles which was unique at the time in urban transport. The overhead power lines for both the tram and the telegraph emphasized the use of the electricity as a new and 'modern' form of power which, unlike the steam locomotive and horse-drawn traffic, was comparatively noiseless. The trams ran every five or ten minutes and were therefore a constant presence on the main urban thoroughfares and carried millions of passengers annually. The electric tram provided a new visual landscape between the 'new' and the 'old', between electricity and the horse.

[35] Reported fares in region's newspapers, 1880-1910.

Figure 56 Newport's Electric Tram 1903[36]

Tram routes and working-class suburbs

The routes of the tram networks were heavily influenced by local urban topography and were super-imposed upon existing travel routes. They strengthened existing routes, largely replaced at least one form of transport with a mass transport system and although they made no significant impact upon the physical structure of urban areas, they were influential in integrating suburbs with the urban centre and improving the road system. The impetus for tram development was, however, slightly different between the two urban areas of Bristol and Swansea. For Bristol, the tram was identified with the needs of working-class suburbs which, in turn, raised questions about the civic boundary. If suburbs accessed all the benefits of its services and economy through the tram connection, so the argument went, they should contribute to the finances of the city which meant an extension to the civic boundary. In Swansea, the tram became a priority for commercial and industrial interests as a means of improving the transport systems in the town and its image as 'progressive', but relied upon working classes as consumers to pay for the tram

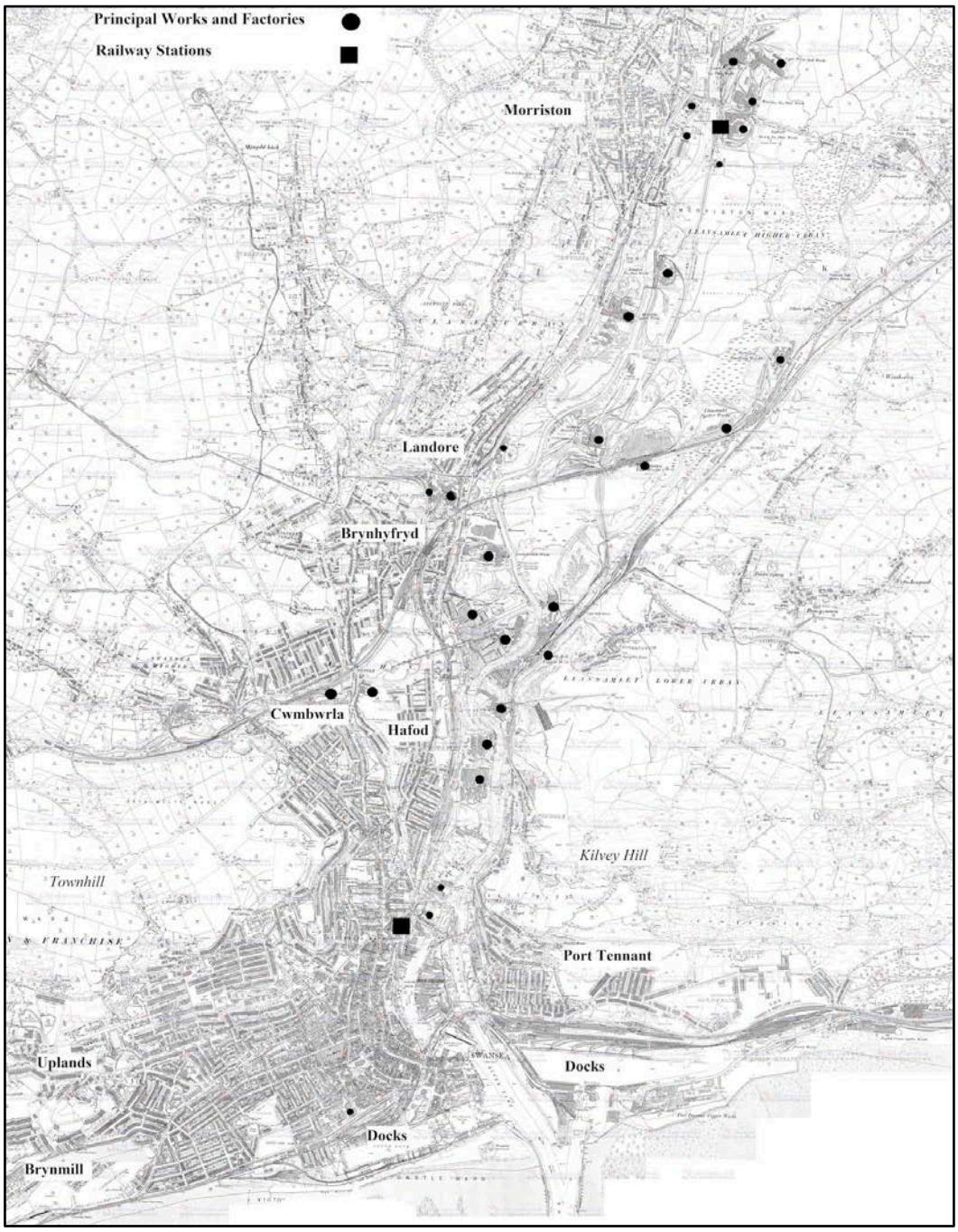
[36] *Wales Online* <https://www.walesonline.co.uk> [accessed on 8 September 2020].

network through fares. The tram altered the visual landscape of the urban area with its tracks, overhead cables and cars, but also had a major impact on how Bristol's urban structure was organized in the late nineteenth century.

Bristol's working-class suburbs were vocal in their demands for connection to the electric tram from the 1890s which helped shape 'modern' Bristol. By the 1870s when the tram networks were initially constructed, the configuration of both Bristol and Swansea had been well established and displayed the 'modern' characteristic of residential segregation by social class away from the urban centre.[37] Many of the élite in Bristol had migrated from the city centre towards the western areas of Clifton and Redland with working classes concentrated near the centre and in remoter suburbs. In a similar way, Swansea's élites had tended to migrate to the western suburbs of Uplands and Sketty with working classes concentrated near the centre and in the industrial suburbs of the Swansea valley.[38]

[37] Henry Rees, 'The Growth of Bristol', *Economic Geography*, 21 (1945), 269-275; Pooley, 'Residential Mobility'; Spencer Jordan, Peter Wardley and Matthew Wollard, 'Emerging Modernity in an urban setting: nineteenth-century Bristol revealed in property surveys', *Urban History*, 26.2 (1999), 190-210; Pooley and Johnson, *Nineteenth-Century Cities*.
[38] Joan Christina Margaret Rees, 'Evolving Patterns of Residence in a nineteenth century city: Swansea 1851-1871' (unpublished doctoral thesis, Swansea University, 1983).

Figure 57 Swansea's Urban Area c.1880[39]



There were significant differences in the comparative populations and population densities of Swansea and Bristol which affected how tramway services were organised. Swansea's population was compressed into a smaller area, whereas Bristol had more scope for expansion (see Figures 57, 58 and Table 16). The topography of Swansea, however, masked the actual density of the town because much of the land contained within the civic boundary contained two hilly districts of Kilvey Hill and Townhill which were largely uninhabited. Consequently, the

[39] Adapted from Old-Maps <https://www.old-maps.co.uk> [accessed 8 July 2015].

population was compressed into a smaller area than the official square mileage which influenced the routes of the tram (see Figure 57).

Table 16 Population density of four urban areas 1911[40]

Urban area	Acreage	Square Mileage	Population	Density per sq. mile
Bristol	17,400	27.1	328,842	12,134
Cardiff	6,372	9.9	228,729	23,103
Newport	4,504	7.0	115,459	16,494
Swansea	5,202	8.1	119,722	14,780

Bristol had a high concentration of its population near the city centre districts, complemented by a spread of more distant working class suburbs to the north, east and south like Hanham in the north and Staple Hill to the east. The affluent areas to the west were also areas of recreation and leisure in the Downs and Avon Gorge.[41] Bristol's suburbs were bounded by open countryside that potentially could accommodate suburban expansion (see Figure 58). Swansea's urban development was in the form of a reverse 'L' which emerged in the wake of industrial development in the copper industry dating from the early eighteenth century. Industrial suburbs were constructed by industrialists to house their workforces who needed to be within walking distance of their mines, quarries and factories.[42] The town's population was concentrated in a relatively narrow valley with a series of working class districts reaching as far as Morriston in the Lower Swansea Valley with affluent areas spread to the west around Sketty and the Uplands. These districts formed an almost contiguous line from the town centre to Morriston. Swansea's suburb of Oystermouth was regarded as 'the holiday suburb' of Swansea rather than a local, working class suburb.[43] The linear configuration of Swansea's working class suburbs along the valley dictated an integration of suburbs into a single urban area as opposed to the spread of suburbs characteristic of Bristol.

[40] *Census of England and Wales 1911*, vol. I, table 8, Cd. 7017 (1913).
[41] David Hussey, '"From the Temple of Hygeia to the Sordid Devotees of Pluto". The Hotwell and Bristol: Port and Resort in the Eighteenth Century', in Borsay and Walton *Resorts and Ports*, pp. 50-65; Vincent Waite, 'The Bristol Hotwell', in *Bristol in the Eighteenth Century,* ed. by Patrick McGrath (Bristol: Bristol Branch of the Historical Association, 1972), pp. 109-126; David Lloyd, 'Urban Evaluation: Clifton England's most dramatic suburb', *Built Environment Quarterly*, 2.4, Theme: Space for Initiative (1976), 327-332.
[42] Miskell, *Industrial Region;* Ieuan Gwynedd Jones, 'The Swansea Valley: life and labour in the nineteenth century', *Llafur*, 4.1 (1984), 57-71; Robert Anthony, '"A Very Thriving Place": the peopling of Swansea in the eighteenth century', *Urban History*, 32 (2005), 68-87.
[43] *The Cambrian*, 17 July 1891.

Figure 58 Bristol's Urban Area c.1880[44]

Expanded suburbs were also suggested later in the century in the wake of the electric trams in Bristol as a means of relieving overcrowding in the city centre districts.[45] All these suburbs were within reach of an electric tram.

[44] Adapted from Old-Maps <https://www.old-maps.co.uk> [accessed 4 March 2015]
[45] *Western Daily Press*, 17 February 1897.

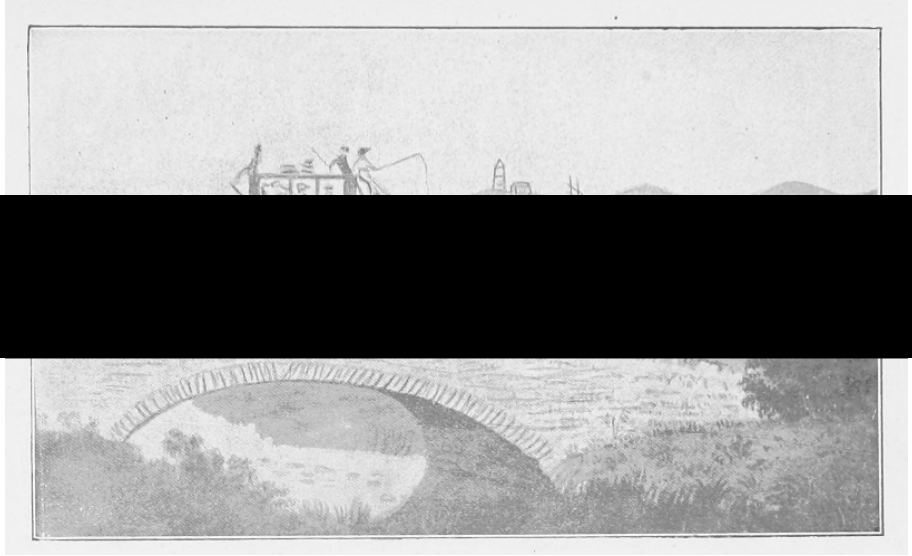
Table 17 Approximate distances in miles between the centre and the suburbs of Bristol and Swansea[46]

Bristol suburbs	Miles from Bristol centre	Swansea suburbs	Miles from Swansea centre
Hanham	4.5	Mumbles	5
Staple Hill	4.5	Oystermouth	4
Kingswood	4	Morriston	2.6
Horfield	3.5	Sketty	2
Fishponds	3.5	Brynmill	1.5
Brislington	3	St Helens	1.5
Redland	2	Port Tennant	1.5
Bedminster	2	Uplands	1.5
Eastville	2	Landore	1.5
Durdham Downs	2	Brynhyfryd	1
Westbury	2	Cwmbwrla	1
Totterdown	1.5	Docks	0.75
Clifton	1		
Durdham Downs	1		

The main lines of the horse tramways used traditional routes which were a combination of parish and turnpike roads.[47] From the 1890s, the electric tram followed the existing horse tram routes, although some additional branch lines were added as the urban areas expanded. The tram routes themselves had a limited impact on the existing road structure apart from straightening and widening some urban roads as in Hafod in Swansea and Clifton in Bristol. One notable exception was the tramroad linking Swansea with Oystermouth which was constructed in 1804 and open for travellers in 1807 well before the first turnpike road of 1826 (see Figure 59).[48] Subsequently, these road and tram routes ran alongside each during the nineteenth century which was unusual.

[46] Old-Maps <https://www.old-maps.co.uk> [accessed 4 March 2015]; Figures 52 and 53.
[47] Marcy, 'Bristol's Roads', pp. 149-172.
[48] Frank Llewellyn-Jones, 'The way from Oystermouth Village to Swansea Town, circa 1800', *Gower*, 30 (1979), 36-44.

Figure 59 ‘An old tram’: the Swansea to Oystermouth horse tram[49]



The tram routes had two main characteristics: they connected suburbs with the urban centre and the centre with leisure destinations which were targeted towards the working classes as consumers of both transport and leisure. It became important, therefore, for the profitability of the tramway company for working class suburbs to be connected to the tramway irrespective of whether they were inside the urban boundary or not. In the case of Bristol, tramway routes became an important factor in the expansion of the city boundaries, but had no impact on the civic boundary in Swansea which already incorporated the major working-class suburbs. The line in Swansea was intended to connect Morriston with Oystermouth and all the working class suburbs in between run by the SITC established in 1873. The line would use the existing Swansea-Oystermouth tramroad integrated into the overall system.

Swansea’s system was largely non-controversial within the urban area except for disputes between the SITC and the Council over the costs of road improvements, mainly on the Aberdyberthy Road connecting Hafod with Swansea. There were, however, running legal disputes between the SITC and the Swansea and Mumbles Railway Company which ran the Oystermouth line which were not resolved until 1896. Given how Swansea’s working class population was distributed, the Swansea system was a single line, with some branch lines to the suburbs of Cwmbwrla and Sketty, which connected from Morriston to the already-existing Oystermouth line. It linked all the mainly working class neighbourhoods in Swansea’s industrialized

[49] Alfred Hall, *History of Oystermouth* (Swansea: 1899), p. 39.

valley.[50] Swansea's suburbs lay within the town's boundary which simplified decision-making, unlike Bristol.

In Swansea frustrations over tramway development were not usually expressed in working class suburbs. The construction of Swansea's tramway was empowered by an Act of 1874, but did not open between Hafod and Morriston until 1878. This was mainly due to disputes between the council and the company over the costs of improving the connection between Hafod and the town to enable trams to run over the river, but this did not prompt any great debate from the working class suburbs. For Swansea, tramway development was more closely linked with overall improvements to the town's road system and its impact on commerce and the status of the town. It engaged Swansea's élites, rather than the working classes. In promoting the tramway at a public meeting in the town in January 1874, Walter Webb, solicitor to the SITC, stressed the improvements to the town and its status that would ensue. He considered that the expanded trade and population of the town had 'entirely surpassed the means of the local authority to adapt the public throughfares and buildings to meet the position which the town holds amongst the trading communities of Great Britain.' Following the construction of tramways, he predicted 'the character of Swansea will be entirely altered, and it will rank as a first class town, with public throughfares and buildings equal to the wealth and importance it has attained...' The experience of other towns had made Mr. Webb confident of its success in Swansea. Under the proposed terms of the Act, the SITC would take over the running of the Oystermouth Railway, which he described as being 'imperfect in every respect though it be', and offer cheap trams to the working classes at specified times to facilitate easy movement to and from work.[51] As an editorial from *The Cambrian* later commented, Mr. Webb's reference to the 'industrial population' indicated that the tramway would be commercially successful because of the traffic from Morriston and Landore which was 'enormous, and the revenue the company would get from these districts alone would be such as would enable them to pay the shareholders very handsome dividends upon the amount invested.'[52] In that sense, working-class consumers would fund improvements to Swansea's transport structure and the image of the town.

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[50] *The Oldest Passenger Railway in the World: Swansea and Mumbles Railway, 1804-1954* (Swansea: South Wales Transport Company, 1954); Lee, *The Swansea and Mumbles Railway*.
[51] *Proceedings to Promote the Introduction of Tramways and to Improve the Town of Swansea* (Swansea: January 1874).
[52] *The Cambrian*, 6 November 1874.

In 1877, 'Ratepayer' expressed a widely held view of Swansea's lack of progress following the passing of the Act authorizing the Swansea tramway in 1874. The correspondent also expressed the sense of competition that existed between towns and cities and the need to keep up with the pace of change.

> Swansea cannot afford to lose this opportunity. We are too much behind the age as it is. Neighbouring towns are ahead of us. Neath has its tramways, Cardiff and Newport have theirs. Shall we lag behind? I trow not ... our town, who prides herself on being designated the metropolis of Wales, may indeed become worthy of the name.[53]

In February 1878, a meeting of ratepayers at Nisi Prius Court in Swansea to discuss delays to the tramway 'was densely crowded by a most respectable audience, the great majority of whom were ratepayers of the middle class.' The meeting claimed that 99 out of 100 residents in Swansea supported the tramway but expected that the company would improve the roads as a prior condition to approval by the council.[54] The view of 'A Morriston Man', as a voice from the suburbs, was something of a minority voice in tramway debates. Debates in Swansea were conducted in the main by élites.

> As one of those whose fate it is to live at Morriston I was inexpressibly pleased at the creation of the *Tramway* line from the town to the place of my abode, because it afforded me rapid, easy and cheap means of conveyance over roads that were always bad, and in winter almost impassable. But now, having had a good foretaste of the blessing, I and my neighbours want it in its completeness.[55]

The situation in Bristol was different. The spread of the suburbs required that Bristol's system was constructed as an arterial network. Many of its suburbs were outside the city boundary in Gloucestershire or Somerset County Councils' areas which complicated tramway development. To run a line from the city to Hanham or Kingswood, for example, required approval from at least two local councils and the tramway company. The routes of the Bristol tramways were therefore subject to negotiation over a period of years where working class suburbs found themselves lobbying for connection to the tramway. Consequently, the working classes were at the forefront of tramway development in Bristol. The considerable debates generated in local newspapers over tramways reflected the concerns of working-class people, at least some of whom saw the prospect of the horse tramway opening up opportunities

[53] *The Cambrian*, 2 November 1877.
[54] *The Cambrian*, 8 February 1878.
[55] *The Cambrian*, 1 August 1879.

for them. There appeared to be generalized support for the tramways as being in the public interest and the city council was expected by many to ensure that the tramway company was subject to local control – roads were public facilities and not to be transferred to a private company. Similar sentiments were expressed in Swansea. 'Bristol', a correspondent to the *Western Daily Press* in 1871, considered that the 'Town Council, though it may have a legal, has no moral, right to transfer any portion our gradually improving and costly streets to any private company for its aggrandisement.'[56] The lease of the lines to the company was for 21 years and it was expected that after the lease expired, the council would run the trams as a public concern.

Although some districts did debate the horse tramway and in general welcomed connection to the system, it unfolded in Bristol over a decade but did not provoke the intensity of debates that accompanied proposals for the electric tram in the late 1880s. One of the earliest meetings at Mangotsfield, which would be included in the line from Staple Hill, anticipated that the tramway would improve the road and 'afforded great accommodation to everybody, and especially to the working classes, as the company were obliged to provide trains at a half-penny a mile...' The discussion at Stapleton followed similar lines and the tramway was also supported at St. George's and Oldland.[57] The first line opened in August 1875 between Colston Street in Bristol city centre and Redland, an affluent business district, and was extended to the working class suburbs of Totterdown and Bedminster in 1878. At the opening of the tramway to Redland, the mayor, C. J. Lewis outlined the public benefits expected from the tramway pointedly including the eastern suburbs.

> The fact that such enormous crowds came to see the opening was a presage of success, and that every man, woman, and child would be glad to save their legs, and therefore would have interest in the tramways. (Hear, hear.) ... There was immense population not only St. Philip's, but St. George's, Stapleton, and Fishponds, and trusted that these places would not be long in obtaining the benefits of the tramways as they had been in the White Ladies' Road.[58]

Mr. Wasbrough, one of the partners in the tramways company, took it a step further, and made it explicit that while the tramway would benefit the residents as whole, it encompassed the suburbs outside Bristol, and was specifically targeted towards the eastern suburbs. The tramways 'would be of great importance, not only to the

[56] *Western Daily Press*, 8 February 1871.
[57] *Western Daily Press*, 24 November 1871.
[58] *Western Daily Press*, 10 August 1875.

citizens of Bristol but the large population lying outside...' The partners felt it would be 'of enormous advantage to the large number of artisans who occupied St. George and that neighbouring district of Bristol ... Their object had been entirely for the benefit of St George and those districts, that they might have tramway accommodation...' He concluded with an advertisement for the tram: the charge for any distance was 2d and would run every eight minutes from Colston Street to Redland between 8am and 11pm and from Redland every eight minutes from 8.25am until 11.30pm. On Sundays, they would run from 1.00pm to 11pm every eight minutes from Bristol and from Redland every eight minutes between 1.25pm and 11.30pm.[59]

Bristol's tramway returns for 1886-1887 indicated an overall annual total of over five million passengers on the seven routes, with substantial traffic to the working class suburbs of Eastville, St. George, Totterdown, Bedminster and Horfield by 1887 (see Table 18).[60] Bristol's arterial system brought the suburbs and the centre nearer.

Table 18 Tramway passenger traffic in Bristol for half-years, 1886-1887[61]

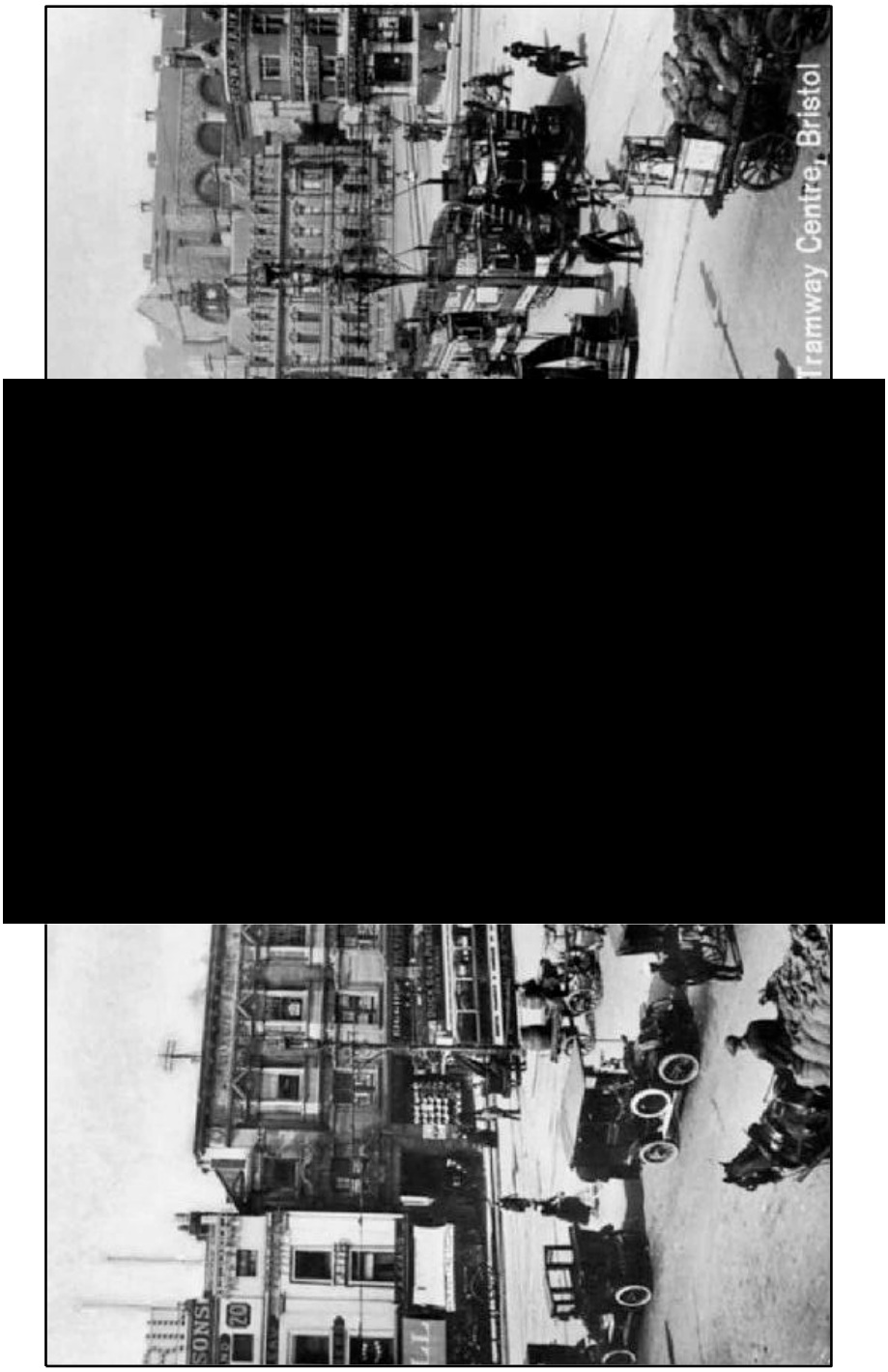
	8 February 1886	8 February 1887
Drawbridge	290,485	301,128
Eastville and Redland	418,400	470,380
St. George	262,976	267,336
Victoria St, Totterdown	518,226	526,957
Hotwells	446,419	480,386
Bedminster	392,167	411,761
Horfield	240,650	249,991
Totals	2,599,323	2,707,922

Bristol's working-class suburbs played a leading role in securing electric tram routes and were far more vociferous in their demands than their contemporaries in Swansea. A possible explanation for this may lie in the different topographies of these urban areas. Bristol's suburbs were often located within rural environments which allowed for expansion and the Tramway Centre was at the hub of this arterial

[59] *Western Daily Press*, 10 August 1875.
[60] *Bristol Mercury*, 2 March 1887.
[61] *Bristol Mercury*, 2 March 1887.

network that constituted the 'Greater Bristol' (see Figure 60). The Centre connected the disparate components of this urban system into a coherent whole linking Westbury-upon-Trym in the north, Kingswood in the east and Hanham, Brislington and Knowle in the south to the city centre in a new urban framework. Bristol's tram network appeared to stimulate suburban expansion and became associated with increasing prosperity and expanding populations which gave Bristol a distinctive character by the end of the century.

Figure 60 Bristol's Urban Hub – The Tramway Centre c.1910[62]



[62] Green, *Rails in the Road:* p. 70.

The Bristol suburbs almost uniformly affirmed the importance of the tramway connection to their future prosperity and linked connection with expansion which was lacking in Swansea. In a short study in 1896 on the impact of trams on rateable values and trading in St. George, a large working class parish that included Kingswood, Mr J. Stubbs, clerk to the district council, stated that the tramway had stimulated construction on the main road through Kingswood.

> The result of the introduction of the tramway into the district has been that the whole of the main road from Lawrence Hill to Kingswood has been almost entirely covered by shops, thus largely increasing the rateable value of the district ... In Kingswood the value of property has enormously increased ... and generally speaking old tenements are being replaced by houses of a better stamp.[63]

In his statement, Mr. Stubbs referred to improvements in housing conditions as Kingswood expanded and there was considerable debate within Bristol on the potential for suburban housing development which would relieve the overcrowding in Bristol's centre. The projected re-housing of working classes to suburbs was made possible by the tram and in the 1880s overcrowding and poor housing were of national concern. Prior to the Royal Commission on the Housing of the Working Classes in 1885, the *Bristol Mercury* had conducted an extensive enquiry into the housing conditions of Bristol's poor which was published in book form in 1884.[64] Bristol and the Royal Commission considered that suburban development in less cramped conditions than the city centre was a possible solution. A correspondent, 'T.W.' in 1897, presented the argument clearly.

> A distance of three or four miles from the city, about 15 or 20 minutes by electric tramways would command in most directions open country. The better class of wage-earners might thus be quickly transported to districts amid healthy surroundings and ample space for cottages and gardens ... free from the taint and turmoil of congested districts...[65]

It is questionable whether suburban expansion did provide better housing for working classes able to make the transition to suburban living. Charles R, Parson expressed a widely held view in 1899 that questioned the benefits of suburban development for the working classes. 'Cheap as are workmen's cars, constant tram driving is expensive, and thus is far from being the only disadvantage in residing a long way off from the city centres... Some of these suburbs are mean and squalid in the extreme,

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[63] *Bristol Mercury*, 4 November 1896.
[64] *The Homes of the Bristol Poor* (Bristol: William Lewis and Sons, 1884).
[65] *Western Daily Press*, 18 February 1897.

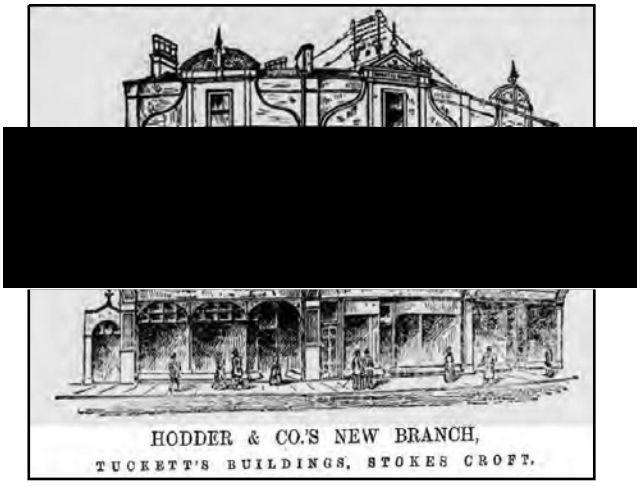
and are a disgrace to our boasted civilisation.'[66] According to Elizabeth Sturge, a leading proponent of 'garden suburbs', suburban houses 'were still being built so close together that the sun could hardly reach them, and the rooms were so small that large numbers still contracted consumption.'[67]

Although suburban development may not have provided the healthy environment for working classes which was an aspiration at the time, the suburbs connected to the tram did expand and by considerable numbers in Bristol which was often identified as a consequence of tramway connection. Mr. R. Brown from Bishopston and a former chairman of Horfield Urban Council, in supporting the extension of Bristol's boundary, argued that 'the phenomenal development of our suburb has been largely brought about by the Tramways Company with its excellent service and low fares'. The continued improvement of the tramway system 'can only result in a continuation of that growth and prosperity of Bishopston and Horfield.' In the same edition of the *Bristol Mercury*, another correspondent from Bishopston, Charles Chorley, also attributed the 'rapid growth' of Bishopston and Horfield to the tram while 'suburbs which have not had the advantage of tramways have grown very slowly in comparison ...'[68]

Bristol's urban expansion in the late nineteenth century was characterised by suburban expansion and the working classes were not simply consumers of transport and housing but also of household goods and services. As Mr. Stubbs had pointed out in his description of Kingswood, a feature of expansion was the growth of shops to meet household consumption. The growth of the 'great northern suburb' of Horfield and Bishopston was emphasized by the construction of 'the imposing buildings and handsome shops all bearing the impress of modern taste and artistic design, now adorning the Croft... The latest edition to these handsome business premises is the block of buildings ... called Tuckett's buildings...'

[66] *Bristol Mercury*, 7 June 1899.
[67] *Western Daily Press*, 24 November 1908.
[68] *Bristol Mercury*, 1 April 1898.

Figure 61 Hodder and Company Provisions Store, Horfield and Bishopston 1896[69]



These buildings had a frontage of 21' x 60' and were the grocery and provisions store of the retail chain of Hodder and Company and would not have been out of place in Bristol's city centre.

In contrast, the impact of the tram in Swansea upon urban configuration was to connect districts more closely with the urban centre rather than stimulate suburban expansion. Suburbs like Morriston or St. Thomas did not experience the same sense of localized prosperity as that expressed by, for example, Staple Hill or St. George. The tram more closely integrated Swansea as an urban area by enabling greater movement, but the more compact nature of Swansea compared with Bristol meant that there were important differences between the two. There was no debate in Swansea that its suburbs could offer a solution to overcrowding and there is little evidence to suggest that the tram promoted suburban development in the ways that were apparent in Bristol. In his letter to *The Cambrian* in 1881, Thomas Walters, a minister from Llansamlet, a village adjacent to Morriston, pointed to

> the great scarcity of houses existing at Llansamlet. No sooner is it known that a house is about to become vacant, than applicants for it become very numerous ... My object however in calling attention to this matter is not so much that of a money investment as in the interest of the working classes, who are now obliged to walk great distances to and from their work in consequence of there being no house accommodation for them near their respective spheres of labour.[70]

Swansea's principal suburbs were already inside the civic boundary by the 1880s and there was no pressing urgency on behalf of civic authorities to connect Morriston, for

[69] *Bristol Mercury*, 13 June 1896.
[70] *The Cambrian*, 3 June 1881.

example, with the town centre. The motivation for providing tramway connections in Swansea had two aspects. The tramway company had clear evidence that a line from Morriston to Oystermouth would engage a mass market of working class consumers ensuring the profitability of the line but for the civic authority it would improve Swansea's road system as a signal that Swansea was a progressive town keeping up with the times.

The six month receipts from the tramway company at the outset of the tramway showed, for example, that two-thirds of the company's income came from the Morriston line to Swansea.[71] The tramway strike in Swansea in 1890-91 gave some indication of the importance of this passenger traffic for working class suburbs on Saturdays. *The Cambrian* report on the effect of the strike indicated that travellers from the suburbs were attracted by shopping facilities in the High Street.

> The strike has greatly inconvenienced Swansea people, especially those in Morriston, Landore, &c. Every Saturday hundreds flock into the town by the trams, but last Saturday they either had to walk, or take train from Landore ... High-street was more than usually crowded up to a very late hour, and the police had enough to do to keep order ... The inconvenience to which the townspeople have been subjected is well nigh incalculable.[72]

Although the tram line was clearly connected to the consumption of leisure by its route to Oystermouth, it also demonstrated an awareness of household consumption by encircling the main shopping areas in Swansea and passing the market which housed over half the butchers in Swansea (70) and 20 green grocers.[73] The purposes of the tram in Swansea were to connect the working-class districts of Swansea with the town centre and from there to Oystermouth and improve the road system. Unlike in Bristol, it did not raise any expectations that connecting the tram would stimulate commercial or housing development in its suburbs. The suburbs of Swansea were more closely integrated into the urban area dominated by the centre unlike the Bristol suburbs of Westbury-upon-Trym or Hanham which retained and developed identities which were separate from, but linked, to Bristol. Morriston and Port Tennant, for example, also had distinctive identities but these were as neighbourhoods within a corporate Swansea. By promoting more rapid and mass travel across the urban area, the tram raised questions regarding whether the civic

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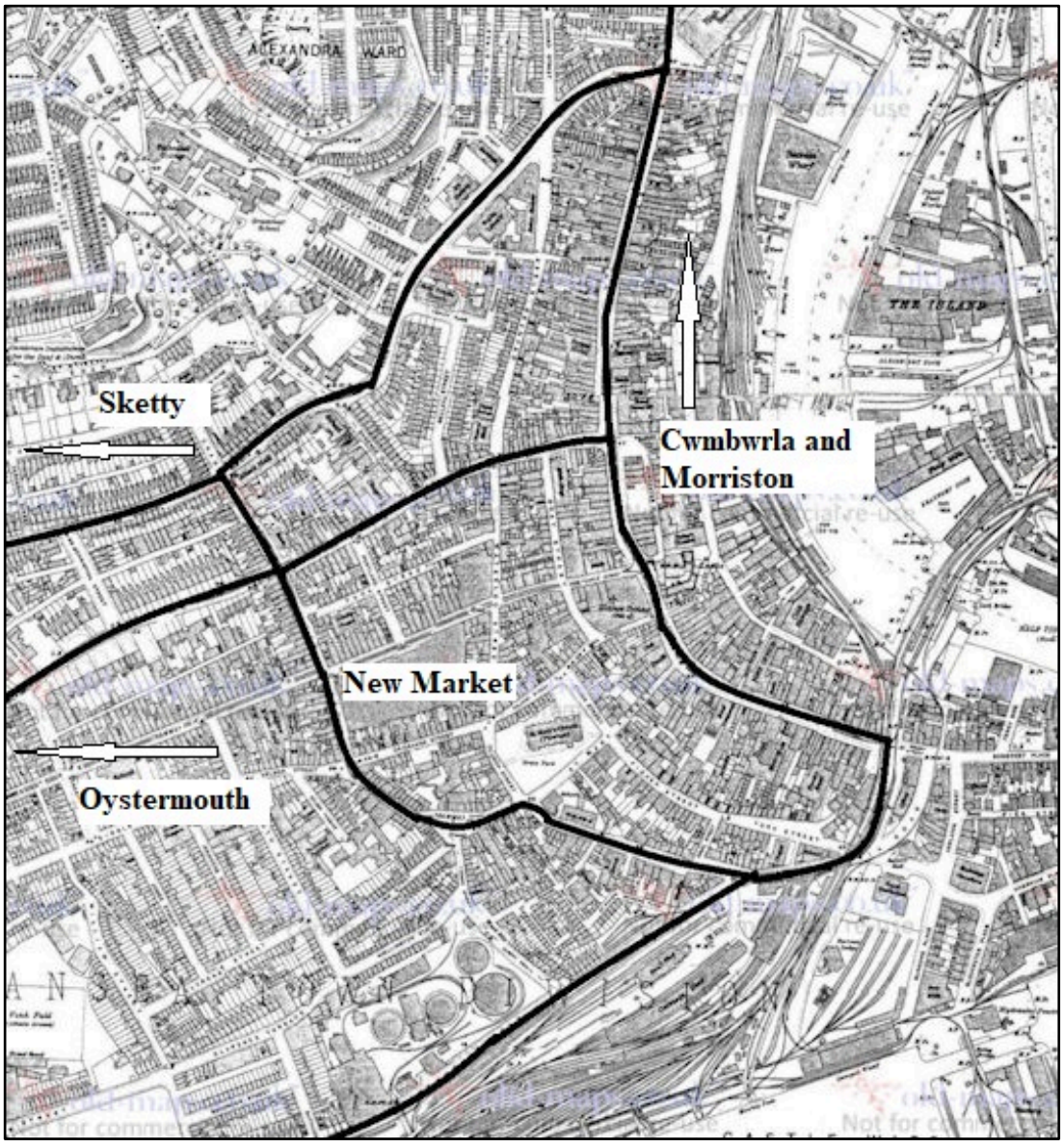
[71] *The Cambrian*, 14 August 1881.
[72] *The Cambrian*, 20 February 1891; David H. Beynon, 'A Year of Unrest. Swansea Tramwaymen's Strike, 1890-1', *Morgannwg*, 40 (19967), 64-79.
[73] *Wales' Trades Directory* (Edinburgh and Birmingham: Trade Directories Ltd., 1912).

boundary should incorporate the suburbs connect by the tram. The issues of the civic boundary, suburbs and tram extensions were connected and sometimes interpreted within the framework of class interests. Swansea's suburbs lay within the civic boundary by the 1890s, but the question of the boundary in Bristol remained unresolved.

Figure 62 The electric tram in central Swansea 1914[74]



In 1894, at a public meeting in St, Philip's in Bristol, a resident, Gilmour Barnett, saw the extension of the boundary as 'a poor man's question' where people in the city were 'driven to seek homes in outside districts' because of the lack of housing which pushed up rateable values in the districts. St. Philip's represented one quarter of the city yet lay outside the boundary resulting in uneven services between

[74] Adapted from Old-Maps <https://www.old-maps.co.uk> [accessed 1 November 2015].

the rural and the urban. At the same meeting, Mr. Moss Levy argued that nine-tenths of the area to be included in the tram extensions was urban and therefore ought to come into the city. 'It certainly could not be right that men who were to all intents and purposes citizens of Bristol should remain outside under a rural administration.' Moss Levy was referring to the practice of the affluent middle classes and gentry gaining their livelihoods and benefiting from services in Bristol, yet living outside the district and not contributing to the Bristol rate.[75]

In 1894, the Bristol and District Trade Council Electoral Association, supported by the Labour Electoral Commission, issued 'a manifesto to the working men of the city on the question of boundaries extension.' The manifesto argued that there was a scarcity of land within the boundary to accommodate the increasing population and the rateable value was not increasing at the same rate as in the outlying districts. Affluent residents from Sneyd Park, for example, could use the city's facilities but did not contribute to the rate. Reference was made to a group of twelve councillors living outside the boundary, the "12 apostles of lesser Bristol", who 'would not oppose us if we would adopt the Parliamentary boundary, and leave their own pet district outside. We are not such fools; if the poorer districts must come in so ought the rich...'[76] This was a reference to affluent suburbs which benefited from Bristol's trade and services without contributing to the city's finances. In a similar vein, the Cardiff Ratepayers Poll Committee opposed the extensions of the tramway outside Cardiff's boundary which, it was argued, simply intended to include these districts in a 'Greater Cardiff'. 'If these parishes want tramway communication with Cardiff let them pay for it, and not the ratepayers of Cardiff, who will bear all the risk and get none of the advantages.'[77] The boundary question, which was linked to the tram extension and the population increases in the districts, had become an issue of class.

The eventual opening of the line to Kingswood line in Bristol was heralded as a sign of progress for all classes and expressed a sense of identity between the district and the city; working classes were perceived as being included in this future. A leading article from the *Western Daily Press* regarded electric traction as important in all town and cities 'having pretensions for progressiveness...The line which connects Bristol with Kingswood has proved triumphantly successful.

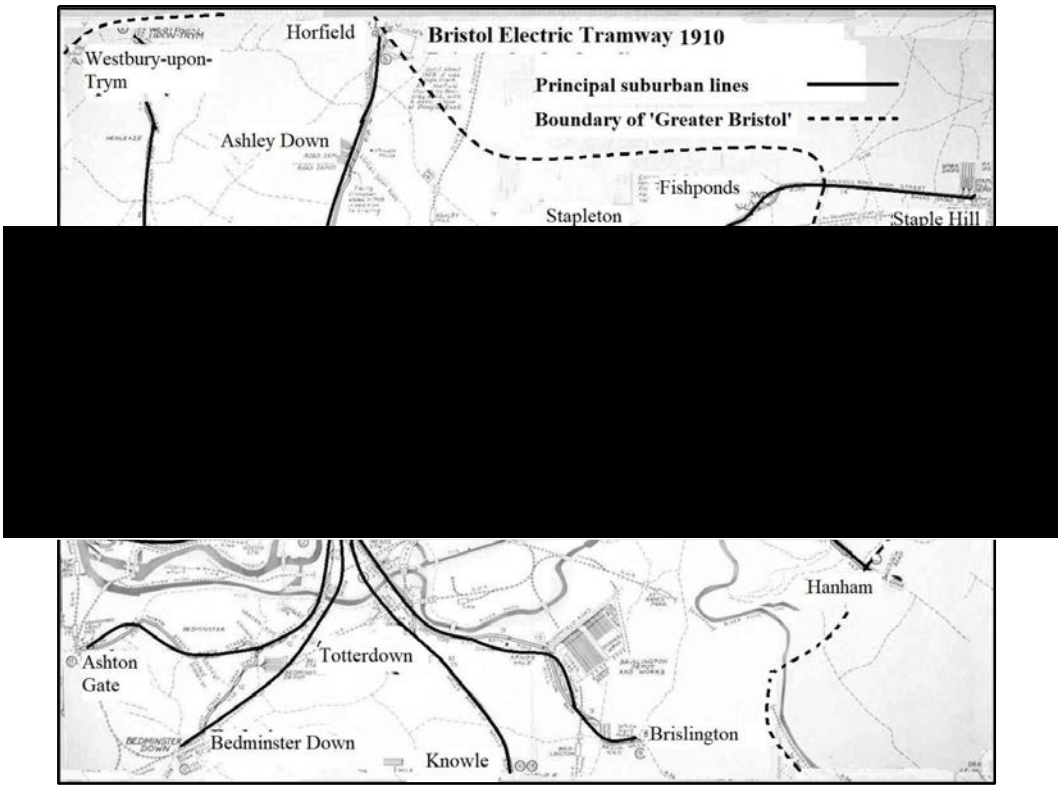
[75] *Bristol Mercury*, 26 May 1894.
[76] *Bristol Mercury*, 26 May 1894.
[77] *The Welshman*, 14 February 1900.

Indeed, the whole tramway system of Bristol, with its penny fares ...has been managed with consummate ability...'. The editorial made the importance of the connection between transit and distance in meeting the challenges of an expanding urban area.

> All growing towns and cities expand from the centre and, consequently, a system of quick and cheap transit has become an imperative necessity. It helps to solve the problem of urban congestion, for it enables industrial classes to live cheaply and healthfully in suburbs comparatively remote from the scenes of their daily toil. The efficient service of cars is, therefore, a considerable economic force...

The electric tram had proven to be a major stimulus for a more integrated and expanded Bristol city, but one in which the interests of the working classes were prominent and which was seen to rectify an unfair system.

Figure 63 The Electric Tramway in Bristol c.1910[78]



[78] Western Power Electricity Historical Society, <https://wpehs.org.uk> [accessed 30 April 2020).

Trams and working-class entitlement

The implementation of tram networks placed the working classes towards the centre of this process as consumers as well as citizens with rights which affected how urban space was redefined. There is an extensive historiography on urban space and how it is socially constructed and defined from the 'Chicago' school of urban geographers onwards.[79] Conflicts over urban social space stemming from working class demands for access to leisure underlined C. G. Pooley's comment that 'urban space is a resource which is contested and control over space conveys advantages to some and disbenefits to others.'[80] In his study of debates around the potential enclosure of the public open space of Brandon Hill in Bristol in the 1830s, a popular venue for working class recreation and political agitation, Steve Poole demonstrated the connection between citizenship and access to public spaces. Citizenship in Bristol 'meant more than just membership of the political nation; it meant active, visible and unrestricted access to the public and civic domain, symbolically represented ... in social conflicts over particular resonant topographies and spaces.'[81] Working-class suburbs in Bristol were forceful in their efforts to connect to the city centre and in facilitating access to traditional leisure destination on the Downs to the west. In these controversies, the interests of the working classes were identified by civic leaders as synonymous with the interests of the public as a whole, although the profits to be made from working class travel were not unimportant in helping to decide these issues along with the growing self-confidence and powers of working class organisations. The issue was presented as one of citizenship.

The expansion of traffic and the placing of the working classes at the heart of this process, even if this was primarily to engage working people as consumers, took place within a wider context of the extension of the male franchise under the Reform Acts of 1832, 1867 and 1884, although the 1884 Act had little impact in urban areas. The 1867 Act, for example, enfranchised all male householders and lodgers who paid rates of a minimum of £10 per annum which substantially increased the electorate for working class men and virtually doubled the electorate nationally. The passing of the Act reflected a sense within élites that working classes could now be 'trusted' to be

[79] Martin Bulmer, *The Chicago School of Sociology: Institutionalization, Diversity, and the Rise of Sociological Research* (Chicago: University of Chicago Press, 1984); Pooley and Johnson, *Nineteenth-Century Cities*.
[80] C. G. Pooley, 'Patterns on the ground: urban form, residential structure and the social construction of space', in Daunton, *Urban History*, pp. 429-465, (p. 432).
[81] Steve Poole, "Till our liberties be secure": popular sovereignty and public space in Bristol, 1750-1850, *Urban History*, 26.1 (1999) 40-54, (p. 54).

included in the body politic and in a wider social world. The 'dangers', as they were imagined, of Chartism had declined and organized labour was perceived as less of a threat than in the 1840s. The working classes were regarded more as 'citizens' in the commonwealth.[82]

The Cambrian acknowledged the potential power of the working class suburbs in Swansea as the franchise extended. This was not fear of insurrection but of working-class influence in local democracy.

> Popularity with the large masses of the working classes of Morriston and the outlying districts is a sufficient credential to unlock the door of the Council and give the candidate free entree. We do not for a moment say that the working classes should not have a vote or choice in the selection of those whom they wish to send into the Council. ... But in consequence of the great preponderance of electors in Morriston and Landore - the large aggregation of the working classes there - the middle and upper classes of the town proper are completely swamped, and their views and opinions are practically unrepresented in the Council.

The editorial went so far as to suggest that Morriston, Landore, and 'other outlying districts' should be separated from Swansea proper. The 'intellectual demands' of the town were 'very considerably jeopardised' by the connection with outlying districts and suggested 'an entire severance, provided of course that amicable arrangements could be come to for the payment of the amounts expended in carrying the drainage and lighting to the outlying districts.'[83] *The Cambrian*, in its editorial comment on the working class outlying districts, had acknowledged the increasing power and self-confidence of working-class people as citizens who had rights and were prepared to exercise them. Debates, particularly in Bristol, were often couched in terms of social class and expressed in conflicts over routes and fares where the local council, rather than the tramway company, was blamed for ignoring the wishes of working-class neighbourhoods in the construction of tramways.

The prospectus of the Bristol Tramways Company published in 1875 made it clear that the tramway would encompass working class suburbs that were at the time outside Bristol's boundary towards the east and provide access to leisure destinations in the west. It would 'provide for a population of almost a quarter of a million a thoroughly comprehensive and complete system of tramways which is more specially

[82] K. Theodore Hoppen, 'Reform and Electoral Politics' in Hoppen, *The Mid-Victorian Generation*, pp. 237-271.
[83] *The Cambrian*, 3 December 1873.
[83] *The Cambrian*, 3 December 1873.

needed by the populous districts through which the lines pass.' It would 'afford the very large artisan population of the Eastern portions of the City the means of easy and direct access to the Clifton and Durdham Downs, which ... are not visited to any appreciable extend by the working classes.'[84] It was also made clear that this was intended to become a system of mass public transport and specifically mentioned connecting working-class suburbs with the recreational areas in the west at Clifton and Durdham Downs.

The mood at the time showed little patience with resistance to trams and this had the effect of making an agenda for social inclusion public policy. A debate in the town council in 1871 set the tone for these debates which continued throughout the decade as the tramways unfolded. A memorial from the residents of affluent Clifton Park objected to the laying of a tramway at the junction of White Ladies Road leading into Clifton Park and skirting Clifton Downs 'unless the general interests of the city imperatively demanded it' on the grounds that it would reduce property values. It was also suggested that tramways would monopolize traffic to the detriment of cabs and Bristol's streets were too narrow for tramways. In moving the resolution to support the tram development, Mr. Pethick, for the council, argued that tramways enhanced the value of property in the example of Birkenhead, and where he had seen tramways, 'they were of great benefit to the public. He was sure tramways in Bristol would be an enormous public boon.' Tramways would be run on Sundays in the interests of recreation, implying that he was referring to the working classes who had free time on Sundays. 'Very often they saw overloaded omnibuses and carriages dragged with great difficulty. A line of tramways would very much lessen the labour on Sundays both of man and horse ...' Mr. Pethick acknowledged the potential power of the working classes to force access to leisure. 'In summer weather, to deprive people of the means of recreation and getting into the pure air, Sundays well as other days, would not last long, for the public voice would demand a change.'[85]

Most of the Bristol's suburbs lay outside Bristol's boundaries in the 1880s which were governed on a local basis by two tiers. Most working class suburbs had to engage with four sets of interest groups in lobbying for the tram connection: the district and county council, Bristol City Council and the Bristol Tramways Company. Laying and running the tramway required the approval of the each council, and

[84] *Bath Chronicle and Weekly Gazette*, 30 September 1875.
[85] *Western Daily Press* 1 February 1871.

debates in the suburbs about tramway development were frequent as the tramway company sought local approval for their extensions. These debates also drew the suburbs into issues around the extension of the city's boundaries at the expense of the local councils and were often linked with discussions about where the future of the suburbs lay and most opted for being a part of Bristol. It is clear from these debates in Bristol that the electric tram and its prospects of cheaper fares energized working class districts in ways that the horse tram had not. John Stubbs, Hon. Secretary of the committee formed to support tram development in St. George and Kingswood, expressed the view that 'There never was a subject that evoked more enthusiasm in this district than this, and the whole of the residents and manufacturers are practically unanimous in its support.'[86]

Unlike the horse tram, the first electric tram in Bristol was intended for Kingswood, a working class suburb described as a 'a town of boots and shoes' referring to its manufacturing base. The line demonstrated to the suburbs the effectiveness of the new tram in reaching relatively distant destinations across difficult terrain.[87] Kingswood was elevated and only reached by the horse tram with difficulty. At a public meeting in Kingswood in 1891, the chair of the meeting, Mr. A. Lovell, stated that the people of the parish

> were in no small way indebted to the tramway for the advance which the parish had made during the last ten years. None of them could shut his eyes to the fact that there had been considerable advantages accruing from the tramway, although before it was laid down fears were expressed that it would interfere with the business of the parish. This was a fallacy which had been exploded by results.

In response, the chair of the tramway company, William Butler, expected passengers to be able to travel from Bristol to St. George in 20 minutes for 2d and to Kingswood for 3d and there would be no delay in hilly areas. The road, as required by legislation, would be paved and the company would use granite. Unsurprisingly, the motion supporting the electric tram to Kingswood via St. George was passed unanimously.[88] Although most suburbs responded in a similar way, the local authorities in the city and the counties were seen as obstructive by insisting on wooden surfacing for the roads when the company preferred to use stone and, for Bristol, the right for the council to supply electrical power. For local councils, issues around the paving, straightening and widening of roads, and the supply of electrical

[86] *Bristol Times and Mirror*, 15 February 1894.
[87] *Western Daily Press*, 15 January 1894.
[88] *Western Daily Press*, 8 January 1891.

power, were issues of municipal control of their thoroughfares. The tramways were an aspect of town and city improvements which were the responsibilities of councils, not companies, whose interests were in making profits and not serving the needs of the local population. For the most part, the outlying districts had little patience with these issues and demanded that the councils cooperate with the company.

Most working-class suburbs identified with Bristol as opposed to rather distant county councils in Somerset and Gloucester. A correspondent from Totterdown, Charles Enright, a leading proponent of the tram connection to Totterdown, expressed views which were largely shared across the working-class districts and critical of Somerset County Council in its opposition to the line to Bedminster via Totterdown. He was dismissive of 'the wood paving fad' where local councils required tramway companies to lay the surface of the road with wood, and which, according to Enright had prevented 'an improved service of cars'.

> It is most displeasing, if not distressing, to find every action of the Tramway Company fettered with serious opposition... The enterprise of the Company is not only splendid but much appreciated by citizens and visitors alike... The refusal of our local authorities to accept proposals in the public interest comes with undue severity upon those closely interested... The Totterdown people, however, must not quietly submit to such high handed proceedings... The Somerset county authorities have ever displayed a reluctance to spend money at Totterdown, although large sums have there been collected in the way of rates.[89]

'Observer', writing in 1891, shared similar feelings in respect of delays to the Kingswood line which crossed Bristol City and Gloucester County Council boundaries, referring to the County Council as 'a body of gentlemen, without the slightest knowledge of the locality' who had ignored 'the resolution in favour of the tramway passed by the Local Board, as well as the expressed wishes of the inhabitants in the public meeting assembled...' While the chairman of the county council

> in his wisdom characterises the tramway as a nuisance, many thousands can testify to the contrary, as it would enable the Kingswood workers to leave home at 5.30 a.m. instead of 4.45... I hope to see the Local Board speak out, in defence of the right to control the traffic on their own roads, as well as the busy workers, and the cable tramway may yet be an accomplished fact.[90]

[89] *Western Daily Press*, 12 January 1891.
[90] *Bristol Mercury*, 15 January 1891.

A letter from 'a frequent traveller on the Redland trams' in 1891 illustrated the importance of cost to the working classes following a doubling of the fares, and how participation in public transport was divided by class. According to the correspondent, the roads were occupied by

> a continuous stream of working people making their way homeward, very tired in appearance after their long day on the Downs, and among these were toilworn mothers carrying their babes in their arms, with two or three weary little children trotting at their side.

He indicated that most travellers were not working class during the working week, Redland being an affluent district.

> On ordinary occasions nearly two-thirds of the passengers belong to the upper or lower middle class, and we pay a penny from Redland to Lark-street. On Easter Monday, the bulk of the travellers are of the working class, and two-pence each is demanded of them. Does this appear fair or reasonable? What opinion must our working people form of such a proceeding? They will naturally think that the laws are made to favour the well-to-do and to press heavily upon the poor.[91]

A resolution from the Totterdown Branch Labour Electoral Association continued the theme of working-class interests with its resolution: 'That this meeting protests against the action of Bristol Town Council in refusing to insert clauses in the Tramways Bill providing for workmen's trams, and against the doubling the fares at holiday times.'[92] The *Western Daily Press* contended that 'Workmen's trains and workmen's trams are existent institutions ... this exclusive devotion of cabs to the use of one class is a matter which the thinkers of the new era should take in hand.'[93] This was followed in June 1894 by a resolution from the Bristol Trades Council requesting that Labour MPs 'block the tramways bill unless workmen's trams were run at ¼d per mile and that no through route should exceed 1d.' Representatives from Kingswood were reported as being strongly opposed to the resolution; the people of Kingswood wanted the trams 'at any cost' and the resolution was defeated. These debates and resolutions clearly demonstrated that the electric tram was an issue for working class suburbs and representatives of organized labour in the city were active in demanding tramway extensions, and had determined views on fares.

The level of fares heavily influenced rates of participation and this was reflected in the debates concerning special rates for working classes which were allowed under the 1870 Act. Under the terms of the Act, working classes could enlist

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[91] *Bristol Times and Mirror,* 1 April 1891.
[92] *Western Daily Press*, 5 March 1894.
[93] *Western Daily Press*, May 21 1894.

the support of the Board of Trade in asserting their rights. In 1879, the *Cardiff Times* reported that 'a memorial is to be sent to the Board of Trade, calling upon the Cardiff *Tramway* Company to run workmen's cars before seven o'clock in the morning, and after five in the evening, to and from Canton and the Pier-head.'[94]

A debate on fares held by the Totterdown suburb expressed similar feelings. In December 1879, a public meeting was held at the Bush Hotel in Totterdown to argue, in correspondence with the Board of Trade, that the fares from Totterdown were too high for a working class district which was entitled to 'working class privileges' as defined under the Tramways Act. The Board of Trade took the view that Totterdown had a population of 'warehousemen, clerical and similar others', while Totterdown responded that the similar others were 'railway porters, mechanics, labourers' and therefore entitled to workmen's trams.[95] At an election meeting in Staple Hill in 1888, a candidate George Lane remarked that fares for workmen's trams to Bristol from this 'large and important district' and which was 'rapidly becoming a suburban residential district for Bristol', had been set at 3.6d. and claimed some credit for reducing them to 1s.9d. These levels of fares would have put them out of reach of most of the working classes.[96] Debates around tramways intensified with the onset of electric tram and the prospect of reduced fares to around 1d for each section, and even ½d for 'workmen's trams'. These debates were not limited to Bristol but were common in large urban areas.[97]

Lobbying for cheap fares was not restricted to access to work. A 'Letter from a Working Man' in Bristol argued that for cheap fares in order to visit the Hotwells. While supporting the Tramway Company for 'having set up an enterprise in the shape of tramcars all over the city, as against our old system of cabs and carriages, at considerably lower fares', 'Working Man' considered that a rival company represented

> an improvement on the two-penny tram fare and well patronised by the inhabitants of Hotwell Road and the public. A penny fare has long been wanted on this section, as Hotwells really is the only nice place we have to go to, the neighbourhood around being so much appreciated; and where one has a family to take down there now and then from Eastville or Stapleton Road, it is expensive.[98]

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[94] *Cardiff Times*, 9 August 1879.
[95] *Western Daily Press*, 29 December 1879.
[96] *Bristol Times and Mirror*, 28 December 1888.
[97] Simon T. Abernathy, 'Opening up the suburbs: workmen's trains in London 1860-1914', *Urban History*, 42.1 (2014), 70-88.
[98] *Bristol Mercury*, 22 August 1887.

Working-class suburbs in Bristol were assertive of what they considered to be their rights to mechanized mobility and demonstrated a sense of entitlement in achieving one of their principal demands for cheap transit: access to leisure in the countryside and the coast. In Bristol, the routes to the countryside in the Downs of Clifton and Durdham went through affluent areas. Residents of these neighbourhoods were resistant to trams because it opened up these neighbourhoods to working-class tourists who had previously been excluded because of cost. The 'Ghost of St. Vincent' expressed this opposition bluntly in 1875 and made it clear this was an issue of social class: an 'anti-petition' referred to the intention of the tramways company to 'carrying passengers at cheap rates and particularly workmen who reside at considerable distances from their work...' The petition argued that tramways were not wanted and travellers should use the hansom cab 'invented by a Bristolian ... workmen are not wanted on the Downs'.[99] The electric tram, in particular, made these areas more accessible to working classes and conflict over whose rights of transit should dominate led local authorities into assuming roles as custodians of 'the public interest' and influenced them in extending ideas about municipal control of key services – transport, housing, health, gas and electricity.

In Swansea, there was little conflict over urban space. The horse tram had traditionally provided access for Swansea's working classes from early in the century to Oystermouth and the electric tram continued this practice but with larger numbers. Oystermouth and Mumbles welcomed Swansea's day trippers and access to Oystermouth did not require moving through affluent suburbs. In contrast, Bristol's traditional urban leisure areas were located in the west of the city along the Avon – broadly speaking, the Downs – which were residential areas for affluent classes. The process of the tramway company providing access for working-class suburbs to the Downs provoked tensions between the interests of the working classes and those of the middle classes and gentry who resisted working class access. The ways in which this conflict was played out in Bristol not only extended working class access to traditional 'gentrified' leisure, but reinforced a growing sense that working classes were citizens with civic rights which could override vested and privileged interests. However, although conflict over access public open spaces became an issue of citizenship, it did not escape the tramway companies that profitability and citizenship coincided. The 'public interest' also served company profits.

[99] *Western Daily Press*, 14 May 1875.

Tram development had unintentionally promoted a stronger sense of citizenship and entitlement. A letter from Thomas Webster, a resident of Redland in 1896, expressed this sense of inclusion and progress about the city's transport, its benefits and opportunities, which was probably shared with most Bristol's citizens. There is no suggestion in his letter of a wish to be exclusive in his social relations and argued for extended access to the tram and the opportunities it created for the working classes. He described himself as a daily passenger and one who 'shared with the poorer classes' – the 'walking class' - an interest in the electric tram. Having ridden on the electric tram to St. George, he found it moved smoothly at twice the speed of the horse tram and

> it seemed quite a luxury to sit in it. My first thought was "Wouldn't this be a boon, not only to the great mass of the 'working classes', saving them time, which is money, as well as fatigue, which is a physical loss, and deteriorates health and comfort and the power to earn their daily bread by the sweat of their brow, but, besides, who can calculate the relief which it will be to the poor over-wrought walking doctor, the hard-pressed curate or vicar ... to the holiday people , when freed for a brief interval from their toil and care, to be landed not at the bottom of Black Boy Hill, but close to the lovely Downs ... it is consoling to know that we have not only the press and the people on our side, but also the overwhelming weight of scientific evidence...'[100]

The tram also had implications for relationships between genders. Tram companies operated a standard fare according to the route and made no distinction between classes of passenger unlike the steam railway. Classes and genders mixed freely on the tram. In the case of women passengers, there were no attempts to segregate women which affected behaviour on trams. The tram had encouraged women into the public sphere which had its impact on relationships between the sexes and how they conducted themselves with each in a public space. The tram may have influenced women's dress and forged new social conventions on behaviour. There appeared to be a code of behaviour in tramway travel which was driven by a sense of what behaviour was appropriate in the company of women. However, women may also have faced harassment at times when travelling in trams and Judith Walkowitz has indicated some of the dangers awaiting women in the public sphere.[101] 'Merlin', in writing to the *Cardiff Times* in 1886, was

> struck with the notable want of courtesy shown towards the women who use those vehicles ... One doesn't expect Chesterfieldian manners in this

[100] *Western Daily Press*, 8 December 1896.
[101] Judith R Walkowitz, 'Going Public: Shopping, Street Harassment and Streetwalking in late Victorian London', *Representations*, 62 (1998), 1-30.

> rough and tumble world but common courtesy demands little acts of self-abnegation in the interest of the weaker sex.[102]

In July 1889, *The Cambrian* commented upon 'the somewhat frisky and rude conduct of the telegraph messenger boys on the tramcars.' Their behaviour sometimes went beyond 'a limit', when 'risibility sinks into rudeness and fun degenerates into offence'. When the boys 'get together ... sometimes in larkish moods, they make it uncomfortable for other *passengers*, and especially for ladies and other more or less timid persons.' According to *The Cambrian*, the use of trams was admirable for the quick delivery of telegrams, but 'All that is wanted is that the lads should be officially cautioned as to their behaviour ...'[103]

Along with telegram boys, smokers were not excused proper behaviour but may not have observed the convention. They were allowed to smoke on the outside of a tram, but as a comment from a Bristolian reported in the *South Wales Echo* pointed out, 'ladies' often liked to sit outside in the summer and therefore smokers should sit at the back of the tram.[104] Overcrowding, however, was not excused in the interests of 'ladies'. In 1905, a Cardiff tram conductor pleaded in court that his tram was overcrowded 'out of kindness to some ladies'. Mr. Plowden, the magistrate, who appeared unmoved by the defence, advised the conductor 'to resist the blandishments of ladies. It is difficult, but it has to be tried.' Mr. Plowden fined the conductor two shillings and sixpence with 6s costs 'just to fortify you.'[105] 'A Passenger' from Swansea writing to *The Cambrian* urged women in 1887 to 'buy whistles to make themselves heard, for a mere shout or a wave of a handkerchief or umbrella is altogether unrecognised' in hailing a tram.[106] A report in the *Evening Express* in 1891 expressed impatience with some women passengers which may have been indicative of a more widespread attitude, but it did imply that significant numbers of women used the tram.

> When will people understand that the 'busses and cars are not their own private carriages, but are meant for the convenience of the public generally. Ladies are the greatest offenders in delaying cars and 'busses. If one stops a few yards from where they stand, do you think they can walk that distance? No they insist upon its being brought up to the very spot where their ladyships are waiting. ... The unnecessary stoppages are most irritating to passengers who have no time to lose.[107]

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[102] *Cardiff Times*, 25 December 1886.
[103] *The Cambrian*, 12 July 1889.
[104] *South Wales Echo*, 5 July 1897.
[105] *Evening Express*, 10 March 1905.
[106] *The Cambrian*, 4 February 1887.
[107] *Evening Express*, 24 April 1891.

By the early twentieth century, the tramway network was closely linked with the expansion of urban areas that incorporated most working class districts even if they lay some miles from the centre. The separation was spanned by the trams which helped integrate distant districts within the civic authority. This sense of inclusion was not simply limited to geography but helped define disparate urban areas like Swansea and Bristol as a social organization of diverse classes, identities and interests. Such integration would not have been possible without the tram. There is no evidence to suggest that social mixing in trams and on the rural Downs or sea-side Oystermouth engendered any significant conflict between social classes. The tram, by providing a platform for travel across all social classes, promoted a social interaction which was unprecedented and gave practical expression to the concept of 'citizenship'.

New horizons in leisure

The 1880s saw the rise of professional sports made possible by spectators who paid to watch. This period coincided with the onset of the horse and then the electric tram which contributed to new levels of participation in formal sports by affording spectators cheap and easy transit to sports grounds. The tram can be considered as a contributory factor in the extension of spectator participation, alongside the more important factors such the extension of leisure time and rising real incomes. By supporting greater volumes of spectator attendance at sporting events, the electric tram played a role in a developing Welsh identity towards the end of the century by enabling football (modern-day rugby union) to emerge as a focus for Welsh nationalism.

In their discussion of the growth of spectator sports in the late nineteenth century, Mike Huggins and John Toulson have argued that for the growth of these sports in the larger urban areas, 'it was crowds arriving on foot, or by the electrified tramways of the late 1890s, rather than by the railway, which these late Victorian sports grounds relied upon...'[108] Of particular importance was the increase in the population and increases in leisure time and in the real incomes of working classes.[109] Wray Vamplew has presented a similar argument.

> By the mid-nineteenth century, rising incomes and improvements in transport technology were laying the foundations for future

[108] Huggins and Toulson, 'The railways and sport', 108.
[109] Huggins and Toulson, 'Railways and sport', 107.

> developments, and in later decades substantial gains in working-class spending power, growing urbanization, and the concentration of free time into Saturday afternoons, encouraged entrepreneurs to market gate-money sport on a regular basis.[110]

The significance of the increase in population was its concentration in urban areas providing a potentially large working class market whose mobility was enhanced by the tram. The tram enabled spectators and participants to travel across urban areas easily and cheaply, although the bulk of the spectators were male.[111] A fixture list for association football in Bristol for a weekend in September 1902 showed competitive matches being played across the working class districts of Bristol, including Brislington, Westbury, Staple Hill, Eastville and Totterdown as well as the Downs which suggested strongly that teams and spectators would travel to all places which were easily accessible by tram.[112] It is difficult to imagine how two football clubs in Bristol at Ashton Gate (1894) and Eastville (1897) could be formed and prospered in the 1890s without the tram. In June 1890, *The Cambrian* reported on a football match where Morriston Working Men's Club had 'travelled' to Briton Ferry to play a match and during the Swansea Tramways strike of 1890, Swansea played Cardiff at St. Helens, with reports that over 14,000 people had travelled to watch the match. The Cardiff team walked from the station, but the implication of the report was they could not take the tram because of the strike. At a meeting of Swansea's Watch Committee in February 1891, it was reported that 3,000 spectators had travelled from Cardiff for the match and the trams that were running were overcrowded. Alderman Pike observed that with the match being played, 'overcrowding could scarcely be avoided.'[113] The implication was that many of these spectators would have used the tram to reach the ground with the resultant overcrowding of the few trams that did run.

That demand overwhelmed supply on Saturday match-days did not appear unusual. In commenting on the Council debates around introducing the electric tram into Swansea, *The Cambrian* noted that 'one car meets three or four thousand football people at the Baths on a Saturday afternoon', the 'Baths' appearing to be the tram stop on the Oystermouth Road near the St. Helens ground where the matches

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[110] Wray Vamplew, *Play Up and Play the Game: Professional Sport in Britain 1875-1914* (Cambridge: Cambridge University Press, 1988), p. 73.
[111] Kathleen E. McCrone, 'Class, Gender and English Women's Sport 1890-1914', *Journal of Sport History*, 18, No. 1 Special Issue: Sport and Gender (1991), 159-182.
[112] *Western Daily Press*, 19 September 1902.
[113] *The Cambrian*, 27 February 1891.

were played. According to *The Cambrian*, about one-third of passengers finished their journey by walking because of the slowness of the tram.[114] Following the extension of the electric tram to the suburb of Brynmill, Mr. David James, manager of Swansea Football Club, reported that the Bryn-road section proved a great 'draw' for the match at the St. Helen's ground.[115] The tram appeared to support competitive sports even if the number of trams was insufficient to meet the demand. The tram may have also played its part in a developing Welsh identity.[116]

From the 1880s which coincided with onset of mass public transport with the horse tram, competitive matches were arranged on a national basis between the home nations of the United Kingdom. While most sports fans would have used the train to travel to the towns and cities hosting these national events, internal travel within the urban area was supported by tram networks. According to David Andrews, rugby union, as one of these spectator sports, had 'long been a setting in which Wales has sought to win some space from the smothering grasp of an overbearing England.'[117] In reporting on a football match between England and Wales in 1900, *The Cambrian* announced 'ANOTHER VICTORY FOR THE PRINCIPALITY: WEIGHT IN FRONT AND SCIENCE BEHIND'. The Welsh team had beaten 'the English fifteen for the second year in succession ... in which the Welsh forwards beat the English at their own game and enabled our backs ... to contribute, in characteristic Welsh style towards the second successive defeat of England.'[118] As Andrews has pointed out, the period between 1890 and 1910, which coincided with the onset of the electric tram, was the 'zenith of the modern Welsh nation' when the game of rugby 'was transformed into a high profile symbol of a vibrant and self-confident national ideology.'[119] Identity was not confined to rugby union as the growing popularity of soccer demonstrated.[120] A number of factors had combined during this time to promote the growth of working class participation in spectator sports – the concentration of working class communities in urban areas, the extension of leisure time and rising incomes and cheap internal mobility provided by the tram.

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[114] *The Cambrian*, 8 January 1897.
[115] *The Cambrian*, 28 April 1905.
[116] David L. Andrews, 'Welsh Indigenous! and British Imperial? – Welsh Rugby, Culture and Society 1890-1914', *Journal of Sports History*, 18.3 (1991), 335-349.
[117] Andrews, 'Welsh Indigenous', 338.
[118] *The Cambrian*, 12 January 1900.
[119] Andrews, 'Welsh Indigenous', 337.
[120] Johnes, *Soccer and Society*.

Passenger traffic on trams was heaviest on weekends but the usage was probably different between Saturday and Sunday. A report on daily passenger volumes in Pontypridd in 1905 showed that Saturday traffic was almost double that of a week-day.[121] From a total of passenger traffic for the week ending 9 September of 35,425, 10,429 passengers travelled on Saturday. Saturday had been established as 'half-day working' under the 1850 Factory Act and the advent of the tram enabled more working class people to shop and pursue leisure activities, including organized sports, on a Saturday afternoon. The use of the tram on Saturdays may have been dominated by shopping and spectator sports while on Sunday the emphasis shifted towards family recreation and leisure activities focused on the beaches and Oystermouth for Swansea and the Downs in Bristol.

In Swansea, Oystermouth was a focus as a leisure destination for Swansea's residents, including the working classes, who had used the horse tram since 1856 to reach Oystermouth. Apart from some short-term issues relating to the High Street and the Aberdyberthy Road which interrupted the line from Morriston to the town, there were no significant disputes over the tramways route and rites of transit. The horse tram route followed the Swansea valley from Morriston to the town centre via Landore and Hafod which was through working class areas and which did not entail having to cross the more affluent and gentrified areas of Uplands and Sketty in the west.[122] Oystermouth as a fishing village welcomed Swansea's visitors. At a public meeting in 1879 in Oystermouth called to support the introduction of steam traction on the Oystermouth line, Mr. Gammon for the Oystermouth Railway expressed his gladness to see 'so many workmen here, dredgers and fishermen who have an interest - and a deep interest ... Without a railway we cannot get anything worth having, and if we get the railway...we may expect everything that we require.'[123] This may have reflected a sentiment that the railway was associated with prosperity.

When the Act was passed authorizing Swansea's horse tramway, its linear route was defined as from Morriston to Oystermouth indicating that access to leisure was a priority for Swansea's suburbs and that the company anticipated a profit from the line from working-class consumers of leisure. The Oystermouth line was already well-used as a horse tramway for day trippers from Swansea and the Act allowed the SITC to use the line having failed to take over the Oystermouth railway company.

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[121] *Pontypridd Chronicle and Workman's News*, 16 September 1905.
[122] *The Cambrian*, 22 March 1878.
[123] *The Cambrian*, 17 January 1879.

The popularity of Oystermouth stemmed from its relative isolation from the urban world of Swansea and its industrialized valley where working class families could 'escape', even for a short while, to 'the chief sea-aside resort and bathing-place of Swansea folk.'[124] In a letter to the Countess of Winterton in 1808, Elizabeth Isabella Spence, an early traveller on the Oystermouth tramroad, described the attraction of Oystermouth. She had 'never spent an afternoon with more delight than in exploring the romantic scenery of Oystermouth.'[125] Oystermouth Castle was described by another traveller as 'an old and majestic ruin'.[126] In his history of Oystermouth, Alfred Hall claimed the castle as 'a favoured retreat of Oliver Cromwell'.[127] Prior to the tramroad, Oystermouth would have been a virtually exclusive retreat for privileged classes, accessible only by walking or by horse or carriage along rough lanes and tracks. Part of the attraction for Swansea's working classes may have been in accessing an ancient and rural setting previously restricted to élites, an emotion which may have also been shared by Bristol's working classes in their day trips to Durdham Downs.

Figure 64 Oystermouth Castle and Bay[128]

The 1874 Act had given the SITC rights to run its horse trams on the Oystermouth line, but the change of ownership and the introduction of steam traction in 1877 provoked a running dispute between the two companies which not resolved until 1896 when the SITC agreed not to run their trams in return for a compensatory

[124] *Butcher's Swansea District Directory* (London: Butcher, 1881), p. 403.
[125] *Oldest Passenger Railway*, p. 5.
[126] G. A. Cooke, *Topographical and Statistical Description of the Principality of Wales*, Part 2, South Wales (London: Sherwood, Needy and Jones, 1810), p. 96.
[127] Hall, *Oystermouth*, p. 11.
[128] Hall, *Oystermouth*, 'From a drawing by Miss Angel', p. 7.

payment. Steam traction was relatively rare on the region's tram lines because of the impact upon horse traffic, although it substantially increased passenger capacity compared with the horse tram. Although few returns were published of passenger traffic, the limited returns did show something of the volume of passenger traffic between Swansea and Oystermouth. In May 1880, one report showed the traffic on the Mumbles Railway alone to be 290,000 annually.[129] For the 1882 August bank holiday, *The Cambrian* reported the following return for both companies for 1879-1882 (see Table 19). A reasonable guess of annual passenger traffic to Oystermouth would be in excess of 300,000 in the 1880s with the tram contributing between one-quarter and one-third of the total traffic.

Table 19 Swansea-Oystermouth August bank holiday passenger traffic, 1879-1882[130]

Passenger traffic by company			Total traffic
1879	Swansea and Mumbles Railway	5,032	N/K
1880	Swansea and Mumbles Railway	7,741	
	Tramway Company,	2,143	9,884
1881	Swansea and Mumbles Railway	9,697	12,177
	Tramway Company	2,480	
1882,	Swansea and Mumbles Railway	11,618	14,342
	Tramway Company	2,724	

The sea was a major attraction by the late 1880s, not just as a seaside but as a way of enjoying sea travel in relative safety. During the summer months, Bristol Channel paddle steamers regularly carried day trippers along both coasts of the Channel and rival companies were not averse to overcrowding and informal and unofficial racing competitions to reach urban piers first ahead of their rivals.[131] Trips were immensely popular; steamer captains were almost celebrities and many people would have reached the piers for embarkation by tram. Weston-super-Mare constructed its tramway such that it included the main urban area through the town and then continued onto the coast passing the two main hotels – one using a branch

[129] *The Cambrian*, 28 May 1880.
[130] *The Cambrian*, 11 August 1882.
[131] Robert Wall, *Bristol Channel Pleasure Steamers* (Newton Abbot: David and Charles, 1973); Chris Collard, *P. and A. Campbell Steamers: The Victorian Era* (Stroud: Tempus, 2006); Chris Collard, *P. and A. Campbell Steamers: The Edwardian Era* (Stroud: Tempus, 2006).

line – and ended at the pier. Peter Borsay and John Walton have shown how the railway fostered the development of the seaside town as a working class holiday destination, but the tram complemented the railway's impact by supporting internal movement from within the urban area to the seaside.[132] The 'Victorians' and 'Edwardians' appeared infatuated with movement.[133]

By 1880, the tram had extended to the Downs and the *Western Daily Press* reported in 1883 that 'large numbers of visitors' were visiting Durdham Downs in the evening, suggesting that the Downs were being used not just on weekends or bank holidays, but were a regular feature of life on the Downs and in the city's suburbs.[134] In September 1883, the 'up' passengers on the Redland line were exceeding the 'down' passengers by 15,000 each month. 15,000 passengers apparently took the tram to Redland on a monthly basis and walked back which gives an indication of how important access to the Downs was for working class families.[135] By1896 and the onset of the electric tram, advertisements for houses in Clifton and Eastville mentioned easy access to the tram as a selling point.[136] The adoption of the electric tram in the 1890s was usually met with overwhelming support from districts which were already connected to the horse tramway. There was some resistance to its extension along White Ladies Road and Black Boy Hill which would simplify the hilly route to the Downs making access easier, which recalled some of the arguments used to oppose the horse tramway.[137] However, by the turn of the century, the electric tramway in Bristol crossed the city and its suburbs, carried over 40 million passengers annually and brought with it significant changes to urban life and social relations.

Conclusion

The tram provided a platform for a social revolution in urban society in the late nineteenth and early twentieth centuries but it was a quiet revolution. Cheap urban transit liberated most of the working classes from the restrictions imposed by walking and opened up new opportunities for leisure, recreation, sports and household consumption and may have widened the scope for employment. The working classes were targeted as consumers by tramway companies with support from local councils

[132] Walton and Walvin, *Leisure in Britain.*
[133] Hannavy, *Victorians and Edwardians*.
[134] *Western Daily Press*, 12 June 1883.
[135] *Western Daily Press*, 7 September 1883.
[136] *Western Daily Press*, 27 January 1896.
[137] *Bristol Times and Mirror*, 10 April 1908.

which may have had an impact on the social and political self-confidence that many working class suburbs demonstrated in the process of tramway construction and operation. They were not simply consumers, however, but also citizens. They were assertive in influencing the routes of trams and in the fare structures and the backing which tramway companies and local authorities gave these suburbs in equating the public interest with their demands over contentious routes, may have strengthened a sense of growing power within the working classes.[138] 'Workmen's trams' would have confirmed that working classes held a particular and special position within transport policies and practices.

Radical change did not simply affect the working classes in isolation from the rest of urban life, but had an impact across wider social relations. Trams did not separate their passengers into classes; there was a uniform fare for all passengers, irrespective of class or gender and this established a system of equality of transport within a highly hierarchical society. Women clearly used trams which led to new behaviours between genders in the public sphere, but it also brought risks for women. The mass participation of different classes in this new form of urban movement led to interactions between classes inside the tram, as well as the mingling in leisure destinations of thousands of travellers on bank holidays and other holiday periods. Prior to the rapid transit created by the tram, there were limited opportunities for classes and genders to mix informally and equally.

In the process of replacing traditional methods of urban transport, the tram altered the urban landscape. Although it followed traditional routes, by popularizing the routes taken by trams, they altered the flow of passenger traffic within the urban area with important implications for household consumption and traders. Although there is little evidence to suggest that the tram in Swansea increased trade along its routes, there was clear evidence that in Bristol the tram route enhanced trading activity and prosperity. Along these routes, road surfaces were improved for the benefit of all road users followed by the laying of steel tracks and overhead cables. The frequency of the cars every few minutes from the early morning to late evening and which were lit at night gave a new dimension to the urban landscape. Some roads were widened and straightened and it gave an important impetus to the electrical supply industry which in Swansea, among other towns, remained under municipal control despite disputes with tramway companies. Horses had virtually

[138] Deian Hopkin, 'The Rise of Labour in Wales 1890-1914', *Llafur,* 6 (1994), 120-141.

disappeared from passenger transport by the early twentieth century with the resultant decline in noise and pollution levels. Urban public life became quieter.

The tram had a mixed impact upon suburban development. Bristol's boundaries could only be extended to incorporate outlying districts which were connected through commerce, leisure and employment to the urban core of Bristol, by the construction of tram routes. More rapid transit drew these districts more formally into Bristol's city and contemporaries equated the tram with prosperity in transforming small towns or villages into suburbs. The impact in Swansea was different, however. The tram followed simple lines from Morriston to Oystermouth along traditional routes and the 'suburbs' of Swansea were not dependent upon the tram. They had already been established prior to the tram and were effectively small townships with local facilities, whose populations could access the town centre and from there Oystermouth through a combination of the steam train along the Swansea valley, omnibuses, carts and walking. What the tram appeared to achieve in Swansea was greater and more rapid movement along traditional routes, but it is likely that given the relative proximity of many of these townships to the centre, the tram would have been complemented by walking. It had little impact on suburban expansion or on patterns of trade and consumption, except that it brought more people who as passengers were counted in their millions more regularly to the town centre. The urban landscape shifted to accommodate mass movement.

The tram lacked the drama of the steam railway with its noise, power and grandiose stations and failed to compete with the steamships or docks for dramatic impact. Its tracks were laid in months rather than years with limited impact on urban life during construction and had no stations or formal stopping points apart from a central terminus. Its existence was quiet and understated. However, with its innovation of the new form of power, electro-magnetism, and its relative silence compared to other forms of transit, it became a symbol of progress, leaving behind horses and steam. As an agent for change, the tram stands alongside the iconic images of the steam locomotive and the steamship in the late nineteenth century.

Chapter 7 Dock-building, maritime trade and empire: the global landscapes of the Bristol Channel ports 1870-1914

> Newport's new dock, named after one of our most illustrious and popular princesses—Alexandra— was opened yesterday by the Mayoress of the town, in the presence of 50,000 persons. The importance of the event was great, and evidently was recognised by the commercial community of South Wales generally. From all parts of the district thousands of persons, whose faces are familiar in other towns, assembled and took part in the general rejoicings of the day. The new dock will be an acquisition which has long been wished for, and the jubilant scene which took place yesterday on the occasion of the opening ceremony will not be soon forgotten.[1]

By the late nineteenth century, international trade dominated much of the life of the Bristol Channel region. Trade was a source of wealth through the export of minerals and commodities and stimulated household consumption through the import of foods, drugs and textiles. Technological improvements to the engines of steamships gave rise to the steamship domination of world trade from the 1880s which, in turn, forced port societies to construct larger and larger ocean docks to accommodate the size and volumes carried by steamships. The outside world came closer as steamships were not so restricted by weather and ocean currents in their travel routes as were sailing ships and consequently shortened journey times for freight and passengers. The world outside became more and more important as trade in commodities and the transit of people expanded, but most of the people living in the region did not experience this world directly. It was imagined.

Élites tended to divide the outside world into two zones, the 'imperial' and the 'foreign' and although trade in the Bristol Channel region was principally conducted with 'foreign' Europe, household consumption was heavily influenced by the imperial trade in tea, sugar, cocoa, coffee, drugs and textiles. The imperial dimension envisaged a 'British world' across the globe much of it inhabited and colonised by Britons. This landscape of an 'English-speaking world' was expressed by the *Western Daily Press* in its editorial in 1871.

> an Englishman is practically at home whatever direction may turn. In the United States, in Canada, in India, at the Cape, in Australia, in New Zealand, he will find hundreds of thousands of his countrymen, ... he will find among the people persons of the same race, the same language, and

[1] *South Wales Daily News*, 14 April 1875.

> ruled by similar laws: and, with certain minor exceptions, necessitated by differences of climate and position, pretty much as people live England.[2]

This landscape gave distance a cultural definition. The opening of the ocean docks from the 1870s, which was crucial to the continuation of trade, was captured by Edward, Prince of Wales and heir to the throne, as part of an imperial design to ensure the prosperity of the empire and to help secure its future. Although the bulk of world trade in the region was conducted with Europe, many of the ocean docks were given imperial names and became imperial events as Edward and later his son George patronized dock openings. Port towns in the region celebrated the openings as mass public events. This, together with the household consumption of imperial products like tea and sugar, has given rise to debates about how people in the region viewed the outside world.

Historiography

The historiography of dock construction tends to focus upon the logistics of dock-building and volumes of trade, rather than upon the hopes and aspirations of port societies of these massive projects and how they may have affected perceptions of the outside world.[3] Joanna Greenlaw, for example, refers to 80,000 people attending the opening of Swansea's North Dock in 1852 and W. H. Jones cites between 70,000 and 80,000 people attending the opening of the town's South Dock in 1859, but the reasons behind these mass public events are not pursued.[4] J. H. Bird's study of ports and Gordon Jackson's archaeology of ports give prominence to port development.[5] W. H. Jones has covered in detail the history of the port of Swansea with the principal focus upon dock development while John Davies has demonstrated the importance of the connection between industrial development and port expansion in his study of Cardiff.[6] John Hutton has published illustrated histories on Newport and Cardiff Docks and there are also a number of histories of individual ports and some web sites devoted to docks written by dock enthusiasts. These histories tend to focus upon the mechanics and logistics of dock construction, rather than the aspirations of

[2] *Western Daily Press*, 25 April 1871.
[3] Dyos and Aldcroft, 'Port and Dock Development', in *Transport*, pp. 266-275.
[4] Joanna Greenlaw, *The Swansea Copper Barques and Cape Horners* (Swansea: Greenlaw, 1999), p. 36; W. H. Jones, *A History of the Port of Swansea* (Carmarthen: W. Spurrell & Son, 1922), p. 193.
[5] J. H. Bird, *The Major Sea Ports of the United Kingdom* (London: Hutchinson, 1963); G. Jackson, *The History and Archaeology of Ports* (Surrey: World's Work Ltd., 1983).
[6] John Davies, *Cardiff and the Marquesses of Bute* (Cardiff: University of Wales Press, 1981; *Port Towns and Urban Cultures: international histories of the waterfront c.1700-2000*, ed. by B. Beaven, Karl Bell and Robert James (London: Palgrave Macmillan, 2016); Jones, *Port of Swansea*.

dock builders and wider public communities, or how the outside intervened in everyday life.[7]

Increased trade is usually given as the reason for dock expansion, but relatively little attention is paid to the technological improvements in steamship engines which increased fuel economy which in turn increased carrying capacity. The replacement of iron by steel in engine and ship construction was an important factor in ship development and contributed to the increasing size of steamships. Discussions of steamships often focus upon the pioneers of the iron steamship of the 1840s to the 1860s and the origins of global steamship lines.[8] While these pioneers are important in the development of steam at sea, there was a revolution in technology from the 1880s which does not receive the attention it merits. This change enhanced global trading and stimulated the construction of ocean docks as well as narrowing global distances. In the view of Luigi Pascali, trade globalization originated from the 1870s and was in part due to improvements in marine engine technologies.[9] Ramon Knauerhase in his study of an early breakthrough in marine engineering, the compound engine, takes a similar view.[10]

The creation of larger docks is often subsumed in the history of the port, which focuses upon trade. Dock development itself does not receive the attention it merits given that docks were the hearts of port societies, occupying acres of space, fostering a distinct docklands culture and enabling port towns to participate in world trade in the late nineteenth century.[11] As William Taylor put it, 'port historians have mostly provided readers with a progressivist and functionalist account of the dock architecture, thereby encouraging forgetfulness of how its construction was an

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[7] James W. Dawson, *Commerce and Customs*: *A History of the Ports of Newport and Caerleon* (Newport: R. H. Johns, 1932); G. Hallett and P. Randall, *Maritime Industry and Port Development in South Wales* (Cardiff: University College, Cardiff, 1970); John Hutton, *The Newport Docks and Railway Company* (Peterborough: Silver Link, 1996); John Hutton, *An Illustrated History of Cardiff Docks*, 2 vols. (Kettering: Silver Link, 2008).

[8] Colin Divall, 'S. S. Great Britain', *The Journal of Transport History*, 28.1 (2007), 125-128; Gerald S. Graham, 'By Steam to India', *History Today*, 14.5 (1964), 301-312; J. R. T. Hughes and Stanley Reiter, 'The First 1,945 British Steamships', *Journal of the American Statistical Association*, 53.282 (1958), 360-381; Sally Dugan, *Men of Iron: Brunel, Stephenson and the inventions that shaped the modern world* (London: Channel 4 Books, 2003); Crosbie Smith and Anne Scott, '"Trust in Providence": Building Confidence into the Cunard Line of Steamers', *Technology and Culture*, 48. 3 (2007), 471-496.

[9] Luigi Pascali, 'The Wind of Change: Maritime Trade, Technology and Economic Development', *The American Economic Review*, 107.9 (2017), 2821- 2854, (p. 2838).

[10] Ramon Knauerhase, 'The Compound Marine Steam Engine: A Study in the Relationship Between Technological Change and Economic Development', *The Journal of Economic History*, 27.4 (1967),The Tasks of Economic History (1967), 615-617.

[11] Beaven, Bell and James, *Port Towns*.

exercise of political power.'[12] Except for R. A. Buchanan's study of Bristol's floating harbour early in the nineteenth century, there is no discrete history of dock development in Bristol, despite fairly extensive literature on Bristol's maritime history.[13] There are a number of industrial histories of the ports like, for example, E. L. Chappell's and Martin Daunton's histories of Cardiff, the histories of Swansea's industrial development by Louise Miskell and the volumes of the *Cambridge Urban History* series.[14] These texts are important in explaining the industrial and trading contexts of dock development, and the challenges facing dock architects and engineers. However, they shed little light on the expectations of the community at large or how they may have influenced perceptions of the outside.

This chapter considers three aspects of how these trading relationships affected perceptions of the outside world in four of the principal ports in the region, Swansea, Cardiff, Newport and Bristol, who undertook major dock-building projects in order to accommodate the increasing size of steamships and the expansion in trade. Firstly, the opening of ocean docks late in the nineteenth century enabled ports in the Channel to accommodate steamships which had increased in size and in their carrying capacities as a result of improved engine technologies. Failure to construct these docks would have adversely affected the ability of the ports to continue to trade globally and their future well-being. The improvements in the design of marine engines also demonstrated how technology could diminish distance at sea over thousands of miles. For the nineteenth century, it was the culmination of the 'demise of distance' on land and at sea for both communications and transport.[15] Secondly, the importance of dock-building to civic and industrial élites was evident in their discussions and planning for the extension of existing docks or the creation of new docks. They set out the options facing the ports in the trade conducted by steamships and made it clear that international trade was essential for the prosperity of towns and cities. If they failed to construct large ocean docks, they risked decline. The debates placed the international world towards the centre of their well-being.

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[12] William M. Taylor, 'Ports and Pilferers: London's Late Georgian Era as Settings for Evolving Material and Criminal Cultures', in Beaven, Bell and James, *Port Towns*, pp. 135-157.
[13] *The Port of Bristol 1848-1884,* ed. by David Large (Gloucester: Alan Sutton for *Bristol Record Society*, 36 (1984); *The Making of Modern Bristol*, ed. by Madge Dresser and Philip Ollerenshaw (Tiverton: Redcliffe, 1996).
[14] Edgar L. Chappell, *History of the Port of Cardiff* (Cardiff: Priory Press, 1939); Daunton, *Coal Metropolis;* Miskell, *Intelligent Town;* L. Miskell, 'A Town Divided? Sea-Bathing, Dock Building and Oyster-Fishing in Nineteenth Century Swansea', in Borsay and Walton, *Resorts and Ports*, pp. 113-125; Gordon Jackson, 'Ports 1700-1840', in Clark, *Urban History*, pp.705-732; Sarah Palmer, 'Ports', in Daunton, *Urban History*, pp. 133-150.
[15] Broeze, 'Distance Tamed'; Bell, 'Dissolving Distance'; Kaukiainen, 'Shrinking'.

Thirdly, despite the global nature of the ports' trade, some dock openings were presented as an imperial project, supporting the vitality of empire and were celebrated as such, even though much of this trade was principally outside the empire. Foreign trade consuls were special guests at the openings that celebrated empire. The enthusiastic public celebration of empire at these events suggested that the townspeople experienced no conflict in this apparent paradox. The importance of the international dimension raised questions about how people in the region identified themselves in respect of the outside world. Sentiments of imperial grandeur were also mixed with sentiments of kinship with the dominions of Canada and Australasia as part of a 'British world'. This issue of identity has engaged historians on whether Victorian society was 'imperial' or not, and what influence household consumption may have had on identity. However, as Linda Colley has remarked, people can accommodate a number of identities at the same time and they appeared to do so in the celebration of dock openings as imperial events while the bulk of trade was outside the empire.[16] Public enthusiasm for dock openings prior to royal patronage indicated that town populations understood the importance of the international dimension in their lives, irrespective of royal endorsement.

Steamship technology and dock expansion

Prior to the industrial expansion within the region, Bristol had acted as an entrepôt for towns and villages in the Channel for the re-distribution of commodities and resources, principally from its north Atlantic trade, much of which was with imperial possessions in the Caribbean and North America. With the rise of the industrial ports in south Wales trade expanded with the outside world, which included the carriage of people as travellers and emigrants, as well as minerals and commodities. Trade came to be considered as a barometer of prosperity. The ports regularly monitored the extent of external trade, reports of which were published in newspapers, and celebrated the creation of larger and larger docks from the 1850s onwards as signals that they were intent on meeting increases in trade and what appeared to be the ever-increasing size of steamships.[17]

[16] Duncan S. A. Bell, 'Empire and International Relations in Victorian Political Thought', *The Historical Journal*, 49 (2006), 281-298, p.292; Linda Colley, *Britons: Forging the Nation 1707-1837* (London: Pimlico, 2003), p. 6; Brad Beaven *Visions of Empire: Patriotism, Popular Culture and the City, 1870–1939* (Manchester, Manchester University Press, 2012).
[17] *The Ports of the Bristol Channel* (London: London Printing and Engraving Co., 1893).

Brunel's giant steamship, the *Great Eastern* completed in 1858, was by far the largest iron steamship in the world at that time. The steamship was constructed to carry 4,000 emigrants to Australia and mail without re-fuelling and was a statement about the future. Its technology combined an iron screw propeller with a paddle, complemented by sail. The key factor in the expansion of docks was a new design in the engine technology of steamships, coupled with the increasing trade in the transit of commodities, mail and people. With the increase in population and the increased speeds and capacities at sea from the 1850s, the transit of mail and passengers across the north Atlantic and to Australia would become major enterprises, alongside ship-building. The Channel ports, however, were unable to intervene in these markets. Emigration and passenger travel across the north Atlantic from the region was virtually monopolized by Liverpool from the late eighteenth century and the port city retained this lead with the advent of steamships. There was no Channel line of steamers to compete with Cunard or White Star across the north Atlantic and the trade with Australia was dominated by the Peninsular and Orient line.[18] The *Great Eastern* had been constructed in Millwall and ship-building in the west came to be dominated by Belfast's Harland and Wolff established in 1865, the Clyde's Farfield Shipyards founded in 1864 by John Elder who designed the compound engine which was a major breakthrough in steamship technology ahead of the triple-expansion engine and the steam turbine, and Liverpool's William Laird.[19] The principal ports involved in mail and passenger transit in the west were Liverpool, Portsmouth and Southampton from the 1850s.

The Channel's ports were disadvantaged by the Bristol Channel itself as a waterway. It was easier for north Atlantic traffic to reach Liverpool rather than negotiate the Bristol Channel and Severn Estuary and the ports were not equipped to accommodate this traffic. Bristol was an inland port which could not be reached by large steamers navigating the Avon, while the south Wales ports were in their relative infancy as international ports with the exception of Swansea. Their focus was upon exporting minerals and industrial commodities from their hinterlands and had little history of shipbuilding. These factors largely excluded the Channel ports from the transit of mail and passengers and led them to concentrate on industrial markets, with Bristol and Gloucester having more of a mixed economy in trade.

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[18] Broeze, *Distance Tamed*,
[19] Crosbie Smith, 'Witnessing Power: John Elder and the Making of the Marine Compound Engine, 1850-1858', *Technology and Culture*, 55.1 (2014), 76-106.

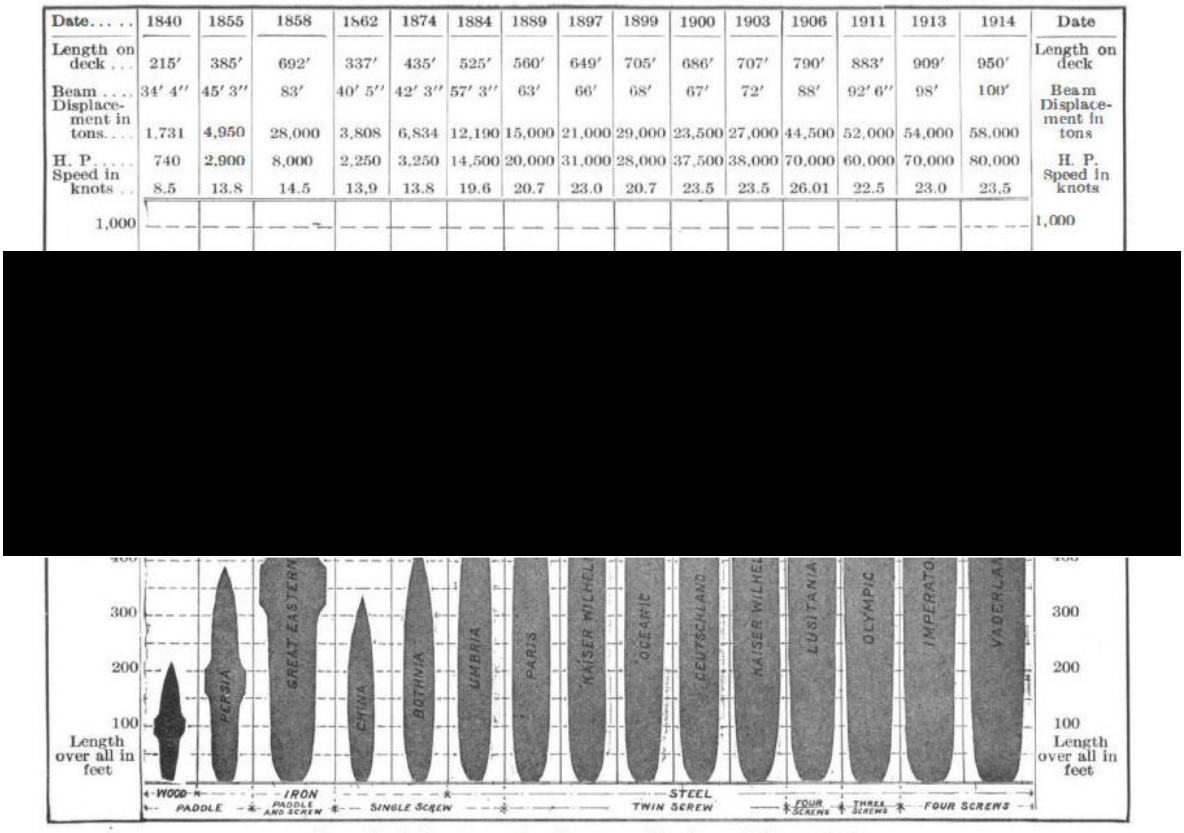
Although Bristol aspired to gaining mail contracts, Cunard's first transatlantic steamship, *Britannia*, was built in 1840 but Bristol's first ocean dock at Avonmouth did not open until 1877.[20] Elder's marine engines powered the Cunard's Atlantic mail steamers from the 1840s and within a decade the international shipping lines and their contractual relationships with ports were well established.[21] The Bristol Channel ports experienced a lag in steamship technology which placed them at a disadvantage compared with Liverpool and the Clyde. Despite these limitations, maritime trade expanded across the region's ports as they each constructed massive ocean docks to accommodate the trade conducted by larger and larger steamships from the 1870s.[22]

In 1868, an iron ship of 4,500 tons with a screw propeller of could carry 1,000 tons of cargo and 1,000 passengers, but also carried 2,600 tons of coal to complete a journey to Australia.[23] According to Brian Lavery, three inventions enabled steamships to dominate world trade by increasing engine efficiency and reducing the carriage of coal.[24] The screw propeller and the iron ship dated from the 1850s but the triple-expansion engine of the 1880s economized on fuel by half enabling steamships to reach most ports without refuelling.[25] The engine reduced the weight of steamships and increased their speed and carrying capacity using steel boilers to contain the steam pressure.[26] Dyos and Aldcroft estimate that following the introduction of the triple-expansion engine, a steamship could make three ocean journeys to one by sailing ships.[27] This engine enabled steamships to increase in size and capacity and presented port authorities with a stark choice. They either constructed massive docks to accommodate these ships, or face a decline in their world trade. Without exception, all ports in the Bristol Channel that traded on a global scale expanded their docks or created new docks which were constructed in the ocean to give steamships unrestricted access to dock facilities. The triple-

[20] Smith, 'Marine Compound Engine', 85.
[21] F. Harcourt, 'British oceanic mail contracts in the age of steam 1838-1914', *The Journal of Transport History*, 3rd series, 9 (1988), 1-18.
[22] 'Dock History and Construction' (Bristol), *Western Daily Press*, 10 July 1908; 'The Coal Ports of the Bristol Channel' (Cardiff), *Cardiff Times*, 7 December 1878, 21 December 1878; 'The Coal Ports of the Bristol Channel' (Newport), *South Wales Daily News*, 18 February 1879, 25 February 1879, 4 March 1879, 11 March 1879; 'The Coal Ports of the Bristol Channel' (Swansea), *South Wales Daily News*, 7 January 1879, 14 January 1879, 21 January 1879, 4 February 1879.
[23] A. Ross, *British and Australian Steam Navigation: Statement and Proposal* (London: Bell and Daldy, 1868), p. 15.
[24] Brian Lavery, *Ship: 5,000 years of Maritime Adventure* (London: Dorling Kingsley, 2004), p.179.
[25] 'The Economy of Triple-Expansion Engines', *Scientific American*, 55.20 (1886), 311.
[26] 'The Triple-Expansion Engine', *Scientific American*, 60.19 (1889), 294-295.
[27] Dyos and Aldcroft, *Transport*, pp. 259-260.

expansion engine was followed by the steam turbine engine in the early twentieth century invented by the British engineer Charles Parsons who pioneered the turbine as a way of generating electricity, as he linked the two principal energy sources of the nineteenth century. The steam turbine further reduced fuel consumption and by the turn of the century fuel consumption had been reduced by 90% compared to the iron ships of the 1870s making the steamship lighter, bigger and quicker. Ships used four screw propellers by the end of the century and could reach lengths of 700' compared to 200' in the 1840s (see Figure 65). The power of the marine engine had increased x 40.[28]

Figure 65 The increasing size and speed of steamships[29]



From the 1830s, steamships progressively increased speeds in ocean travel. By 1870, speed had increased to the north Atlantic by 70 per cent compared with 1820 and to Australia by 61 per cent (see Table 20). By the 1860, the eastern seaboard of the United States could be reached in around two weeks and Australia in two months. Although sailing ships had also increased speeds, the principal reason

[28] Lavery, *Ship*, p. 179; Dyos and Aldcroft, *Transport*, p. 261.
[29] 'Transportation in Land and Sea', *Scientific American* 112.93 (1915), 523-526, 556-558, (p. 523).

for increased speeds were developments in steamship technology.[30] Increased speed diminished distance in the imagination and Yrjö Kaukiainen has used the term 'time-distance' to describe how distance was increasingly being measured using time.[31] The steamship's forerunner, the steam locomotive, had popularized this concept using timetables.

Table 20 Relative improvement in the speed of communication[32]

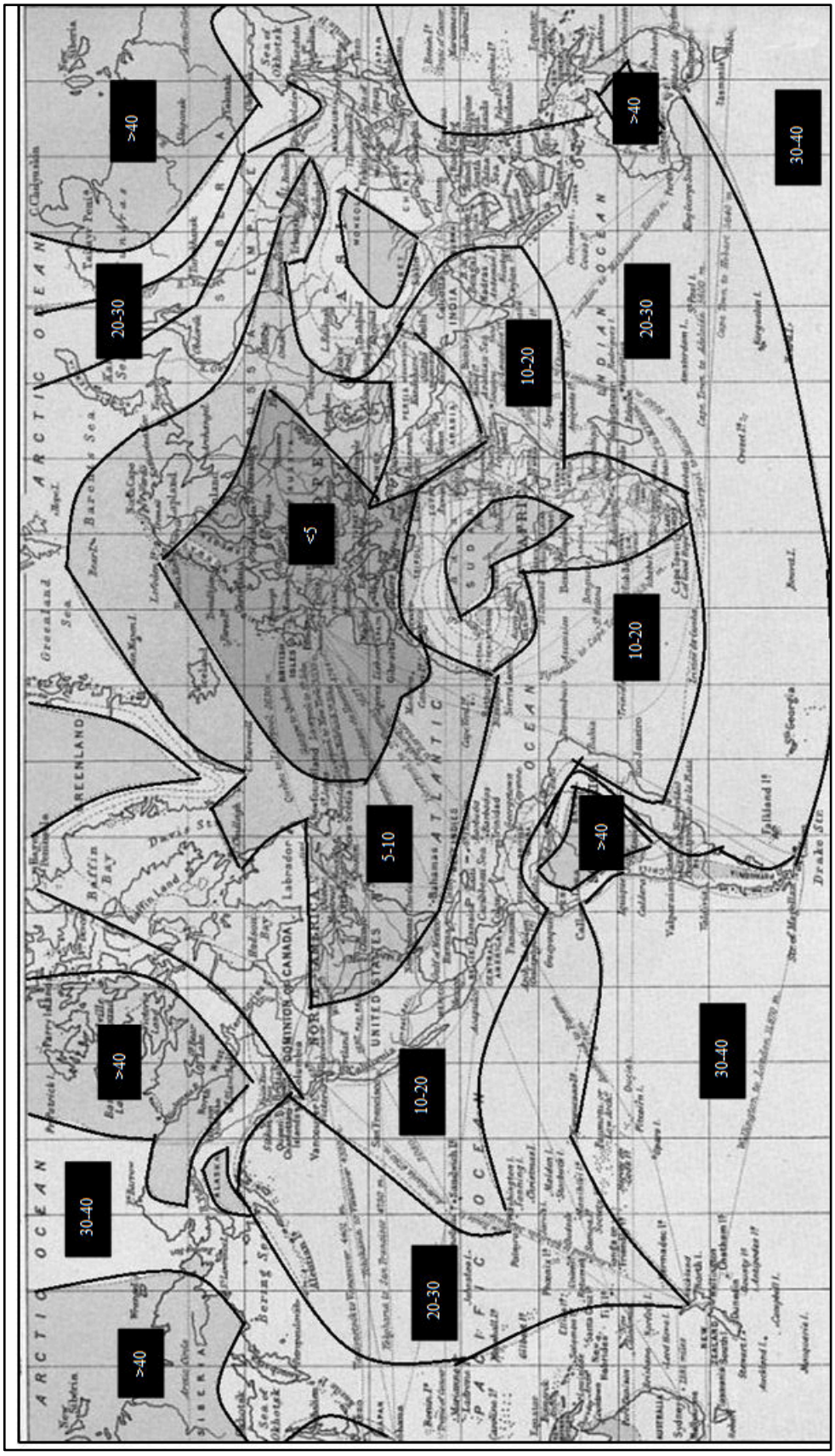
Route*	1820	1830	1840	1850	1860	1870
NE Atlantic (1–2)	100	84	62	49	42	30
Baltic (4–8)	100	71	46	43	27	24
North Sea (3, 9–10)	100	71	50	42	29	29
Atlantic France (11–13)	100	92	52	39	26	21
[redacted]						
Australia (32)	100	101	86	85	38	39
Valparaiso (33)	100	101	92	55	39	38
Argentine, Brazil (34–35)	100	77	84	72	39	35
Caribbean, Gulf of Mexico (36–39)	100	78	75	51	39	39
US East Coast (40–41)	100	82	64	42	41	33
Unweighted average	100	86	63	49	34	29

Steamships could cross the Atlantic in around five days by 1901 compared to fourteen days in 1850.[33] The ascendancy of the steamship signalled the virtual demise of the sailing ship from the 1880s as distance at sea was compressed through increased speeds.[34] In 1914, J. G. Bartholomew published an atlas which divided the world into zones according to travelling times. The atlas showed how the world had shrunk as distance was measured by time travelled (see Figure 66).[35] Although the steam railway shrank distances on land, it was the steamship that achieved this at

[30] Kaukiainen, 'Shrinking', 9.
[31] Kaukiainen, 'Shrinking', 9.
[32] Kaukiainen, 'Shrinking', 5.
[33] Dyos and Aldcroft, *Transport*, p. 262; 'Records of the Fastest Transatlantic Steamships', *Scientific American*, 58.26 (1888), 404.
[34] Gerald S. Graham, 'The Ascendancy of the Sailing Ship 1850-85', *Economic History Review*, New Series, 9.1 (1956), 74-88; Glen O'Hara, '"The Sea is Swinging into View": Modern British Maritime History in a Globalised World', *The English Historical Review*, 124 (2009), 1109-1134.
[35] J. G. Bartholomew, *Atlas of Economic Geography* (London: Oxford University Press, 1914).

sea, but this shrinkage was dependent upon the construction of ocean docks that could accommodate the sizes of steamships.

Figure 66 World travel zones as measured by time in days from London



The importance of docks

The construction of docks from the mid-nineteenth century in the Bristol Channel was a response to the increasing size and speed of both sailing ships and steamships and the increase in trade. The speeches made by dignitaries at dock openings clearly showed the importance port towns attached to trade which were usually celebrated as public events. Dock openings like that of the Bute West dock in Cardiff in 1839 witnessed celebrations that were typical at the time with rhetoric similar to that associated with railways with a number of themes – the spirit of enterprise, the importance of trade for future prosperity, achieving a competitive edge over other ports and the contribution to empire trade. The *Monmouthshire Merlin* declared the opening to be 'a proud day for Cardiff', which would 'commence a new era in her commercial history ...' The number of visitors 'was great beyond what had been expected' and included 500 visitors from Newport.[36] One estimate put the attendance at between 12,000 and 20,000 in a pre-railway age. 'So numerous have been the arrivals, it will be a matter of wonder where or how they can all find beds. Every inn is already full to overflowing and almost every private house is in the same condition.'[37] *Rule, Britannia,* as an expression of imperial power and patriotism, was performed as part of the celebrations as it was with other dock openings, and foreign consuls invariably attended these events which stressed the mutual material benefits accruing from trade. The dock placed Cardiff within the competitive context of a global empire as well as British internal trade and commended the spirit of enterprise, demonstrated by the second Marquess of Bute in financing the dock, which was a key characteristic at the time.[38]

Although the planning and construction of the dock was directed towards facilitating the export trade mainly with Europe, the formal ceremony invoked references to empire in formal speeches where Cardiff was elevated through the Bute Dock 'to a rank wherein to compete with the most flourishing ports of the empire.'[39] The opening formalities demonstrated an ability to harmonize two distinct aspects of engagement with the outside world: the importance of world trade expressed by the presence of foreign consuls but presented in an imperial context as a celebration of power and patriotism. The dominance in the United Kingdom's trading position was often presented within an imperial context of a Britannic island as the world's

[36] *Monmouthshire Merlin*, 12 October 1839.
[37] *Monmouth and Brecon Gazette*, 12 October 1839.
[38] *Monmouthshire Merlin*, 12 October 1839.
[39] *Monmouthshire Merlin*, 12 October 1839.

greatest naval power overseeing global free trade. The image of 'Britannia' shown in Pigot's directory which covered the Bristol Channel region linked trade with empire which translated into global power as early as the 1830s (see Figure 67). Dock openings made a connection between trading dominance and empire.

Figure 67 Britannic image of Great Britain's Trading Dominance[40]

The opening of the Town Dock in Newport in 1842 was the occasion for similar sentiments to those expressed in Cardiff. Mr. Blewitt, M.P. witnessed 'the thousands who congregated this morning to celebrate a day which will be remembered in Newport for thousands and thousands of years ...' Although Newport's principal trading area was Europe, he expressed no doubt that Newport's merchants 'may enter into competition with those of any city in the empire... and we shall see Newport become, as I before said, a second Liverpool.'[41] Mr. Blewitt was expressing sentiments common at the time which located trade as the source of prosperity and which ranked ports by volumes in trade as 'shipping intelligence' reports in newspapers became a barometer of prosperity. Despite the imperial rhetoric of dock openings, dock development was driven by trade largely conducted with Europe as industrialists sought the most cost effective transport systems linking production with their markets at home and overseas. For example, Monmouthshire's coal and iron magnates, supported by the principal landowner, Philip Jones of the Llanarth estates near Abergavenny, were prominent amongst the Newport's Town Dock Committee's membership.

[40] *Pigot's Directory of England and Wales 1835* (Manchester: Pigot, 1835).
[41] *The Cambrian*, 15 October 1842.

Table 21 Principal shareholders, Newport's Town Dock Committee[42]

Samuel Homfray	Tredegar Wharf Company, Tredegar Ironworks, Sirhowey Ironworks
Thomas Powell	Newport Coal Company, Monmouthshire Railway and Canal Company
Summers Harford	Sirhowey Ironworks, Victoria Ironworks and Collieries, Nantyglo ironworks
Joseph Latch	Newport Coal Company, ship owner
John Jones	Secretary to the Llanarth estates
Thomas Cooke	Monmouthshire Canal Navigation
Thomas Protheroe	Newport Coal Company, Newport's Town Clerk, slate and timber merchant

The Committee was headed by civic dignitaries – it was chaired by Richard Blakemore, M.P., and included Reginald Blewitt, M.P. and coal trader and Sir Digby Mackworth (High Sheriff and Caerleon landowner) – but its principal shareholders were industrialists. This was a pattern in dock and railway development in south Wales in the second half of the century. Sir John Guest (Dowlais Ironworks in Merthyr) was the main protagonist for the Taff Vale Railway (TVR) which opened in 1841 which eventually linked the iron and coal industries in Merthyr and Aberdare with the Bute East Dock. TVR also constructed the Penarth Dock (1875) as a rival to the Bute Docks and David Davies of the Ocean Coal Company which operated in the Rhondda Valleys constructed the massive Barry Docks (1889-1898) along with the railway system between the mines and the docks which effectively was a rival to both the Bute and Penarth Docks. The opening of Newport's Town Dock also stimulated railway development to connect mines with docks along the lines of the TVR-Bute connection. In 1844, the Monmouthshire Railway Company published its prospectus to construct a railway linking the Town Dock with the mining areas of Nantyglo, Blaenavon and Pontypool. The provisional Committee for the railway was headed by the Earl of Abergavenny and the membership was similar to that of the Town Dock. Its stated objectives were to afford Monmouthshire 'a cheap and convenient means of transit for its produce to market,

[42] *Cardiff and Merthyr Guardian*, 18 March 1848.

by Railway and Locomotive power. It will also afford travelling accommodation through a densely-populated country, now almost destitute of roads.'[43]

The pressure for dock expansion came from trade and ports, therefore, had to decide whether or not to expand their docks in order to capture increasing trade. In 1867, Robert Bright, of Gibbs, Bright and Company, a prominent colonial shipping agent, put the issue plainly to civic leaders at Bristol referring to the Avon, but which also applied to all the ports. He stated the case for coastal docks with direct access to the sea.

> No commercial truth is more clear than that the leading and periodical trades and intercourse of the world will be carried on by large steamships; that not to provide for them is to divest your not distant future of its greatest promise, and that for them the Avon ... will always be totally unfit.[44]

In 1872, the Bristol Docks Association considered that 'in consequence of the great increase in the tonnage of sea-going steamers, it has become absolutely essential to the prosperity of the city that dock accommodation should be immediately provided for such vessels.' The Association further observed 'with much anxiety the powerful competition with which Bristol is threatened by the neighbouring ports of Cardiff and Newport, where docks upon a large scale are actually in the process of construction.'[45] From the 1870s onwards, the ports in the Bristol Channel attempted to meet the rising demands of trade and the size of steamships by constructing larger and larger docks in a continuing spiral of rivalry and a sense of competition. The significance of the opening of the Alexandra Dock in Newport in 1875 as expressed by the *South Wales Daily News* was illustrative of Bristol's anxiety.[46] Port towns were in competition with each other for trade and the future of the town was at stake if dock facilities could not cater for steamships. There was a hierarchy of ports which the populace, and not just élites, understood. The opening of the dock was described as

> the salvation of the port of Newport. Commenced as was this stupendous undertaking in the year 1868, when the cutting of the first sod was performed by Lady Tredegar, amid considerable demonstration and interest on the part of the inhabitants of the port .... Many of those connected with the trade and commerce of the port had felt for years that if Newport was to keep pace with the rival ports of the Channel, it was absolutely necessary to extend her dock accommodation.

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[43] *Monmouthshire Merlin*, 16 November 1842.
[44] 'Trade and Prospects of Bristol', *Western Daily Press*, 3 July 1867.
[45] *Western Daily Press*, 15 June 1872.
[46] *South Wales Daily News*, 11 March 1879.

Foreign trade was being conducted by large steamships which needed easy access to docks making ocean docks inevitable. 'The growing demand for steamships of large tonnage in the overseas carrying trade, and the quick despatch which such vessels demanded, was bound to be met by a dock easily accessible at all states of the tide.' The option facing Newport as with the other ports was to construct ocean docks or to 'fall behind in the competitive race for traffic... the projectors and constructors of the Alexandra Dock have by their undertaking raised Newport from an insignificant port to rank amongst the first positions in the shipping records of the United Kingdom.'

Docks sometimes competed with each other within the same port town as with the Penarth and Barry docks in Cardiff, and Avonmouth and Portishead in Bristol. Dock companies would oppose in Parliament rival dock projects, but there were also concerns over the costs of larger docks. The *Bristol Mercury*, for example, was scathing in its assessment of the Corporation's decision to back Portishead against Avonmouth, the result of private enterprise which opened in 1877.

> The determination to obstruct the completion of the Avonmouth Docks ... is a fitting conclusion to the shameful device by which half a million of money – the property of the citizens – is being thrown into the mud of the Avon ... they become industrious only to do evil... The patience of the city has long been severely tried by its sham representatives ...'[47]

Bristol's newspapers tended to support the Avonmouth Dock. The *Western Daily Press* was fulsome in its coverage of the opening and published a series of sketches illustrating different aspects of the dock.[48] *The Cardiff Times* supported the development of Penarth Docks, a rival to Bute, but, in contrast to the *Bristol Mercury*, adopted a conciliatory tone over the rivalry and argued that Cardiff's industrial strength could accommodate both, welcoming Penarth as 'a new and thriving suburb'.[49] A correspondent 'J. C.' in a letter to the *Monmouthshire Merlin* over the opening of the Town Dock in Newport adopted an attitude which seemed to be shared by many in acknowledging that the dock project had attracted often bitter controversy but having constructed the dock, it was now time to put disputes aside in the interests of the town. The interests of trade had to be met. He described the dock as 'one of the finest locks in the kingdom' and it was in everyone's interests to 'ink

[47] *Bristol Mercury*, 6 July 1872.
[48] *Western Daily Press*, 26 February 1877.
[49] *Cardiff Times*, 9 June 1865.

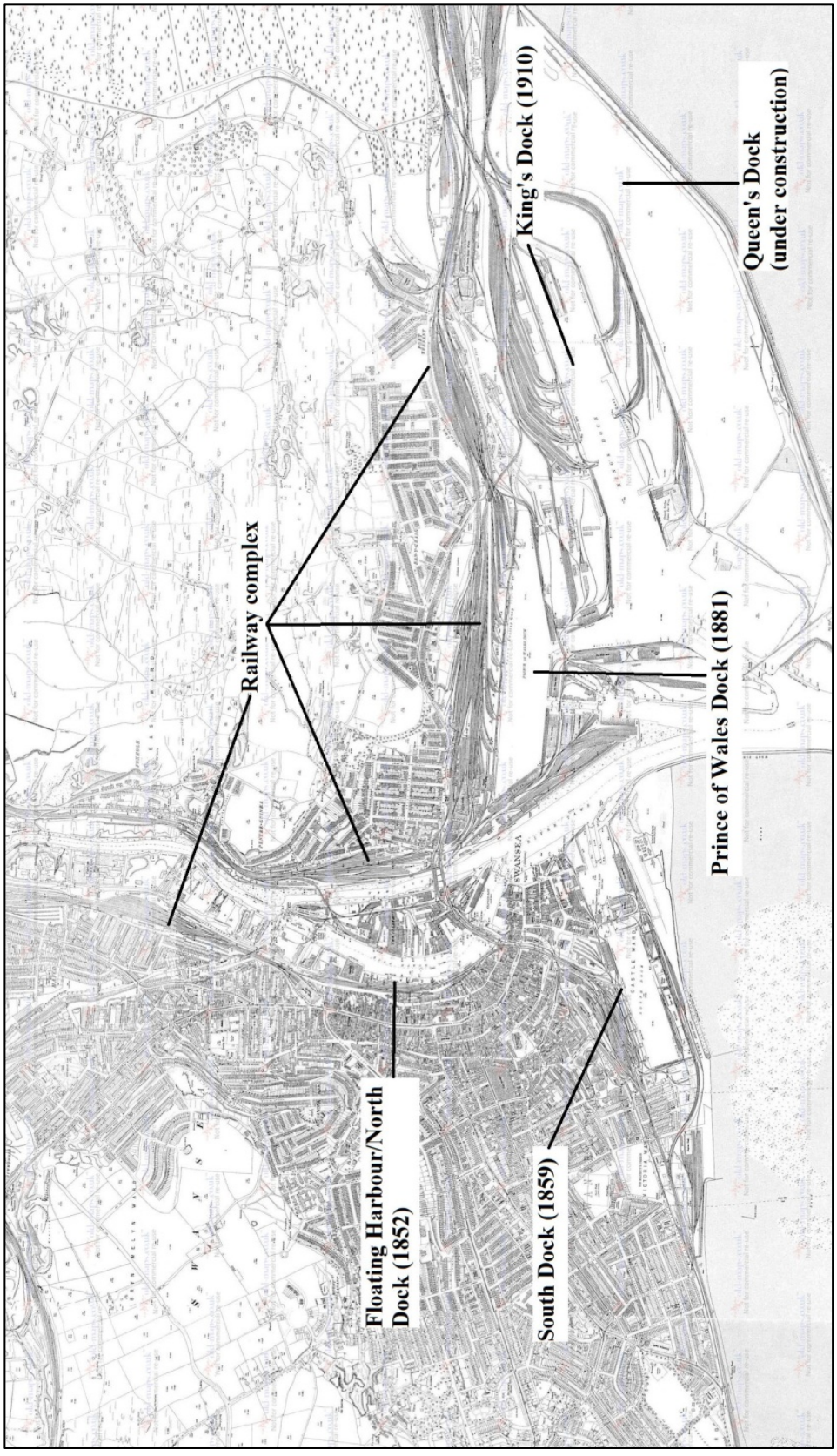
any unamicable feeling that may exist, and join in the celebration of the event, so as to pass a joyous gala day.[50]

Dock improvements and extensions were a major pre-occupation for port societies during the century. Judging by the level of capital investment needed and the celebrations that usually announced most dock openings, the populations of the ports were aware of the importance of docks and their connections with the rest of the United Kingdom, the wider world and the empire. They were regarded by industrialists, traders and civic leaders as indispensable for the prosperity of the town or city and labouring classes were also aware of the importance of trade as they experienced the impact of fluctuating trade patterns. In a time when populations expanded and created the phenomenon of 'urban' and all that that meant in terms of employment, services, housing, communities, transport and retail trades, docks and their associated railways, sidings and warehousing were an important influence in shaping these new urban landscapes.[51] Martin Daunton has calculated that the Bute Docks in Cardiff at the end of the century covered over 162 acres of managed water and over 6½ miles of quays and as the docks needed to increase in size in terms of width and depth to cater for steamships, they also needed direct access to the sea which often involved substantial land reclamation.[52] The construction of the King's and Queen's docks in Swansea, for example, necessitated the reclamation of 400 acres of land.[53] The town's Prince of Wales Dock (1881) required the excavation of 1,200,000 cubic yards of soil and rock and the length of the concreted quays stretched to 5,240 feet.[54] Swansea's urban environment in 1910 showed how the dock facilities and their associated railways influenced urban space as they pushed urban development to the west and the north between the river, Townhill and the sea (see Figure 68). There was a complex connection between the docks, the town and the nation, which linked economy, trade, consumption, science and engineering in a chaotic but dynamic relationship. Docks were an integral and defining feature of the second half of the nineteenth century which made global dominance in trade possible, often expressed through a Britannic image, of which the motif to Pigot's *Directory of England and Wales 1835* shown in Figure 67 was not untypical. Table 22 gives a summary of dock development from the 1830s in the region which

[50] *Monmouthshire Merlin*, 10 September 1842.
[51] Beaven, Bell and James, *Port Towns*.
[52] Daunton, *Coal Metropolis*, p. 28.
[53] Jones, *Port of Swansea*, p. 232.
[54] *The Cambrian*, 21 October 1881.

demonstrates the scale and costs of dock construction as port towns responded to, and accommodated, the increasing size of steamships.

Figure 68 Swansea's Dock and Urban complex c.1910[55]



[55] Adapted from Old-Maps <https://www.old-maps.co.uk> [accessed 8 July 2015].

Table 22 Dock expansion, dimensions (in feet) and estimated costs 1839-1909[56]

Town/city	Dock	Date opened	Cost £	Dock dimensions	Acreage
Bristol	Avonmouth	1877	600,000	1,400 x 500	19
	Portishead	1879	260,000	1,800 x 500	20
	Royal Edward	1908	2,500,000	1,000 x 1,200	30
Cardiff	Bute West	1839	338,000	4,000 x 200	18
	Bute East	1858	410,000	4,300 x 500	44
	Roath Basin	1874	500,000	1,000 x 550	12
	Penarth	1875	750,000	2,100 x 330	17½
	Roath Dock	1887	945,565	2400 x 60	35
	Barry Dock 1	1889		3,400 x 1,100	70
	Barry Dock 2	1898		3,338 x 400>600	
	Queen Alexandra	1907	1,274,318		52
Newport	Town dock	1842	300,000	795 x 240	24
	Alexandra	1875	500,000	2,500 x 500	28¾
	South dock	1893			30
Swansea	North Dock	1852	50,000	900 x 120	11
	South Dock	1859	200,000	1,600 x 70	18
	Prince of Wales	1881	500,000	2,320 x 500	23
	King's Dock	1909		4050 x 1100	95

Swansea began construction of the Queen's Dock in 1909 which was projected to extend over 120 acres, the largest in the Bristol Channel. It was completed in 1920 and opened by King George V and Queen Mary in line with the imperial patronage of docks.[57] John Davies, in his study of the Bute Docks has demonstrated this spiralling pressure between trade and docks; expanded docks meant, with some exceptions for trade depressions, expanded trade which in turn required larger docks (see Table 23).

[56] *The Cambrian*, 21 October 1881; Daunton, *Coal Metropolis*, Roath Dock and Queen Alexandra Dock p. 28; Hutton, *Cardiff Docks*, vol. 1, Bute West Dock, pp. 15, 23, Bute East Dock, pp. 41,46,49; Roath Basin, p 88, Roath Dock p. 108; Hutton, *Cardiff Docks*, vol. 2, Queen Alexandra Dock p. 15; Jones, *Port of Swansea*, South Dock, pp. 175, 204, North Dock, p, 191, King's and Queen's Docks, p. 232; *South Wales Daily News*, 1 October 1873, 14 April 1875, 10 December1878, 11 March 1879; *Bristol Times and Mirror*, 26 September 1907.

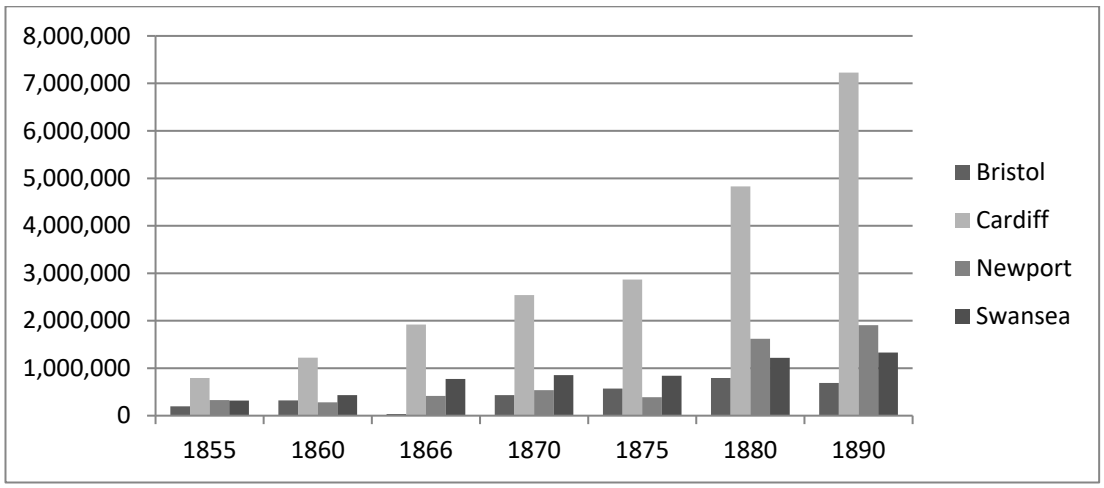
[57] Swansea and Port Talbot Docks History < http://swanseadocks.co.uk/docksnewsite/queens.html> [accessed 189 April 2018].

Table 23 Dock improvements and volumes of trade in Cardiff, 1839-1913[58]

Dock Development	Date	Trade volume in tons	Date
West Bute Dock	1839	8,000	1839
		827,000	1849
		1,300,000	1854
East Bute Dock	1855-1859	2,000,000	1864
Roath Basin	1874	3,600,000	1874
		8,000,000	1886
Roath Dock	1887	9,200,000	1888
Queen Alexandra Dock	1907	11,900,000	1907
		13,700,000	1913

The volume of trade escalated throughout the latter half of the century which maintained constant pressure upon dock-building, the debates around which were played out in public and kept issues around docks, international trade and prosperity in the public realm.

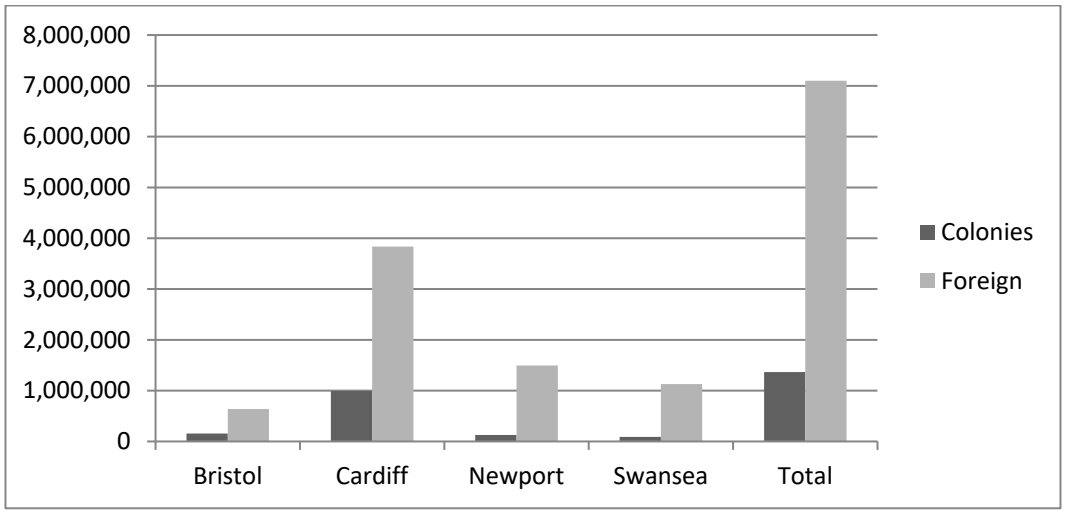
Figure 69 External Trade by shipping tonnage 1855-1890 [59]



Trade with foreign countries considerably exceeded that with colonies and although overall trade increased with both markets, the proportions of trading shown in 1880 demonstrated the imbalance with imperial trade which was around 15% of the total.

[58] Davies, *Marquesses of Bute*, pp. 246-300.
[59] *Annual Statements of Trade and Navigation* (London: H.M.S.O., 1855, 1860, 1870, 1880, 1890).

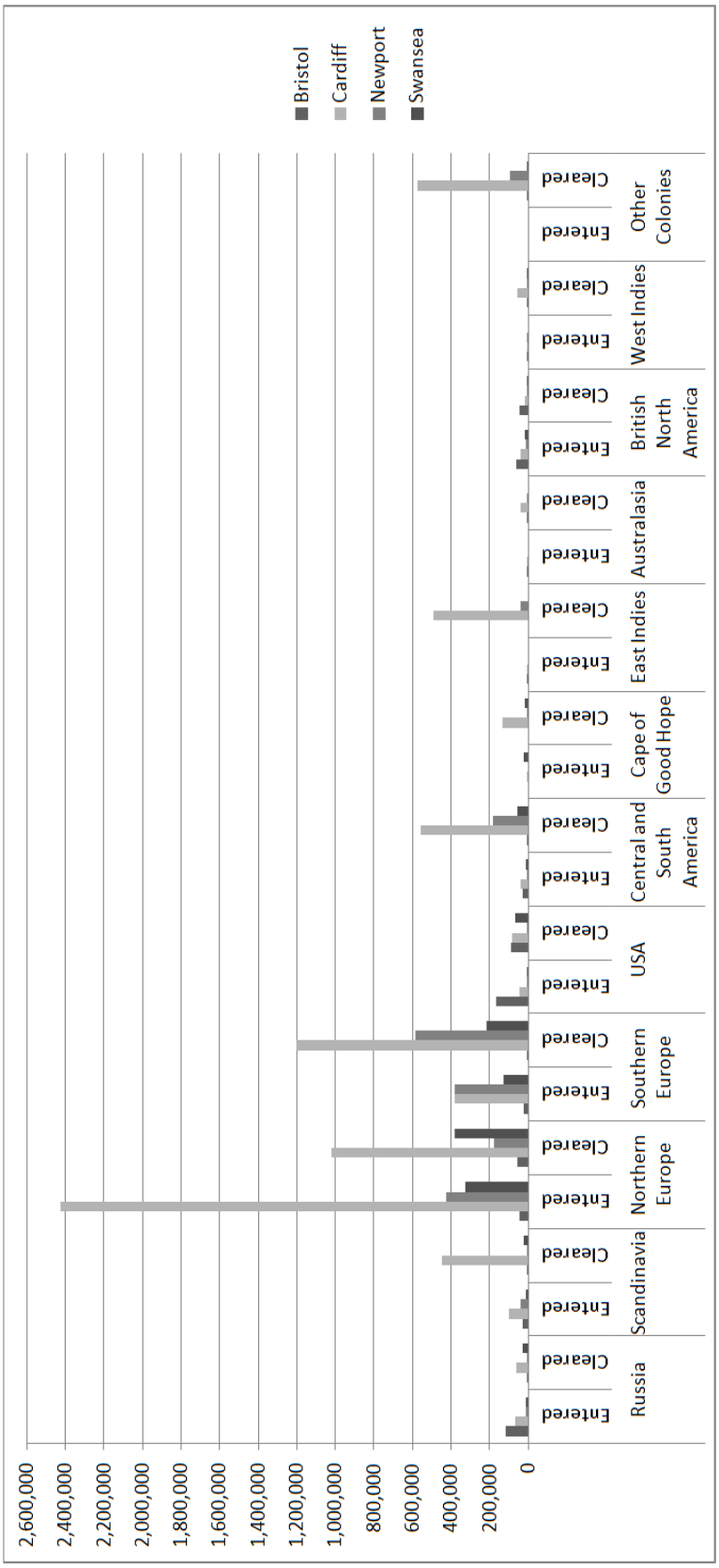
Figure 70 Total Foreign and Colonial trade by shipping tonnage, 1880[60]



By the 1880s, the Bristol Channel had achieved a global reach in trade which showed no sign of contracting – the overall expectation was that docks would just get bigger and bigger as the decade 1880-1890 demonstrated. The global reach was similar at the beginning and at the end of the decade but the volume had substantially increased. Cardiff's trade with Northern Europe, for example, almost doubled during the decade with colonial trade around 25% of its total. The external trading profiles of Swansea and Bristol in 1890 both indicate a strong north Atlantic presence, with Bristol having significant trading links with the U.S.A. and British North America. Cardiff, Newport and Swansea also had strong trading links in the south Atlantic with central and South America and Cape Colony (see Figure 71).

[60] *Annual Statement of Trade and Navigation*, 1880.

Figure 71 The global reach of four Bristol Channel Ports 1890 by shipping tonnage[61]



[61] *Annual Statement of Trade and Navigation 1891* (H.M.S.O.: London, 1890), pp. 106-126.

The imperial connection

Although in the early dock openings in the region, there were references made to empire, it was not until later in the century that a formal connection was made between docks and the prosperity of the empire. Newport had initiated the royal connection with docks in the Bristol Channel with the Alexandra Dock in 1875, although neither Edward nor Alexandra attended the opening despite the best efforts of Lord Tredegar, landowner and chairman of the dock company, in encouraging Edward to attend.[62] It was followed by something of an outbreak of royal docks and royal patronage of dock development. Edward attended the opening of Swansea's Prince of Wales Dock in 1881, and, as King Edward VII, the ceremony for cutting the first sod in 1904 for the King's Dock which opened in 1909 by which time the town had planned the complementary Queen's Dock which eventually opened in 1920. Edward's son, George, graced the ceremony for cutting the first sod for the extended dock at Avonmouth in 1902, the future Royal Edward Dock which Edward opened in 1908 having opened the Queen Alexandra Dock in Cardiff in the previous year. The royal visits to Bristol, Cardiff and Swansea became occasions for extensive celebrations, attended by huge crowds and the playing of *Rule, Britannia* alongside the national anthem, and the opportunity for Edward, George, civic leaders and industrialists to express their views on the importance of docks in sustaining Britain's empire.

At a meeting of Swansea's Harbour Trust in January 1880, H. H. Vivian, M.P., referring to the planned opening of the East Dock, expressed the view that 'the making of these docks marked one of the most important eras in the history of the town and harbour...' and raised the possibility of inviting Edward to conduct a formal ceremony. While the idea was supported by the Trust, a Capt. Davies expressed the sense of being slighted by the royal family who had never visited south Wales. He believed 'we have a Prince of Wales, but we have never seen him in the Principality. He supposed there really was such a personage ...'[63] Vivian had attempted and failed to have Edward lay the first stone of the new dock in March, and in December the Town Council decided to issue a formal invitation to Edward to open the new dock. In the discussion, Edward was given the benefit of the doubt for the reason he had never visited south Wales – he had never been invited - and members saw such an event as 'a fit opportunity, which they had so long desired, to

[62] *The Welshman*, 26 February 1875.
[63] *The Cambrian*, 16 January 1880.

manifest to him their loyal and devoted attachment.' During the discussion, the loyalty of Wales appeared to be an issue which appeared to date from the 'English' Civil War. Dr. Rogers, the former mayor, remarked that

> Swansea had always been a loyal borough, at least since the Commonwealth. The burgesses had kicked over the traces a little, but had soon come back to their allegiance, and since that time there was no town wherein loyalty had been more the rule that in Swansea.' [64]

When the invitation was accepted in May 1881, the mayor expressed the view that 'This welcome intelligence will be hailed with as much satisfaction throughout South Wales as in Swansea itself, for the Welsh people are amongst the most loyal of Her Majesty's subjects.'[65] In October 1881, the Harbour Trust decided on the name for the new dock, the Prince of Wales Dock; the trustees 'appeared to believe that there is a good deal in a name' and a factor in the choice may have been that 'it includes the name of the Principality'.[66] It was an opportunity to promote Swansea on behalf of Wales and the Welsh.

The ceremonial opening was a mass celebration, attended by a choir of 2,000 and 10,000 children and the loyal address from the mayor linked loyalty, trade and empire.

> It has long been the wish of the people of Wales to be honoured by a visit from your Royal Highnesses and to have the opportunity which they now seize of evincing their loyalty and affection. As a trading community we have long-observed with gratitude the exertions made by your Royal Highness to extend the commerce of this great Empire ... and trust that the undertaking you are about to inaugurate will assist the port of Swansea to take the place among those of the Empire to which its natural position would seem to entitle it, and bring increased prosperity to the borough.[67]

Edward expressed his personal support for the construction of docks within the context of the trade of the British Empire.

> This vast empire is largely dependent on its commercial prosperity for the power and influence which she enjoys, and I believe that nothing tends to assist in expanding the resources of the country in a. more marked degree than the creation of docks.

He wished to 'demonstrate in a practical manner my anxiety to advance, in however small a degree, the interests of the trading community of the country, and to lend my

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[64] *The Cambrian*, 3 December 1880.
[65] *The Cambrian*, 13 May 1881.
[66] *South Wales Daily News*, 11 October 1881.
[67] *South Wales Daily News*, 19 October 1881.

aid towards the development of her commerce.'[68] However, not everyone was charmed. A Pontypool newspaper expressed the resentment at the slight felt at least by some in Wales. 'The Prince has at last condescended to visit that country from which he has borrowed his name. A Royal visit to Wales is a rare occurrence...'[69]

These themes were continued and strengthened in 1904 but with a greater emphasis upon Welsh identity when, as the King, Edward cut the first sod of the King's Dock with a similar ceremony to the 1881 opening – estimated crowds well in excess of 100,000, with many from outside the town arriving by excursion trains, with triumphal arches, choirs singing in English and Welsh and processions through the town alongside formal ceremonies, the dinner and speeches.[70] Twenty-nine excursions trains were reported to have arrived in Swansea including 300 waiters from London while 3,000 attended the formal opening with special seating constructed for the guests at the event. The Royal party was entertained by the Morriston Amalgamated Choir of over 600 in Alexandra Road, a 'selected Children's Choir' of 1,100 children at St James's Garden and by the Tawe Male Voice Choir. The Mayor, Griffith Thomas, was knighted and other medals were awarded. Along with *The Cambrian*, *The Weekly Mail* published a series of images to mark the event.[71]

Figure 72 King Edward VII and Queen Alexandra in Swansea, 1904


THE KING AND QUEEN IN WALES.

SCENES OF ENTHUSIASM AT SWANSEA.

INTERESTING CEREMONIES

HIS MAJESTY KING EDWARD VII.

HER MAJESTY THE QUEEN.

ARRIVAL OF THEIR

[redacted]

[68] *The Cambrian*, 21 October 1881.
[69] *Pontypridd Chronicle and Workman's News*, 22 October 1881.
[70] *The Cambrian*, 22 July 1904.
[71] *Weekly Mail*, 21 July 1904.

Figure 73 The opening ceremony and the cutting of the first sod for the new dock

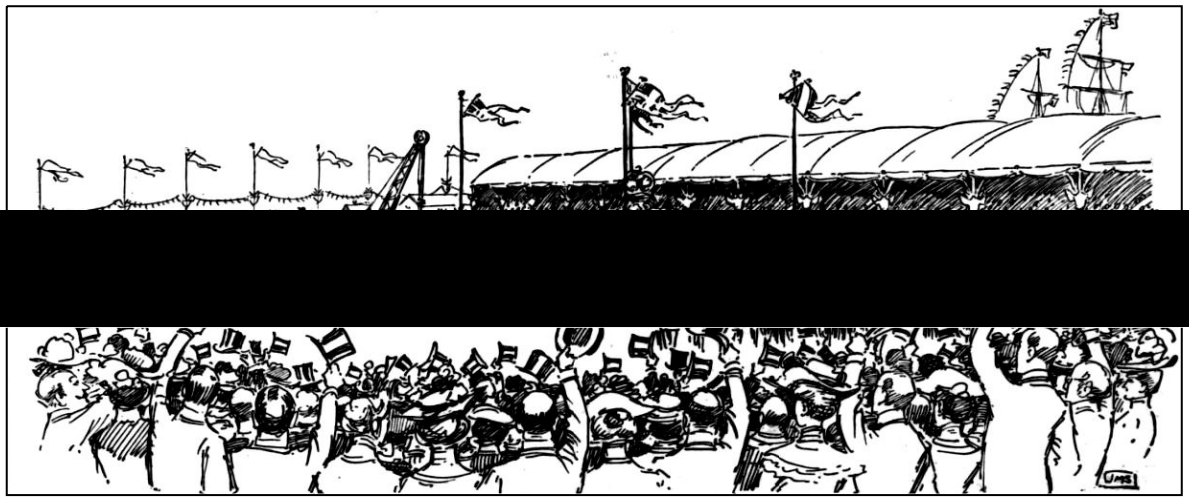
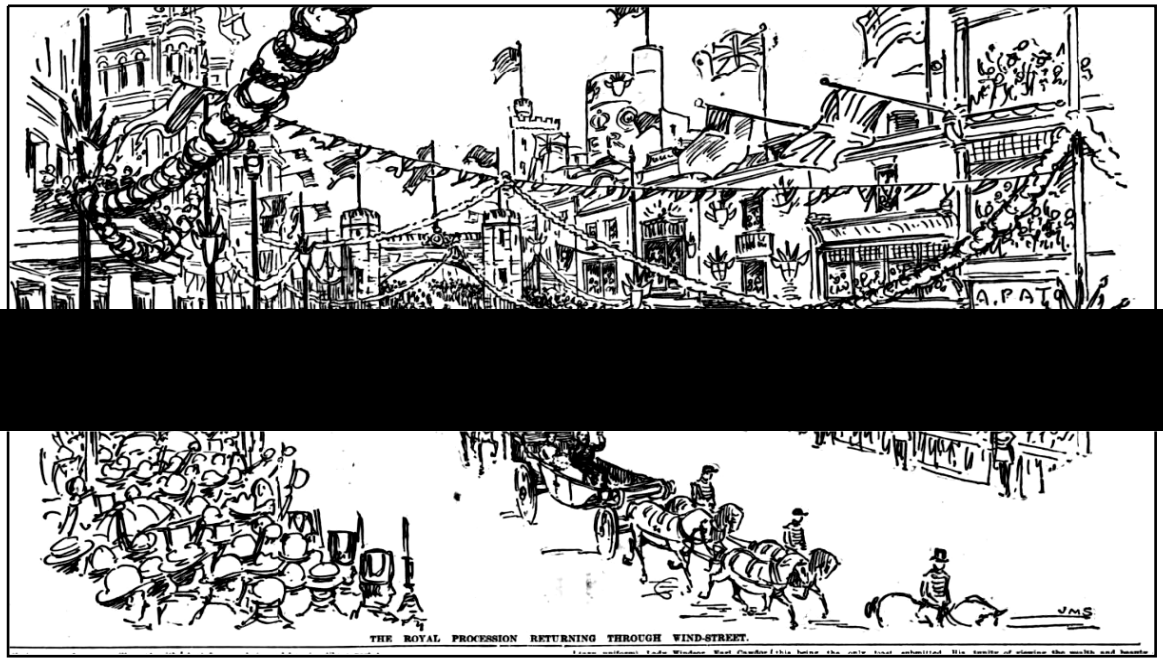


Figure 74 The procession in Wind Street



The opening of the Queen Alexandra Dock in Cardiff in 1907 by Edward was a similar event to those in Swansea, and expressed similar sentiments, including an emphasis upon Welsh culture and tradition. The Cardiff Welsh Ladies Choir, dressed in traditional costume, entertained the royal party, as well as two Welsh harpists. The Cymmrodorion address was in Welsh and Cardiff was commended by a Welsh bi-lingual newspaper in an article, 'Welsh Nationality to the Fore'.

> At Caerphilly Castle, the local District Council will present the King with an address in both Welsh and English.... I have never seen Welsh mottoes so conspicuous in any great gathering before. The Welsh national flag is

> also very prominent. In fact the great prominence given to Welsh nationality is highly creditable to Cardiff.[72]

In responding to the Cymmrodorion address and possibly to the long shadow cast by the Blue Books, Edward commended the Society.

> The preservation of your ancient tongue has, I am sure, done much to preserve the noble traditions which have always inspired the Welsh people ... to keep alight the flame of loyalty ... The main object of my visit to Wales has been to give my support and encouragement to the important step in the development of higher education in Wales ... and I rejoice to hear that your society, devoted to the intellectual elevation of the Welsh people is so widely represented...

In his address, the King explicitly referred to foreign competition as a challenge and that Cardiff's prosperity was linked to the prosperity of the empire as a whole. British trade

> is sensitive in a high degree, and responds its whole mass to local changes. The improvement of shipping facilities in this great port will be felt wherever the commerce of the empire extends, and any increase in maritime commerce is necessarily followed by an increase of the influence and prosperity of the country...[73]

By 1907, the United Kingdom and its empire were experiencing commercial and industrial challenges from both the United States and Germany. Germany, in particular, rivalled Great Britain in its pursuit of empire in the only populated continent left to colonize – Africa – and presented itself as a global trading and military power, The British Empire was vulnerable in times of war because of its long lines of communication and these weaknesses had been exposed during the Boer War (1899-1902). In response to these challenges, Edward emphasized the need for peace in the world. In his reply to the address from the Chamber of Commerce, Edward agreed that 'peace among the nations, which is an important condition of prosperity, and every other factor that contributes to the stability and well-being of our highly-developed trade are, and always will be, the constant objects of my solicitude.'[74]

The imperial theme of foreign competition and the importance of peace in the world as a pre-condition for successful trading were repeated in Bristol, but the city also had its own reasons for seeking royal patronage of its dock enterprise. The relative decline of Bristol was something of a theme in Bristol's economic and social

[72] *Cymor a'r Celt Llundain* (*LWK*), 13 July 1907.
[73] *Evening Express*, 13 July 1907.
[74] *Evening Express*, 13 July 1907.

life during the nineteenth century, which was usually attributed to a lack of enterprise within Bristol as its merchants grew complacent, but also to outside factors over which Bristol had no control. Bristol had 'invented' transatlantic steam navigation, but 'others' had exploited the innovation while Bristol struggled with navigation on the Avon. The opening of Bristol's first ocean dock at Avonmouth in 1877 was welcomed as a new start for Bristol. A street song that was performed at Shirehampton during the celebrations that accompanied the opening of the dock expressed some of the feelings at the time about Bristol and its enterprise.

> Good luck to dear old Bristol.
> She's waking up at last:
> All her old-fashioned notions
> Are buried in the past.
> Both rich and poor will try I'm sure
> With willing heart and hand
> To make the Port of Bristol
> The foremost in the land.[75]

Mr. W. H. Smith, the High Sheriff, rehearsed the argument in his speech at the opening of the dock. Bristol had 'shared the fate of most inventors: it had impoverished itself. Forty years ago the great scientific difficulty of the day was solved in Bristol ... by Bristol enterprise, by Bristol money, by Bristol citizens and by a Bristol crew', referring to the crossing of the Atlantic by Brunel's steamship *Great Britain* in 1845, an iron steamship using a screw propeller. Bristol, however, could not accommodate steamships at its dock in the city and other ports – Liverpool, Hull and Glasgow – had overtaken Bristol. Bristol had toiled under a feeling that their own inadequacies had contributed to their decline, but that they were also victims of outside circumstances. The dock promised to change Bristol's fortunes. 'Yesterday they were a fourth-rate port; today they were one of the first ports in Great Britain.'[76] For Bristol, the creation of ocean docks was not simply a matter of trade and prosperity; it was also, as the *Bristol Mirror* expressed it, an opportunity to 'enable Bristol to regain her lost *prestige* in the maritime world...'[77]

If the Bristol Ocean Dock Company had considered emulating Newport in naming its dock after Alexandra, this was made unlikely by the conflict within Bristol between the rival ports at Avonmouth and Portishead. The Corporation had supported Portishead and therefore was not in a position to endorse a royal name for

[75] *Western Daily Press*, 26 February 1877.
[76] *Western Daily Press*, 26 February 1877.
[77] *Bristol Mirror*, 24 February 1877.

Avonmouth. The conflict was self-inflicted which was something of a characteristic of Bristol, but when the dock was extended starting in 1902 with the cutting of the first sod for the Royal Edward Dock, Bristol was unanimous in its expectations of the new dock. It presented an opportunity for Bristol to regain, not only its trading power, but also its prestige. Edward had opened a dock in Swansea and had even cut the first sod for the King's Dock; Bristol had named its new dock after Edward and was hopeful that the King would cut the first sod and perform the opening ceremony when the dock was completed. When it was confirmed that George, Prince of Wales, an accomplished naval officer who had toured the empire in 1901, would perform the ceremony for the cutting of the first sod, Bristol duly celebrated royal endorsement.

In an extended article 'Ports of Bristol: Epochs in its History', the *Western Daily Press* recounted important events in Bristol's maritime history from the explorations of John Cabot onwards. The newspaper acknowledged that the city 'had backed the wrong horse' in supporting Portishead, but anticipated that was all in the past and the future was bright with the additional ocean dock at Avonmouth.[78] In its coverage of the opening, the newspaper gave an account of George's career in the navy and his tour of the empire in 1901, covering 50,000 miles. Apart from his royal status, Bristol seemed to relate to George because of his naval background and eulogized on George's contribution to the empire and his awareness of the challenges the empire faced.

> The Prince more than any other Englishman stood as a link between the various parts of the great Empire through which he had toured... his timely and vigorous exhortation to the nation to awake and see that everything possible is done to secure that industrial and commercial efficiency which would alone enable us to compete with our foreign rivals.

[78] *Western Daily Press*, 6 March 1902.

Figure 75 The Prince and Princess of Wales in Bristol 1902[79]

The newspaper was perfectly aware of where Bristol's trading interests lay, but was swept up in its enthusiasm for empire. George's tour of the empire 'had no parallel and it has revealed to all the world that there is a Greater Britain which has all the enthusiasm of the original race'. The Corporation's loyal address was dominated by visions of empire as a trading community in which loyalty to the monarch bound the whole enterprise. His imperial tour 'while tending to knit together ... the diverse people living under the beneficent sway of the British Empire...', the editorial expressed the hope that 'the great enterprise ... will help not only to preserve but to increase the commercial prosperity, (and) will tend to weld still more firmly together the whole of the British Empire.'[80]

For George, dock expansion was 'a colonial scheme' and through this enterprise, Bristol 'is true to her ancient tradition'. After recounting Bristol's maritime past, the Prince referred to a sense of decline within Bristol, but 'the old inherent spirit of foresight and enterprise re-asserted itself and since then Bristol has moved with the times.' Having complimented Bristol on the rediscovery of its old self, George then outlined his vision of empire as a trading community which echoed the loyal address.

[79] *Western Daily Press*, 6 March 1902.
[80] *Western Daily Press*, 6 March 1902.

> The benefits of this municipal effort will not only be realized in Bristol and the Mother Country, but will be felt throughout His Majesty's dominions. (Hear, hear.) The increased facilities for commerce and inter-communication will inevitably strengthen the grip of hands across the sea, will intend to increase that community of interest, that mutual trust, and that sense of kinship which are the sources that make for the unity and strength of the Empire (Cheers.)[81]

Writing in 1894, George R. Parkin argued that distance was not what it used to be in respect of the empire and saw it, like George, as an integrated whole despite the vast expanse of distance covered by the empire. According to Parkin, while the

> backbone of national strength is white, Caucasian and English-speaking, beyond this all is diversity; every colour ... all races ... all religions... Language is even more various than race, creed or colour ... in spite of all this apparent diversity, the territorial growth of the empire has not been abnormal, but strictly organic ... each part is fitted to minister to the wants of other parts ... to speak of the geographical unity of the Empire is no paradox, but a simple truth...[82]

In making the case for integration of a widely-spread and diverse empire, Parkin did make a telling point about the nature of distance which was defined by trade. The sea 'unites far more than it divides ... Freight, not mileage, is the true mercantile measure of distance, and it will soon not always be easy to say whether Toronto lies nearest to Manchester or to New York or Chicago.'[83]

The significance of the ceremony conducted by George was for Bristol, at least in part, an opportunity to regain status and to demonstrate that Bristol's enterprise was endorsed by the Prince of Wales. It provided a platform for Bristol to counter the 'feeling of decline' that had haunted the city since the late eighteenth century and charges that Bristol was complacent in a changing world, lacking the enterprise of its ancestors which had made it the second city in the empire. The opinion of the outside world was important to Bristol and the *Western Daily Press* chose to publish extracts from national newspapers on the event's significance for the empire in binding the whole together as a global trading area and Bristol's contribution.

The Times commented that 'the Corporation and citizens to whom the docks belong, expect that when the new works are completed, their city will be able to once again claim her full share in the sea-borne commerce of the Empire...' The *Morning Post* viewed the future dock as 'one of the links binding the colonies more closely

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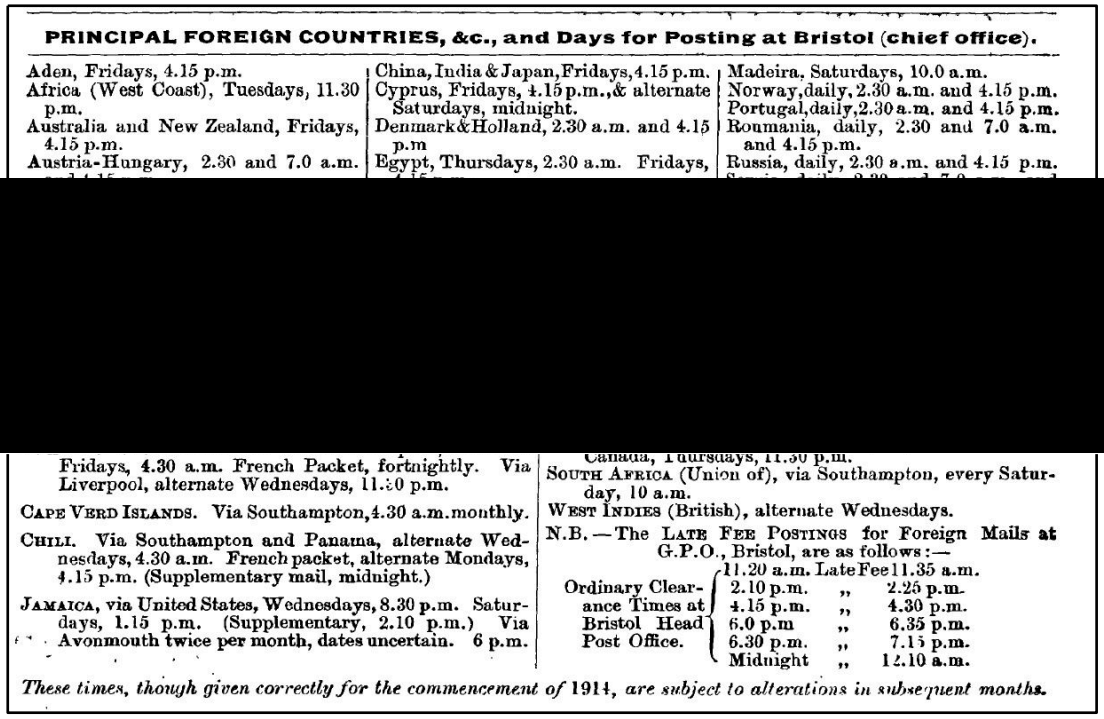
[81] *Western Daily Press*, 7 March 1902.
[82] George Robert Parkin, *The Geographical Unity of the British Empire* (Foreign and Commonwealth Office Collection, 1894)., pp. 225-226.
[83] Parkin, *Geographical Unity*, p.234.

and more firmly to the Mother Country... The new dock at Avonmouth is a step towards that great commercial federation on which the future of the British Empire depends.' For the *Morning Leader*, Bristol was doing 'In a metaphorical and literal sense alike the spade work for the Empire' and in the view of the *Pall Mall Gazette*, 'the City of the West begins to realise the position which is rightly hers in the Empire of the future.' [84]

However, the connection between dock-building and empire in the late nineteenth century was invented.[85] Dock builders did not display any sense that they were involved in an imperial project but were flattered by Edward's intervention. For Bristol, it was an opportunity to re-establish its status as a leading port in the kingdom and empire, and for Welsh ports to gain recognition for their contribution to the nation's was well as to the empire's prosperity and security, and validation of their culture and loyalty to the crown. The dock openings which were cloaked in an imperial seal of approval were largely ceremony: performances with little connection to the material interests of the port economies. Traders demonstrated no such distinction with the outside world, their engagement being determined by trading partners. In publishing information about trade, newspapers and trade directories rarely identified whether incoming and outgoing vessels were coming from or going to the empire and the same was true of global postal communications as shown in Figure 76. 'Foreign' was defined as all geographically external countries and territories. In the everyday world of trade, the empire was relatively unimportant compared with European trading.[86]

[84] *Western Daily Press*, 7 March 1902.
[85] *The Invention of Tradition*, ed. by E .J. Hobsbawm and Terence O. Ranger (Cambridge: Cambridge University Press, 1983).
[86] David Edgerton, 'The Misremembered Empire', <https://members.tortoisemedia.com,> [accessed 26 April 2019].

Figure 76 Details of the timetables for global posting destinations[87]



PRINCIPAL FOREIGN COUNTRIES, &c., and Days for Posting at Bristol (chief office).

Aden, Fridays, 4.15 p.m.
Africa (West Coast), Tuesdays, 11.30 p.m.
Australia and New Zealand, Fridays, 4.15 p.m.
Austria-Hungary, 2.30 and 7.0 a.m.

China, India & Japan, Fridays, 4.15 p.m.
Cyprus, Fridays, 4.15 p.m., & alternate Saturdays, midnight.
Denmark & Holland, 2.30 a.m. and 4.15 p.m
Egypt, Thursdays, 2.30 a.m. Fridays,

Madeira, Saturdays, 10.0 a.m.
Norway, daily, 2.30 a.m. and 4.15 p.m.
Portugal, daily, 2.30 a.m. and 4.15 p.m.
Roumania, daily, 2.30 and 7.0 a.m. and 4.15 p.m.
Russia, daily, 2.30 a.m. and 4.15 p.m.

Fridays, 4.30 a.m. French Packet, fortnightly. Via Liverpool, alternate Wednesdays, 11.30 p.m.

CAPE VERD ISLANDS. Via Southampton, 4.30 a.m. monthly.

CHILI. Via Southampton and Panama, alternate Wednesdays, 4.30 a.m. French packet, alternate Mondays, 4.15 p.m. (Supplementary mail, midnight.)

JAMAICA, via United States, Wednesdays, 8.30 p.m. Saturdays, 1.15 p.m. (Supplementary, 2.10 p.m.) Via Avonmouth twice per month, dates uncertain. 6 p.m.

Canada, Thursdays, 11.30 p.m.
SOUTH AFRICA (Union of), via Southampton, every Saturday, 10 a.m.
WEST INDIES (British), alternate Wednesdays.

N.B.—The LATE FEE POSTINGS for Foreign Mails at G.P.O., Bristol, are as follows:—

Ordinary Clearance Times at Bristol Head Post Office.	11.20 a.m.	Late Fee	11.35 a.m.
	2.10 p.m.	,,	2.25 p.m.
	4.15 p.m.	,,	4.30 p.m.
	6.0 p.m	,,	6.35 p.m.
	6.30 p.m.	,,	7.15 p.m.
	Midnight	,,	12.10 a.m.

These times, though given correctly for the commencement of 1914, *are subject to alterations in subsequent months.*

For the great majority of people living in the Bristol Channel ports during this period, the 'empire', along with the rest of the world, was a construction of the imagination. Despite the imperial celebrations that accompanied some dock openings and royal visits, few people who celebrated empire had direct knowledge of these 'possessions' and it is not clear what it was they were celebrating. As Julie Codell has expressed it, 'The representation of the Empire in the press called on readers to support or reject policies for places they would never see and for people they would never meet except in texts and images.'[88] Their experience of the outside world was indirect and came in the main from print media - newspapers, pamphlets, advertisements and literature.[89] Social and political élites in the region followed national élites in dividing the outside world into two distinct zones: the 'empire' and 'foreign' countries. However, there was no clear definition of 'empire'; it was an imaginary way of categorizing the outside world.[90] 'Empire' could be sub-divided into two further spheres. 'Dominions' which became self-governing and populated largely by migrants from the United Kingdom. 'Non-

[87] *Kelly's Trade Directory for Bristol, 1914* (London: Kelly, 1914).
[88] *Imperial Co-Histories: National Identities and the British and Colonial Press*, ed. by Julie F. Codell (London: Associated University Presses, 2003), p. 21.
[89] Brake, Bell and Finkelstein, *Construction of Identities*.
[90] Edward Beasley, *Mid-Victorian Imperialists: British Gentlemen and the Empire of the Mind* (London: Routledge, 2005).

dominions' had no clear title but tended to be subsumed under 'colonies' or 'possessions' were indigenous civilizations but deemed to be incapable of self-government and ruled from the metropolitan centre. India, for example, was invariably separated from the mainstream empire and given a semi-independent status as the 'Indian Empire' of which Victoria was 'Empress'. In the national censuses of the nineteenth century external trade, migration and population data were always divided between 'empire' and 'foreign', where the peoples of the empire were treated as British subjects and not as foreign nationals. The *Annual Statements of Trade and Navigation* followed the same division. The empire, according to these élites, had two distinct characteristics: it was a global community under the benign rule of the monarchy, expressed as a 'Greater Britain' or a 'Britannic' community, and the lands, peoples and resources within the empire were 'owned' by the monarchy, making them effectively 'British'.

Late in the nineteenth century, there appeared to be a concerted drive by élites to promote a greater awareness of empire and of the potential dangers to the security of the empire. The royal patronage of dock openings was an aspect of this change. Dock expansion from the 1870s contributed towards this promotion of empire with the intervention of Edward, Prince of Wales. Dock expansion was promoted as an imperial project, and dock builders responded to this change in the naming of their docks and the formal involvement of Edward and his son George in dock projects and ceremonies. As Prince of Wales, Edward had opened the Albert Dock in Hull in 1869 and this was followed by two docks named after his popular consort, Alexandra, in Liverpool (1874-1882) and Hull (1881-1885).

Towards the end of the century, the idea of a 'Greater Britain' as some form of a federal empire was debated.[91] According to Thomas Richards, there was a marked change between Victoria's jubilees of 1887 and 1897 where she, as a commodity of conspicuous consumption, moved from a domesticated image to an imperial one.[92] When Edward was crowned in 1901 he had acquired additional titles as King of the United Kingdom of Great Britain and Ireland, of the British Dominions and Emperor

[91] Duncan Bell, *The Idea of Greater Britain: Empire and the Future Order, 1860-1900* (Princeton, Princeton University, 2007); Michael David Burgess, 'The Imperial Federation Movement in Great Britain, 1869-1893' (unpublished doctoral thesis, Leicester University, 1976); Robyn Cooper, 'A "Greater Britain": the Creation of an Imperial Landscape, 1880-1914' (unpublished doctoral thesis, Leicester University, 2012); George Augustus Haig,, *How to Federate the British Empire* (Foreign and Commonwealth Office Collection, 1897).

[92] Thomas Richards, 'The Image of Victoria in the Year of Jubilee', *Victorian Studies*, 31.1 (1987), 7-32, (p.32).

of India. 'Empire Day' was proclaimed in 1902 'to *remind children that they formed part of the British Empire, and that they might think with others in lands across the sea, what it meant to be sons and daughters of such a glorious Empire'*.(author's italics)[93]

Empire was promoted through a variety of print media from cigarette cards to adult fiction and children's books and comics and ceremonies such as the Queen's Jubilees of 1887 and 1897.[94] Novels were a significant media in promoting images of empire through the use of both text and images.[95] Patrick Dunae saw the 1870s as a watershed in the 'new imperialism' in his study of how boys' comics and books promoted empire.[96] Simon Potter has viewed the empire as a series of 'webs' or 'networks' in showing how communications which were subject to logistical difficulties and institutional pressures and influences affected how and what information was circulated.[97] International news-gathering from the 1870s was largely controlled by three agencies with *Reuters* covering the British Isles and most of the British Empire with the result that news provided through *Reuters* was heavily dominated by imperial news which sought to underline the importance of empire to Great Britain.[98]

While it is clear that the notion of empire was promoted in a variety of ways in the late nineteenth century, it is difficult to assess what impact this might have had on the consciousness of ordinary people in the region. The celebration of empire in the dock openings can be misleading. At the opening of Newport's Alexandra Dock in 1875 where there was no royal presence, the celebrations were similar to those of other ports which were opened by Edward or George. According to *The Cambrian,* the dock opened

> amidst great rejoicings. At an early hour in the morning the whole town presented a gay and festive aspect. Festoons of evergreens were suspended on poles ornamented by banners and escutcheons from post to post on both sides of the long streets of the town for about two miles.

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[93] Ben Johnson, 'Empire Day' <https://www.historic-uk.com/HistoryUK/KingsQueensofBritain> [accessed on 29 April 2020].
[94] John A. MacKenzie, *Propaganda and Empire: The Manipulation of British Public Opinion, 1880-1960* (Manchester: Manchester University Press, 1984); Patrick Brantlinger. *Rule of Darkness: British Literature and Imperialism, 1830-1914* (Ithaca and London: Comell University Press, 1988).
[95] Suvendrini Perera, *Reaches of Empire: The English Novel from Edgeworth to Dickens* (New York: Columbia University Press, 1991).
[96] Patrick A. Dunae, 'Boys' Literature and the Idea of Empire', *Victorian Studies*, 24, Victorian Imperialism, (1980), 105-121.
[97] Simon J. Potter, 'Webs, Networks and Systems', *Journal of British Studies*, 46 (2007), 621-646.
[98] Alex Nalbach, '"The Software of Empire": Telegraphic News Agencies and Imperial Publicity, 1865-1914', in Codell, *Imperial Co-Histories*, pp. 68-94.

> Bunting was liberally displayed by the tradesmen, and appropriate mottoes struck the eye in every direction. About nine o'clock a.m. a procession in honour of the occasion, and which increased to a mile in length, assembled at the upper end of the town, and proceeded, after being marshalled, to the dock ... The general public were entertained on a large piece of ground belonging to the town, called "The Marshes", with rustic sports. A grand illumination, a display of fireworks, and a ball concluded the day's festivities.[99]

In a similar report from the *Monmouthshire Merlin*, the celebrations included the working classes, which is indicative of the general awareness that the prosperity of the town was largely dependent upon the port and its docks.

> Perhaps one of the most gratifying features in the day's proceedings was the hearty cooperation of the working-classes, and we do not think we shall be going far wide of the mark when we say that this fact may be put down to the credit of our manual toilers, as evincing their ready and intelligent appreciation of the fact that the outlay of capital must inevitably be beneficial to labour.[100]

Relationships with the outside world were far more diverse than the simple division between imperial and foreign. Trade and commerce produced its own networks, alongside imperial ones.[101] Telegraphic reports on trade were a regular diet for the business sections of newspapers which made no distinction between foreign and empire.

A sense of kinship may have played a significant role in forming perceptions of the outside world, fuelled by emigration, particularly the notion of a 'British world'. As Karl Bridge and Kent Fedorowich expressed it, 'The British world was a phenomenon of mass migration from the British Isles... As trans-oceanic and trans-continental communications improved, so this world became more intricately inter-connected and self-defining'.[102] It was held together over vast distances by a form of 'cultural glue' which comprised 'sentiment and shared institutional values but also of a plethora of networks. These ranged from the obvious family and community connections to business, religious, educational, scientific and professional

[99] *The Cambrian*, 16 April 1875.
[100] *Monmouthshire Merlin*, 16 April 1875.
[101] Chris Evans, 'A World of Copper: Introducing Swansea, Globalization and the Industrial Revolution', *Welsh History Review*, 27.1 (2014), 85-91; Chris Evans and Olivia Saunders, 'A World of Copper: Globalizing the Industrial Revolution, 1830-1870', *Journal of Global History*, 10 (2015), 3-26; ; Louise Miskell, 'From Copperopolis to Coquimbo: international knowledge networks in the copper industry of the 1820s', *Welsh History Review/Cylchgrawn Hanes Cymru*, 27/1 (2014), 92-111; Tadashi Uchida, 'Swansea's copper connection with Japan', *Minerva*, 14 (2006), 10-22.
[102] *The British World: Diaspora, Culture and Identity,* ed. by Karl Bridge and Kent Fedorowich, (London: Frank Cass, 2003), pp. 2-3.

associations, to trades unions, and to itinerant workers of all kinds ...'[103] The British world was a 'consensual association that included much of the formal and informal empire', which included, for example, technical networks.[104]

Correspondence from emigrants describing their new lives which was published in newspapers strengthened the sense of kinship.[105] Territories such as Canada and Australia were afforded dominion status as they moved towards self-government and were separated from the rest of the British Empire which were ruled as colonies.[106] The United States, comprising former colonies, was afforded a similar cultural status, and together with dominions, formed a global entity of like-minded nations or territories. This world view was not imperial, but based on kinship and could embrace a country like the United States which was perceived to have a similar cultural profile, but which lay outside the empire. Benedict Anderson and Bill Jones have shown how cultural identities can be formed across great distances.[107] Jones's formulation of an 'international Merthyr' was not synonymous with the concept of a 'Greater Britain' but expresses the idea that people in Merthyr were part of a wider world defined by kinship or 'family'. Emigration created a sense that parts of Merthyr and Wales existed somewhere else after emigration, even if that somewhere else was thousands of miles away. Distance was not a factor in kinship and in this sense was culturally defined. The zonal construction of outside helped make sense of a world most would never experience, transcending and dividing geography into a series of cultural spheres which were independent of distance. As Edward Thompson has put it, the impact of the empire 'far from being

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[103] Bridge and Fedorowich, *British World*, p. 6.
[104] Bridge and Fedorowich, *British World*, p. 7; T. Boyns and S. Gray, 'Welsh coal and the informal empire in South America, 1850-1913', *Atlantic Studies*, 13.1 (2016), 53-77.
[105] Laura Mitsuyo Ishiguro, 'Relative Distances: Family and Empire between Britain, British Columbia and India, 1858-1901' (unpublished doctoral thesis, University College of London, 2011); Elizabeth Jane Errington, *Emigrant Worlds and Transatlantic Communities: Migration to Upper Canada in the First Half of the Nineteenth Century* (Toronto: McGill-Queens University Press, 2007); W. H. Johnston, 'The Welsh Diaspora: Emigrating around the world in the late nineteenth century', *Llafur*, 6.2 (1993), 50-74.
[106] Marjorie Harper, 'British Migration and the Peopling of the Empire', in Porter, *British Empire*, 75-87; *Oxford History of the British Empire*, Companion Series, *Migration and Empire*, ed. by Marjorie Harper and Stephen Constantine (Oxford: Oxford University Press, 2014); David Feldman, 'Migration', in Daunton, *Urban History*, pp.185-206; Dudley Baines, *Migration in a Mature Economy: Emigration and internal migration in England and Wales, 1861-1900* (Cambridge: Cambridge University Press, 1985).
[107] Anderson, *Imagined Communities*; Bill Jones, 'Representations of Australia In Mid-Nineteenth-Century Welsh Emigrant Literature: *Gwlad Yr Aur* and *Awstralia A'r Cloddfeydd Aur'*, *Welsh History Review*, 23:2 (2007), 51-74; W. D. Jones, *Wales in America: Scranton and the Welsh 1860-1920* (Cardiff: University of Wales Press, 1997); Jones, 'Extraordinary Drain'; Aled Jones and Bill Jones, 'The Welsh world and the British empire, *c*.1851–1939: An exploration', *Journal of Imperial and Commonwealth History*, 31.2 (2003), 57-81.

forceful and aggressive, was often subtle and unobtrusive...'[108] It has been argued that an influential form of subtlety in shaping perceptions of the outside world was the consumption of imperial products and the consequent penetration of the empire into the home.

Although trade was principally conducted with Europe, imperial products such as tea, sugar, opium, textiles, porcelain, coffee and cocoa were prominent in everyday household consumption from the late eighteenth century. This pattern of consumption has posed questions regarding how aware consumers were of the imperial origins of commodities, and how this may have influenced their concepts of empire and the external world.[109] Some historians have argued that consumption in everyday life had no bearing upon perceptions of empire; that if consumers were aware of the origins of tea, for example, it was so routinely an aspect ordinary life that consumers made no connection with empire.[110] Others have argued that 'empire' was present in virtually every home and in a new world of a 'consumer society', companies specifically referred to the imperial origins of consumer goods which strengthened the imaginary links with 'empire'.[111] In his *Eating Empire*, Troy Bickham has argued that consumption was more important than print in constructing images of empire during the eighteenth century.[112] For these historians, the 'quest for food and drink' was instrumental in shaping images of empire and this 'quest' also included artefacts, textiles, porcelain and drugs. For David Armitage, the 'empire' was an ideology rather than an identity.[113] Tea has been regarded as of

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[108] Edward Thompson, The *Empire Strikes Back?: The Impact of Imperialism on Britain from the Mid-Nineteenth Century* (Harlow: Pearson Longman, 2005), p. 241.
[109] *The Birth of a Consumer Society* ed. by Neil McKendrick and John Brewer (London: Hutchinson, 1982); John Burnett, *Plenty and Want: A Social History of Food in England from 1815 to the Present Day* 3rd edn (London: Routledge, 1989); John Brewer and Roy Porter, *Consumption and the World of Goods* (London and New York: Routledge, 1994).
[110] Bernard Porter, *The Absent-Minded Imperialists: The Empire in British Society and Culture, c.1800-1940* (Oxford: Oxford University Press, 2006); Bernard Porter, '"Empire, What Empire" Or, Why 80% of Early- and Mid-Victorians Were Deliberately Kept in Ignorance of It', *Victorian Studies*, 46.2, Papers from the Inaugural Conference of the North American Victorian Studies Association (2004), 256-263.
[111] *At Home with the Empire: Metropolitan Culture and the Imperial World* (Cambridge: Cambridge University Press, 2006) ed. by Catherine Hall and Sonya O. Rose; Zutshi Chitralekha, '"Designed for Eternity": Kashmiri Shawls, Empire and Cultures of Production and Consumption in Mid-Victorian Britain', *Journal of British Studies*, 48.2, Special Issue on Material Culture (2009), 420-440.
[112] Troy Bickham, 'Eating the Empire: Intersections of Food, Cookery and Imperialism in Eighteenth-Century Britain', *Past and Present*, 198 (2008), 71-109.
[113] David Armitage, *The Ideological Origins of the British Empire* (Cambridge: Cambridge University Press, 2000), p.72; Beasley, *Imperialists*; Richard Price, 'One Big Thing: Britain, its Empire and Their Imperial Culture', *Journal of British Studies*, 45.3 (2006), 606-627.

particular significance in the consumption of imperial goods and national identity.[114] As John Burnett has described it, tea 'came to vary another set of meanings associated with national pride in Empire, patriotism, Free Trade and the material rewards that Britain's industrial and commercial expansion was now bringing to many people.'.[115] It became one of the first commodities to be branded – Home and Colonial, Lyons, Liptons. Brooke Bond, Twinings,Ty-Phoo – and was instrumental in the branded retail shops, grocers and tea and coffee shops that proliferated in the late nineteenth century including Kardomah Cafés, Lipton's stores of grocers, and Home and Colonial stores. By the 1830s, the duty on tea alone amounted to 20 per cent of government income.[116] Great Britain fought two wars in the 1840s against China as a way of forcing the sale of opium, grown in India, in order to fund the purchase of tea in China which brought to public focus the origin of tea and of opium which was processed into an everyday drug, laudanum – the 'aspirin of the nineteenth century'.[117] Bristol was the principal distributor of tea in the region, delivered through a network of agents, and given its mass consumption, the tea trade was an important factor in the region's economy.[118] In the wake of crisis with China, one of the leading tea dealers in Bristol placed an advertisement in *The Cambrian* in 1839 addressed 'To The Inhabitants of South Wales' which pointed to the suspension of trade in Canton, 'through the determination of the Chinese Government to put an end, if possible, to the Import of Opium from India... till the contest is settled, no Tea will be shipped to this or any other European country...'[119]

Ordinary people in the ports would have been aware that much of their consumption was the benefit of trade and there is little evidence to suggest that consumers made any distinction between 'imperial' and 'foreign' commodities, and in some cases, like laudanum, they may not have known the origin. Even when foods were known to be imperial products, like tea or plum pudding, their origins

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[114] Julie E. Fromer, *A Necessary Luxury: Tea in Victorian England* (Ohio: Ohio University Press, 2008); Julie E. Fromer, '"Deeply indebted to the Tea-Plant": Representations of English National Identity in Victorian Histories of Tea', *Victorian Literature and Culture*, 36.2 (2008), 531-547; Hannah Ruth Kathleen Lewis-Bill, 'Dickens, China and Tea: commodity conversations and the re-conception of national identity' (unpublished doctoral thesis, Exeter University, 2015).
[115] John Burnett, *Liquid Pleasures*: *A Social History of Drinks in Modern Britain* (London and New York: Routledge, 1999).
[116] Lizzie Collingham, *The Hungry Empire: How Britain's Quest for Food Shaped the Modern World* (London: Bodley Head, 2017), p. 148.
[117] Ellen Castelow, 'Opium in Victorian Britain', <www.historic-uk.com> [accessed on 24 April 2020].
[118] *Monmouthshire Merlin*, 7 April 1830.
[119] *The Cambrian*, 14 September 1839.

were masked in British tradition and the sense of ownership in the 'British world'. Tea was 'British', irrespective of where it originated, and was the product of trade.

People as consumers expressed little preference over the origin of commodities. By the 1870s, the information networks of the British world were well established and Australian drovers were reported as eating on average 10lbs. of beef weekly, compared with 1lb consumed in England.[120] Beef and mutton were plentiful and cheap in Australia, while they were outside the household budgets of the majority of the population in the British Isles. The answer, at one level, appeared simple to contemporaries– import Australian beef and mutton across 6,000 miles of ocean. The difficulty was the distance. The *County Observer* proposed the possible solution drawing upon a confidence that science could solve problems posed by the natural world.

> within the resources of science there must be some method, although perhaps as yet undiscovered, by which these immense quantities of the best food might be preserved and conveyed in good condition... We are glad, however, to see that a movement has been commenced to introduce a supply of Australian beef into the markets here at home...[121]

Although Australian, American and Argentinean tinned meat had been imported into the United Kingdom in the 1860s, it was the Australian beef that was promoted by state institutions like the Boards of Guardians which attempted to introduce Australian tinned beef into the diets of paupers as well as the armed forces in the face of consumer resistance.[122] Potential consumers in the workhouses, as well as in the wider community, proved resistant to 'Kangaroo meat' as it was described by one resident to the Bristol Board of Guardians.[123] In celebrating his son's 21st birthday, the Rhondda industrialist David Davies, in his address to an audience composed mainly of miners, suggested a reason for the resistance.

> Now, look at Australian beef, the working man wont have it. ... Because he has an idea that the rich have brought it here for him, and that he is expected to eat it. The consequence is that he won't eat it.[124]

Consumers in the region showed no great interest in the quest to promote new forms of imperial trade with Australia. They largely treated all tinned meat – American, Argentinean and Australian – with the same disdain. However, as

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[120] *Bristol Times and Mirror*, 15 April 1872.
[121] *County Observer and Monmouthshire Central Advertiser*, 26 October 1867.
[122] *The Cambrian*, 10 May 1872; *Cardiff and Merthyr Guardian*, 7 October 1871.
[123] *Western Daily Press*, 6 January 1872.
[124] *The Welshman*, 20 June 1873.

distance diminished, cattle farmers in the dominions of Canada and Australia were exploring ways of reaching the United Kingdom as an important market for their produce. In 1876, the *Monmouthshire Merlin* reported that Canada had successfully transported one hundred live cattle across the Atlantic 'in a condition so excellent that they brought a price equal to the best English breeds.'[125] The journey took fifteen days from Montreal to Liverpool. In December 1876, a Swansea ironmonger, Mr. C. H. Ashton of Castle Street, sold fresh American beef which had been successfully refrigerated.

> The front of his shop was thronged on Friday, to witness the gyrations of some splendid pieces of beef, attached to vertical-roasting-jacks, and which, twisting round and round, showed the joints off splendidly to an admiring crowd gazing in at the window.[126]

The distance from the United States placed American meat at an advantage – it could be transported using ice, but not frozen. Australian meat had to be transported over 4,000 miles further and using ice as a coolant was not a solution for Australia. In January 1877, 'fresh' American beef was reported as having been sold in Cardiff and Aberdare by independent traders, by-passing butchers. From these imports, 'the poorer classes generally will be enabled to obtain a fairer share of that national article of food than hitherto, notwithstanding the recent advances in wages, it has been possible for them to secure...'[127] At Cardiff, 'there was large attendance from buyers in Newport, Swansea, Abertillery, Rhymney, Ebbw Vale, Aberdare, Merthyr.'[128] In February 1877, in an 'American Beef Sensation at Swansea', a shop in Oxford Street selling American beef was 'crammed with buyers from morning till night'. 2,000 customers were reported to have bought over a twelve-hour period, 4,000 lbs. of meat.[129] The *Western Mail* reflected on the effective closure of space between the British Isles and North America as far as consumers were concerned.

> A hundred years ago ... It would have required a man of no ordinary courage to have asserted then that within a century three thousand miles would be reduced to speaking distance... the ox that a fortnight ago ran wild on the prairies of America may to-morrow elicit the encomiums of many a British family seated at the savoury meal.[130]

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[125] *Monmouthshire Merlin*, 4 August 1876.
[126] *Western Mail*, 9 December 1876.
[127] *Western Mail*, 16 January 1877.
[128] *South Wales Daily News*, 20 January 1877.
[129] *Western Mail*, 12 February 1877.
[130] *Western Mail*, 20 January 1877.

Distance had militated against Australian efforts to transport beef to Great Britain. However, on 2 February1880, distance was, in one sense, overcome as the SS *Strathleven* successfully shipped a consignment of frozen Australian beef to London which opened up a new consumer market in Australian dairy products and strengthened ties of kinship within the British Empire. The technologies behind the steel steamship driven by the high-pressure engine and refrigeration had combined to compress distance.[131] To the consumers in the region, however, there was no apparent difference to beef produced in Argentina, the United States, Australia or Ireland.

Consumers had demonstrated no preference between imperial and foreign beef and mutton and resisted tinned meat irrespective of its origin. Consumption outranked both kinship and empire. The trade in refrigerated and frozen beef was viewed as part of the global trade within the region without specifying any great preference on the origins of trade. The consumers of the English 'tradition' of roast beef and plum pudding from the 1880s appeared unconcerned that the bulk of this meal – the beef, fruit and spices – may not have been 'English', but may have come from the West Indies, the East Indies, the United States, Argentina or Australia, but was still treated as an 'English' tradition, like tea-time. Trade was a part of life and it was not of any great interest where this trade originated, except for political élites who were concerned about the future of empire and speculated on the possibility of empire as a free trade area. The shrinking of distance delivered by steel steamships and ocean docks had opened up new horizons in trade and consumption.

Conclusion

The towns and cities within the region engaged with the outside world through trade and, to some extent, migration and consumption, but their perceptions were influenced by print media. Trade was principally conducted by steamships in the late nineteenth century which brought the outside world, however it was defined, closer. This trade was only made possible by the construction of ocean docks. Port authorities were faced with the challenge of either constructing these docks or declining relative to how other ports responded. The largest ports all constructed ocean docks in order to protect their trade and participate in the anticipated expansion of trade. The debates over dock construction and the public celebrations

[131] Refrigerating Steamship for Carrying Fresh Meat', *Scientific American*, 49.17 (1883), 259.

of dock openings brought to the fore the importance of the outside world to these societies.

What is not so clear is how these debates and celebrations shed light on how the outside world was perceived, but it appeared changeable. As with Colley's multiple identities, people in the region could celebrate empire as part of a British world, but equally could express sentiments regarding the 'family' in a like-minded, English-speaking world. As consumers, they appeared disinterested in either and the outside world was 'foreign', but important as the source of trade. At the other end of the empire in Australia, such sentiments appeared to be shared. In the view of John Griffiths, Australia's 'urban elites' attempts to cement mass imperial sentiment through advocating closer political ties with Britain and encouraging imperial societies failed to garner popular support.'[132]

The sentiments expressed surrounding the opening of docks with royal patronage are clear so far as élites were concerned, but less so with the mass of the population. As David Armitage and Edward Beasley have shown, the 'empire' was more an idea than an actual entity which was not closely defined.[133] Celebration of 'empire' could have varying significance for different audiences. Élites from outside the region overtly promoted the importance of empire and local élites responded in similar ways. They extolled the virtue of empire, following the lead provided by Edward and George, and celebrated their contribution to the success of the empire through their docks, even though they were motivated by trade conducted mainly outside the empire. The celebrations of élites and the populace may be more related to local factors of prestige and inclusion within the wider British state, rather than empire. Bristol appeared to hope that some of their lost prestige would be restored with the opening of the Royal Edward Dock and celebrated the royal endorsement of their efforts. For the Welsh ports, there are striking similarities in the opening of their docks with how the railway was celebrated, albeit without royal patronage. Cardiff, in particular, took the opportunity to celebrate Welsh language and culture which George fully recognised, and both Swansea and Newport took pains to express their loyalty to the Crown. Although 'loyal addresses' were common in welcoming royalty at public events, there was a sense in the Welsh ports that this

[132] John Griffiths, 'On the Margins of Empire: Antipodean Port Cities and Imperial Culture c.1880-1939', pp. 91-109 in Beaven, Bell and James, *Port Towns* (p. 92).
[133] Armitage, *Ideological origins*, Beasley, *Imperialists*.

took on a special meaning. Through 'loyalty', Wales was expressing its full membership of the wider British community for which it sought formal acceptance.

The 'Bristol' region, having been marginalized from the eighteenth century and for south Wales for much longer in the wider British world, were focused upon inclusion and sought an equality of status with other regions and towns in the United Kingdom. The region had 'missed' the first industrial revolution, constructed its canal system around a decade after the English system and were similarly 'late' in connecting through railways and the electric telegraph and accessing the 'intelligence' that went with it. The early steamship trade in the 1840s for mail and the transit of passengers developed outside the region, as did the major industry of ship-building. Dock openings were an opportunity for the region to catch up. In this sense, the openings had a domestic as well as an international dimension for the region's ports. Edward and George may have pursued an imperial project in their endorsement of dock openings, but for the local populace their agenda in royal celebrations were more domestic than international.

People in the region demonstrated multiple identities with the outside world without any apparent conflict. Relationships, however they were conceived, were dependent upon maritime connections which had a long history of trade conducted by sailing ships and processed in the nineteenth century though docks. Steamships enhanced these connections late in the nineteenth century through increased speed, safety and capacity as distance was compressed. The outside world was embedded in the life of the region which was enhanced by the reduction of distances. By the end of the century, it took under six weeks to reach Australia compared with six months earlier in the century and ten days to reach Newfoundland as opposed to three weeks in the 1840s. Commodities of any description, including foods, could be shipped from virtually anywhere in the world. 'Near' and 'far' took on new definitions as the outside world was divided into zones of kinship, empire or simply foreign.

Chapter 8 Conclusion

> The history of the development of mankind is epitomised in that word transit. In the earlier world it fixed the boundaries of cities, kingdoms, and empires; as it improved so the limits of each were enlarged....
> And great as the change has been during the last eighty years, it is as nothing to the changes impending ... Science is preening her wings for bolder flights, the whole fabric of our civilization is in the melting point; the imagination falters and reels as it attempts to anticipate the marvels yet to be disclosed.[1]

This thesis has attempted to demonstrate how the experiences and perceptions of time and space changed significantly in the Bristol Channel region during the study period. The canal, steam railway and steamship were important features in making industrialization and urbanization possible, along with the tram that facilitated increased urban mobility, but they also affected perceptions of distance. Speed in the transit of commodities, people and communications affected how distance was experienced. Electrical communications brought a new sense of speed as distance diminished. A direct relationship between speed and distance was established: speed shrank distance in terms of perceptions, despite the knowledge that speed did not alter absolute distance. The diminishing of distance, however, was not dependent solely upon speed. It was also related to capacity in the transit of goods and people. The ability of a canal to transport merchandise up to twenty times greater than that of road transport brought destinations nearer in the imagination because they became more accessible. They were effectively 'quicker' because they reduced the number of journeys in the carriage of people and commodities. The same principles applied in the increased capacities of steam railways, trams and steamships. The impact of increased speeds created new landscapes of time and space as distance appeared to diminish. These landscapes had a number of ramifications in the region: they affected identity, forged a sense of linear progress driven by technology and established a new relationship of imagined dominion of human agency over the natural world. Everyday life changed as mechanical mobility on land and at sea and electrical communications brought the outside world closer. These changes also affected a sense of speed in life which began to be perceived as a race. It became important to 'keep up' or face decline because nothing was 'still'. Time became a commodity to be measured, used and not wasted. Because all was change and

[1] *The Cambrian*, 4 July 1902.

movement, the future was unknown but there was confidence that change represented progress.

This thesis uses newspapers as the principal resource in providing insight into the past. There are strengths and weaknesses in using such a methodology which have been discussed in the Introduction. The statements 'The past is a foreign country. They do things differently there.' remind historians that they cannot know the past or reconstruct it. 'Knowledge' about the past is based upon evidence that Peter Burke has called 'traces' which are subject to interpretation using a modern lens. It is not possible to know how these traces were actually experienced or perceived in the past. The attempt in this thesis to glean something about how people experienced and perceived change is fraught with difficulty. Although newspaper editors and correspondents in newspapers made what appear to be clear statements about their world, much is missed in the translation between the past and the present. It is not possible to know exactly what they meant by the statements they made and it is even less secure to draw conclusions about how those who were silent thought and most were silent. History remains an interpretation of the past from limited evidence. However, history as a scientific discipline is not alone in dealing with uncertainty. As Collingwood has observed, 'the separation between what is attempted in principle and what is achieved in practice is the lot of mankind, not a peculiarity of historical thinking.'[2]

Change and continuity

From approximately 1790 to 1914, the principal source of change within the region was industrialization. Improved transport, communications and manufacturing processes were integral to this change which was also the catalyst for urbanization and the expansion of trade nationally and internationally. It also connected time and space in a new relationship which challenged the natural world. These changes brought the region from a position of marginality within Great Britain to a position of prominence and importance, comparable with other industrialized estuaries and sea ways in the United Kingdom like Merseyside, Humberside and the Clyde. It was the waterway of the Bristol Channel that made this possible. The 'Severn Sea' underpinned most industrial and demographic change in the region by affording

[2] Collingwood, *History*, p. 247.

access by sea to markets and stimulated urban growth. It was the platform for change in the region.[3]

Prior to the nineteenth century, the region was dominated by Bristol as an entrepôt, although Bristol's hinterlands in the eighteenth century stretched far wider than the Channel coasts extending into mid-Wales and the west of England. Bristol's eminence, sometimes referred to as a metropolis, was dependent upon the waterway for its coastal as well as its external trade in the north Atlantic and the Iberian coast. Although other ports like Swansea, Cardiff, Bideford and Bridgewater traded within the region, much of their trade was connected to Bristol. The relative decline of Bristol, comparative to other regional ports in the eighteenth century, underlined the marginal position the region held within the overall life of the nation as the 'first' industrial revolution in textile manufacturing by-passed the region.

Industrial and transport technologies changed the region. The substitution of coal for charcoal in the smelting of minerals and new canal and tramroad technologies enabled industrialists in south-east Wales to access the ports of Newport and Cardiff for the transit of coal and iron commodities to markets principally in the British Isles and Europe. Swansea and Llanelli in the west followed a similar pattern of using canals and the ports to access external markets. Swansea specialized in the production of non-ferrous metals unlike Cardiff and Newport which exported coal and iron commodities. The technologies of industrialization demonstrated how distance could be challenged through transport, and they stimulated an internal shift within the region. Lacking the industrial hinterlands of Cardiff, Newport and Swansea, Bristol lost its pre-eminence in the region as a port although throughout the study period, it remained the largest urban area as it extended its boundaries and expanded as a port. The industrialization and urbanization which characterized the Welsh coastline and hinterland was not reflected to the same extent along the English coastline to the south of the region. However, Bristol, Bridgewater, Bideford and Barnstaple did benefit from the increases in population as trade increased within the region and externally.

Under the impact of industrialization and trade, the centre of gravity within the region shifted from Bristol towards the port towns of south Wales. The industrialization of much of south Wales brought the region more closely into the industrializing economy of Great Britain which had a positive impact upon the

[3] Jones and Stone, *Newport Ship*.

identity of south Wales. The diminishing of distance with the connection of the steam railway to the region in the 1840s to Bristol and Gloucester and to south Wales in the 1850s enhanced a sense in south Wales that it was a significant contributor to the wider nation, but did little to stem a sense of grievance in Bristol. The city had lost its position of prominence in the nation in the eighteenth century and within the region with the rise of the Welsh ports and industries in the second half of the nineteenth century. As Chapter 5 showed, the uniformity of Greenwich Time at the expense of local time was adopted without debate throughout industrial south Wales, but resisted in Bristol which may have been an attempt to re-assert its status. The opening of Bristol's ocean docks in the 1870s was greeted as a prospect that Bristol might restore its position as a leading port and city, but the ports in south Wales also created ocean docks and extended their dominance in trade. The region was no longer Bristol's Channel, but effectively reverted back to its former identity as the Severn Sea.

The view expressed by Perkin, for example, that the railway created a single England as opposed to a series of regions suggested that regional identity was weakened by the railway.[4] Even though the railway network was organized on a regional basis, the routes emanated from London with the speed of the railway bringing regions more closely into the orbit of the nation's metropolis. Evidence from the opening of the South Wales Railway in 1850 provided by newspaper reports suggests strongly that identity was strengthened within south Wales as the railway improved communications between the Welsh towns and ports as well as their links with England. This identity was further strengthened in a similar way by the opening of ocean docks in south Wales as shown in Chapter 7. However, there is little indication that this mentality was regional. By strengthening Welsh identity and a sense of worth in contrast to the Blue Books, there was no necessary conflict between having a Welsh and a British identity simultaneously. Sentiment in south Wales appeared to link the two – Welsh identity was strengthened by being recognised as an important part of the kingdom. The region was divided by national sentiment – England and Wales – separated in the main by a waterway but which they also shared. For Bristol, on the other hand, the extension of the railway as well as the telegraph from London fed a sense of grievance of being on the margins of the nation as Bristol élites expressed frustration at the 'delay' in connecting to Bristol.

[4] Perkin, *Age of the Railway*.

The railway and telegraph connections to the region were interpreted differently. Change weakened any sense of a regional identity as the 'region' divided between south Wales and the English counties.

Competitiveness was a characteristic of the region under the impact of change. Ports experienced twin pressures from the steam engine from the1860s onwards. Railways accelerated internal trade on land forcing ports to extend their dock facilities and the increasing size of steamships pushed dock development into the ocean as they abandoned river facilities. Giant docks processed increased coastal and global trade, but it was a period of rivalry. Despite the onset of free trade from the 1840s, a mercantilist spirit was evident in some of the debates around dock development. Port towns looked at each other to see if their respective docks would secure their share of trade, fearful that they might lose trade to other ports as steamships increased in size. This was particularly the case in Bristol which expressed fears at the expansion in the south Wales dock facilities. Along with the other ports, Bristol was flattered by the royal endorsement given by Edward, Prince of Wales, to their endeavours. The naming of docks after royal personages and the presence of Edward and later George at the opening of these docks suggests that competition between the ports extended to royal patronage.

Speed and mobility became features of everyday at least in urban areas. Railways carried millions of passengers annually from its early years and despite issues relating to the cost of railway travel, third-class passengers dominated railway travel. The railway, along with the tram, stimulated new horizons in working-class leisure and women's mobility and helped establish Minehead, Ilfracombe and Tenby as working-class centres of leisure as well as promoting the Mumbles in the Swansea area as a leisure suburb. Railway timetables indicated that travel throughout the region was popular on weekends given the number of trains that ran on Saturdays and Sundays. Later in the century, railway travel included travel to work which extended choices in employment and housing in suburbs. The steam engine was also adapted to drive ships, initially in the form of paddle steamers prior to the screw propeller, which enhanced water travel and excursions in the Bristol Channel itself. Paddle steamers became a regular feature of waterway traffic and were immensely popular which helped establish the coastal centres of leisure in the region. Later in the century, the electric tram complemented the railway in extending urban mobility and promoting working-class leisure. It made the town centre more accessible to people in outlying districts like Morriston in Swansea which affected patterns of

consumption by increasing the trade of the town centre and of the 'high street'. It was seen by contemporaries as an important factor in the expansion of Bristol's urban district through greater connectivity with suburbs and altered most urban landscapes. For Bristol, the electric tram expanded the urban area, but compressed space at the same time.

The steamship of the 1880s radically reduced travel times across the world and increased the safety of oceanic travel which brought the outside world closer. Ahead of the electric telegraph, in the 1840s the steamship substantially reduced the time involved in the transit of mail and improved the safety of emigrants. Global consciousness within the region was constructed largely from newspaper reports, including letters from migrants, and how the news was reported. Consequently, perceptions of the outside world were likely to be broadly shared since direct experience was limited. The outside world tended to be divided into 'empire' and 'foreign' with a sense of kinship promoted within the dominions of the empire and with the United States as a former colony. Kinship was an important characteristic within the global landscape promoted by newspapers which affected how distance was perceived. 'Near' and 'far' became cultural rather than geographical expressions. The outside world had become integral to everyday life and influenced a changing sense of identity as societies came to terms with the impact of the outside on their everyday lives.

Electricity not only powered transport, but provided the energy for a global system of communications through the electric telegraph. The importance of speed in narrowing distance was not restricted to transport. The electric telegraph brought into focus speeds which were unimaginable at the time and were so rapid that they defied accurate measurement until late in the century. The laying of the telegraph across land, and particularly, the subterranean telegraph across the Atlantic, was widely publicized in newspapers and journals and helped form a global perspective on communications. A common theme that was expressed was amazement at the speed of something that was invisible and could only be 'seen' indirectly like wind. It was a power completely outside the experience of societies until the 1840s and radically changed how speed was imagined. Even with the railway, the probable maximum speed experienced by passengers was around 50 m.p.h. Estimates of the speed of the telegraph claimed it could encircle the earth seven times in a second.

It was principally used in commerce, but newspapers also accessed telegraph communications for both news and reporting on stock exchange valuation of

commodities. A newspaper's ability to report on electric telegraph communications was celebrated as a sign of civilization, of being 'modern', as they rivalled London newspapers in the timely dissemination of news. In this sense, the telegraph closed space within the United Kingdom, bringing the region into the mainstream and weakening a sense of region, as well as narrowing distance globally with the completion of an international network of land and subterranean telegraphs. The landscapes of trade and communications assumed more of a global dimension.

The electric telegraph in combination with the steam railway altered the nature of time and its measurement. With conventional local times, a telegraph message could be sent westwards from London to Bridgewater and be received in Bridgewater before it was sent according to Bridgewater and London clocks. The change to standardized, uniform time contradicted the conventional nature of how time was measured. For many, it imposed an artificial time over 'natural' time and asserted, for example, that sunset and sunrise were not times of the day in Cardiff because they happened 'later' than sunset and sunrise in Greenwich. The imposition of measured time reflected something of the mentality that had emerged during the period of industrialization. Nature and its 'rules' were there to be challenged and could be supplanted through science and technology. However, technology could not always be relied upon to provide the answer. The innovation of the time-gun as a way of broadcasting the time was a nineteenth-century version of the medieval system of church bells. The proliferation of public clocks late in the nineteenth century in attempts to communicate time was a testimony to the technical problems facing standardized time and the 'town hall clock' became a feature of urban architecture.

The changes in mobility and communications which accompanied industrialization and urbanization which marked the region paradoxically established divides between communities as well as promoting connections between them. This divide was overwhelmingly between rural and urban areas. These forms of change favoured urban life because in the region transport and communications were provided by private companies who needed to make a profit. The companies needed a market and those markets were largely in urban areas. The effective nationalization of the telegraph in 1870 under the aegis of the Post Office did extend the telegraph over a wider geographical area, but this was unknown in transport, despite pressures to nationalize the railway. In the eighteenth century, an important aspect of the market for commodities carried on canals and tramroads was coal for

domestic consumption, but the transport network terminated in towns like Pontypool, Brecon and Abergavenny or the port towns in the region. Coastal shipping could transport coal to other ports, but inland towns and villages would have had to use horse-drawn transport. The further away from the major ports, the more expensive the coal would have been. 'Isolation' took on new meanings with the onset of the 'canal age', and was a sign of things to come.

Even allowing for the extensive range of railways at the end of the nineteenth century, there was a clear disparity between the urban and the rural experience of railways. Debates raged in towns over the routes proposed by railways. Civic élites were particularly concerned that the railway was connected to their town or city and fearful of the consequences if they were not. The railway promoted competition between towns as different towns lobbied railway companies and opposed rival routes in petitions to Parliament. The companies which were considered to be monopolies wielded considerable power in their ability to determine routes. Some civic elites clearly felt helpless in the face of this outside force. These controversies were about how movement across space was to be managed in the interests of individual towns and the measurement of space through time travelled assumed a greater prominence.

Despite fundamental changes in the means of production and the speed of transport and communications, these changes did not replace the past. Societies have inhabited the Bristol Channel region for at least 5,000 years and the challenge to distance was not new. There is evidence that ancient communities in the region traded with Ireland, Brittany and with each other using the waterway.[5] The efforts of past societies to reduce the importance of distance in the way of roads, carts, river navigations, quays and sailing ships which used horses, winds and ocean currents as sources of energy persisted during the study period. These 'traces' from the past which were present in the eighteenth and nineteenth centuries co-existed with and often complemented change as new technologies built upon past achievements. It was a period of continuity as well as change. What was distinctly new was the perception and the confidence that distance could be changed fundamentally by increasing the speed of travel through technological and scientific advances without having to alter the absolute distance.

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[5] R. M. Protheroe, 'The Bristol Channel Coastlands: Early Cultural Contacts', *Scottish Geographical Magazine*, 65 (2008), 44-54; Martin Bell and Heike Neumann, 'Prehistoric Intertidal Archaeology and Environments in the Severn Estuary', *World Archaeology*, 29 (1997), 95-113.

Intra-regional interaction followed a similar pattern to that which can be dated back to at least the fifteenth century except that paddle steamers criss-crossed the Severn Sea as well as the sailing ship. The coastal trading within the region continued as it had done for centuries using sails as well as engines. Bristol's trade expanded alongside the other ports and the sea continued to function the way it had done for centuries in making coastal and global trade possible. The seaway became busier, hosted large docks and serviced larger fleets, but, as far as the ocean was concerned, nothing much had changed by the end of the nineteenth century since the channel was formed.[6] The global dimension to the Bristol Channel region was based upon trade, but the waterway, known in the past more accurately as 'The Severn Sea', had served for centuries as a passage way to the outside world, as well as fostering coastal trade and interactions.[7] The maritime empire and the domination of world trade were achieved using sailing ships and it was not until the 1880s that the steamship began to dominate trade as engine technology improved.

The travel routes followed by the technological innovations that challenged distance – canals, tramroads, railways, trams and steamships – largely followed existing routes that were centuries old. Canals and tramroads followed valleys and many of the railways simply converted tramroads. The iron tram road was an improvement on wooden rails with iron strips. The horse provided the traction for much of tramroad and canal traffic as it had done for centuries on roads. The railway was dependent upon the road system to take travellers, merchandise and the mail to railway stations. Horse and carts were a form of traction that made railways effective without which railways were 'stranded whales'. The 'railway age' was 'the greatest age of the horse'.[8] Land communications using cables and telegraph poles followed the railway which in turn compromised with the topography of the countryside and with the existing roads in towns and cities. The electric tram followed the urban road system and laid its tracks on existing roads. Steamships were less dependent upon winds and currents than were sailing ships, but they co-existed with sailing ships that followed traditional sea routes until the late nineteenth century.[9] The early docks were constructed on rivers and adapted the bends in rivers to create the first 'floating harbours' prior to establishing docks which sat in the

[6] F. W. North, *The Evolution of the Bristol Channel: With special reference to the coast of South Wales* (Cardiff: National Museum of Wales, 1955).
[7] Bowen, *Oceanic Empire*.
[8] Thompson, *Victorian England*, p. 13.
[9] Graham, 'Ascendancy of the Sailing Ship'.

ocean. The electric telegraph was not a free-spirited Ariel but followed ocean routes to the empire. Electro-magnetism was a natural source of energy as was coal.

Progress and dominion

In its commentary in 1904 on the previous century, *The Cambrian* expressed a view that was common amongst élites from the 1840s onwards in the wake of technological and industrial change and the 'conquest' of distance. The rhetoric proclaimed a society always on the move, unsure about what the future held as science and technology was perceived to dominate the natural world. This dominion was usually expressed as the exploitation of natural resources through manufacturing processes and trade and the 'conquest' of distance through rapid transport and communications. The two aspects were linked. Industrialization was dependent upon 'advanced' transport and communications systems which tended to marginalize industrialization prior to the steam railway and the electric telegraph.

This dominion was interpreted as 'progress' where the present was conceived as being superior to the past but inferior to the future, establishing a linear motion for human achievement. Since this 'present' was superior to the 'past', it followed that the present was also different from the past and, by implication, the future would be different and superior to the present.[10] In Perkin's view, 'modernity has been characterised as the need to conceptualise and generalise the future' which was a characteristic of the time where the nation was 'quite sure that the future would resemble nothing as much as the present.'[11] *The Cambrian* expressed this ideology clearly.

Human agency had altered many aspects of the natural world. It was difficult for contemporaries to be precise on what else could change in determining the scope and limits of human ingenuity. The more knowledge was secured, the more questions were raised. As Mr. Whiteside M.P. in Devon, who lived through these changes, expressed it in 1860,

> M.P.s forget the days of Pitt and Fox were the days of the slow coaches, when a man was a week or a fortnight going from Edinburgh to London, and made his will first. These are the days of Hansoms and electric telegraphs - of the steamships and the railways, and the thoughts that shake mankind.[12]

[10] Heilbroner, *Visions;* Lowenthal, *Foreign Country*.
[11] Perkins, *Reform of Time*, pp. 15 and 39; M. Perkins, *Visions of the Future: Almanacs, Time and Cultural Change 1775-1870* (Oxford: Clarendon Press, 1996).
[12] Mr. Whiteside M.P., *Bideford Weekly Gazette*, 4 December 1860.

'Progress' had many elements and the rhetoric surrounding scientific advances linked to technology, industrialization, communications and transport does convey the excitement, the wonder and the self-confidence, if not arrogance, of discovery, invention and dominion that élites clearly felt. Oceans were sometimes described as 'highways', underlying the sense of dominion over nature.[13] Change unfolded as one 'advance' followed another in an apparent line of human progression. Speed as the conqueror of distance tended to be prominent in the notion of progress.

> This is the age of great discoveries in all directions. The railroad has become the magician's rod, the electric telegraph a wire of wonders ... The rapidity with which change follows change is also remarkable. Things that took a century to do some time ago are now finished off in a day... The whirlwind is the chariot of the nineteenth century...[14]

However, the newspaper also expressed the tensions within the 'new' which Schivelbusch and Carter have pointed out.[15] The 'whirlwind' was outside of human agency and lacked purpose or clear direction, but drove chaotic change.

Much of this ideology was disseminated through print as with *The Cambrian*'s editorial and would have influenced opinion and stimulated imaginary worlds which could not be experienced directly. It may have influenced at least some aspects of transport and communications historiography which has affected social and cultural history. Some of the weaknesses in historiography may in part be inherited from contemporary celebrations of 'the railway age' or 'the age of machinery', while other important features may have suffered from redundancy, victims of historians' knowledge of what comes next. The electric telegraph was replaced by the wireless telegraph, radio and the telephone, the canal, in time, gave way to the railway, tramroads were converted into railways, the electric tram was replaced by motorized transport and the horse disappeared. The innovations were 'superior' to those they replaced but the railway endured.

Élites at the time exuded an overriding self-confidence derived from an apparent dominion over the natural world and its resources. Industrial and commercial power in the world served to underline British supremacy over nature and other nations. Thomas Carlyle was not always an enthusiast for the changes he witnessed, but his commentary on the 'Age of Machinery' as he called it in 1829

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[13] Rawson W. Rawson, 'Ocean Highways: Approaches to the United Kingdom', *Journal of the Royal Statistical Society*, 1 (1894), 136-148; *Our Ocean Highways: A Condensed Universal Hand Gazetteer and International Route Book*ed, ed. by Maurice Dempsey and William Hughes (London: Edward Stanford, 1871).

[14] *Weston Gazette*, 24 November 1848.

[15] Carter, 'Rail, Steam and What?'; Schivelbusch, *Railway Journey*.

conveys the sense of power and restless ambition which drove change in a combat with nature. 'We remove mountains, and make seas our smooth highways; nothing can resist us. We war with rude Nature; and, by our resistless engines, come off always victorious, and loaded with spoils.'[16] It is impossible to assess accurately how far this view was shared, but what is clear is that landscapes of time and space were different from the past. Distance was compressed in the imagination through the impact of speed as a triumph over nature and, as such, became a defining characteristic of 'the "modern"'.

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