

The Neuroses of the Railway:
Trains, Travel and Trauma in Britain,
c. 1850 - c. 1900

Ralph Harrington

D.Phil. Modern History
Lincoln College
Trinity Term, 1998

PREFACE

I attempt in this work to take a new look at the Victorian railway. My contention is that just as the economy, society and culture of nineteenth-century Britain cannot be understood without taking account of the railway, so the railway cannot be understood if it is not related to the social, cultural, intellectual and other contexts within which it existed. In particular, this thesis is concerned with exploring the cultural dimensions of the railway, not only in the ways in which it was perceived and experienced but also in terms of the processes of mediating, imagining and re-shaping those perceptions and experiences, and the motivations behind them. The railway is related in these pages to the deep-seated and enduring Victorian ambivalence towards the machine and the society it was creating, and some of the ways in which the railway was central to nineteenth-century perceptions of the negative aspects of modern technological society are explored in detail. For too long historical consideration of the Victorian railway has been divorced from the wider historical landscape of the period, and the railway has itself been treated too simplistically as a beneficial phenomenon which the Victorians were happy to accept and celebrate. By placing the railway in its sociocultural context, I hope to show that the picture is more complex and more subtle than has previously been thought, and much more interesting.

This thesis began its life at the University of London in 1992 as an undergraduate essay on the railway as a theme in nineteenth-century degenerationist thought. In a sense, it has taken me six years to finish that essay. I have incurred many debts along the way, and it is a pleasure as well as a duty to attempt, however inadequately, to acknowledge them here.

Ruth Harris believed enthusiastically in this project from the beginning of my time in Oxford, and has been the perfect supervisor to a most imperfect supervisee. I owe her more and deeper thanks than I know how to convey. I am grateful to Paul Weindling for taking on the supervision of this thesis for a period, and for the support, encouragement and guidance he has offered throughout. For encouragement, assistance, advice, criticism and support at various times I must thank, in alphabetical order: David A. Alexander, Theo Barker, Eric Caplan, Roger Cooter, Nicholas Daly, Colin Divall, Di Drummond, Richard Horton, Jo Innes, Paul Johnson, Paul Langford, Paul Lerner, Haidée Lorrey, Iain Maclean, Gordon Marsden, Richard Mayou, Mark Micale, Jill Murdoch, Michael Neve, Richard Overy, H. J. F. P., Conrad Russell, Jennifer Seedyke, Phil Waller, Allen Warren.

To the following libraries and collections, and to their unfailingly helpful and endlessly patient staff, my sincere thanks: the Bodleian Library, University of Oxford; the British Library, London; King's College London Library; Lincoln College Library, University of Oxford; the Library of the National Railway Museum, York; the Public Record Office, Kew; Senate House Library, University of London; University College London Library; Wellcome Institute for the History of Medicine Library, London; Library of the Wellcome Unit, University of Oxford; University of York Library.

Among institutions, I must record my thanks first and foremost to the British Academy, without whose support not one word of this thesis would have been written. I also owe thanks for financial support to Lincoln College, Oxford, and the Trustees of Lord Crewe's Benefaction. I must also thank the following institutions, companies and organizations for help of many kinds, freely given at various stages: London Underground Limited; National Railway Museum, York; the Open University; Railtrack; the Royal College of Physicians; the Royal College of Psychiatrists; the Royal College of Surgeons; the Science Museum, London; Trinity and All Saints College, Leeds; the Wellcome Institute for the

History of Medicine, London; the Wellcome Unit, University of Manchester; the Wellcome Unit, University of Oxford.

Special thanks go to Penny Galloway.

To pay adequate tribute to the encouragement, support, generosity and patience of Vicky Cooper, who married me in 1995 knowing full well that she was also marrying a thesis, I am utterly unequal. Without her critical intelligence, historical sense, clarity of insight and expression, and love for late-night argument, this thesis would be much the poorer, and so would its author. I can only say thank you for everything.

Finally, I must express my gratitude to my parents, who have supported me most generously and for longest. My love and heartfelt thanks are a poor acknowledgement for all that they have done for me, but they have them, now and always.

Ralph Harrington

1 July 1998

ABSTRACT

This thesis explores some aspects of the cultural history of the railway during the latter half of the nineteenth century and the beginning of the twentieth. It argues that the railway was of central importance in creating and shaping Victorian attitudes to the machine and to mechanized civilization in a world increasingly dominated by large-scale technologies. In particular, it explores the significance of negative responses to the railway — fear, anxiety, nervousness, alarm, revulsion — in influencing a range of social, cultural and medical responses to the perceived degenerative threat of technological civilization. The four chapters of the thesis are organized so as to provide a progressive tightening of focus on particular aspects of the railway's significance in this context.

The first, most wide-ranging, chapter explores the ways in which the Victorian railway was perceived as both an icon of progress and civilization and as a disruptive, threatening, destructive force. In particular, it seeks to establish the deep-rooted, enduring and influential nature of the fear and anxiety which the railway provoked. The second chapter is concerned with the railway journey as an experience, relating the ambivalence with which the railway was viewed to the journey as a sensory, physical and mental experience. The third chapter focuses on the accident as the most dramatic instance of the dangers of the railway, and relates its significance in contemporary culture to the wider context of the fears provoked by increasingly powerful and potentially destructive technologies. The fourth and final chapter explores the phenomenon of 'railway spine', the obscure nervous condition supposedly suffered by railway accident victims who had seemingly received no actual organic injury, but nonetheless displayed nervous, mental and physical symptoms of serious bodily disorder. This condition is seen to be both a

culmination of the perceptions of anxiety and alarm with which the Victorian railway was viewed and as an expression of the response of the human mind and body to the pressures exerted by a society dominated by ever more powerful technological systems.

EXTENDED ABSTRACT

I attempt in this work to investigate some important themes in the sociocultural history of the railway in Britain during the period from the mid-nineteenth century to the first world war. My central concern is with the railway as an expression of the perceived degenerative threat of technological modernity, and as a locus of contemporary concerns about the relationship between the machine, human society, and the human mind and body.

In more detailed terms, I have tried in this thesis to do three things. Firstly, I have sought to place the Victorian railway in its wider sociocultural context, by defining and exploring the ideas, associations and perceptions connected with it, and by relating it to the more general nineteenth-century cultural landscape, in terms of contemporary attitudes towards technology and its perceived benefits and dangers. Secondly, and moving from the general to the particular, I have set out to explore what I have termed the 'neuroses of the railway', a term which has in the context of this thesis both a specific and a general meaning. In its more general sense, it refers to a range of social and cultural responses, expressed both individually and collectively, to the perceived threat of this most powerful, dramatic and potentially destructive of large-scale technologies; while in its more specific application, it refers to a range of disorders, believed by contemporaries to be (in different ways) the products of a disrupted or damaged nervous system, apparently suffered by those who might collectively be referred to as the victims of the railway (whether through involvement in a full-scale railway accident or through experience of the lesser traumas associated with railway travel). Thirdly, and moving from the particular to the specific, I have focussed on one very important aspect of these biomedical railway neuroses, 'railway spine'. I have

attempted to re-examine the 'railway spine' phenomenon, to re-assess its supposed role in the development of 'modern' psychiatric and psychological medicine and to relate it fully — I believe for the first time — to its wider cultural context of Victorian ambivalence towards the machine and mechanized society.

I believe this thesis makes an important contribution to railway history and the histories of medicine and of technology in nineteenth-century Britain, broadening and deepening these fields of historical enquiry and relating them in new ways to each other and to nineteenth-century British cultural history more generally. Railway history urgently needs its cultural dimensions developed, and those dimensions to be related to wider historical contexts. Railway historians, whether academic or 'popular', have focussed on the technical, the operational, the managerial, the economic and have tended to study the various aspects of the railway in isolation from each other, and the railway itself in isolation from its social and cultural context. As a consequence, the cultural history of the railway is the untold history of the railway; this thesis attempts to illuminate one aspect of it, and to argue for a fuller and more sophisticated attempt to explore the rest. I also seek in this work to challenge the teleological biases long evident in railway history. The history of nineteenth-century railways has been seen as a history of progress, of continuous improvement and beneficial development, and the voices of anxiety and hostility which accompanied the growth of the railway system throughout the century have been largely dismissed and written out of the story. This thesis attempts to give the discontents their full importance in that story, and argues that a full appreciation of the Victorian railway as not merely an artefactual but a cultural and social phenomenon can only be gained through understanding the negative as well as the positive reactions it provoked. I am also concerned here to correct a similar teleology which exists in the specifically medical aspect of this history. 'Railway spine' has been seen as contributing to the development of 'modern' psychiatry through its contribution to the 'discovery' and legitimization of non-organic nervous and mental disorder. I argue that this is a misreading, and

that a properly contextualized understanding of railway spine — contextualized in terms both of medicine and of the wider cultural landscape — leads to a more accurate characterization of its role as reflecting and sustaining, rather than challenging, the organic bases of nineteenth-century medicinal thought and practice. Lastly, and leading on from that wider point, I seek in this thesis to build bridges between what are too often seen as discrete disciplines — social history, cultural history, technological history, medical history. By tracing the interrelationships between the technological, the cultural and the medical in the case of the railway generally and ‘railway spine’ in particular we can come to a much better understanding of strands of thought and cultural reaction and response which were vital in the formation of Victorian society: responses to technology, new understandings of biological and mental structures and processes, new models of social, technical and biomedical development and change.

The railway was one of the most dramatic of the large-scale technologies of the nineteenth century; it was also one of the most public. It provoked responses in way in which other manifestations of industrial civilization did not; most significantly, it brought the Victorian middle classes into direct contact with the machine and exposed them to the dangers of an industrial environment for the first time. The railway also raised issues of human control over ever more powerful technologies, of the limits of human agency and the extent of the autonomy of mechanical systems, in a more dramatic and urgent way than had been the case before. Human beings of all classes and conditions had to entrust their safety to the railway, and issues of railway safety were not confined to the factory and restricted to a limited number of employees, but impacted on society at large.

It is within this context that this thesis sets out to delineate, explore and anatomize the neuroses of the railway. It starts from the premise that technologies are not autonomous and subject to internal dynamics of development independent of any wider social and cultural dimensions, but are on the contrary inextricably bound up with every aspect of the human society which gives them birth.

Technology and society can only exist in each other's presence; and in the webs of culture through which human society constantly recreates, reinvents and reimagines itself we can see reflected the nature of their continuing encounter.

The investigation of that encounter is inevitably an inter- and multi-disciplinary project, and this work is thus concerned with cultural, medical, social and technological history, and draws evidence from a wide range of sources, including fiction, poetry, technical and medical texts, journalism, paintings, cartoons and engravings. This material is inevitably heterogenous; with the exception of the final chapter, in which a group of medical texts provides the core of evidence around which the argument is constructed, there is no unified body of source material acting as the foundation for this study. Rather, a choice of material has been made through which the persistent themes, images and processes which constitute the reality of the cultural phenomena under consideration can be traced, uncovered and explored. The sources illustrate the processes which form the focus of this study: the dialectical relationship between assimilation and anxiety in attitudes to the railway; the relationship between the railway and ideals and perceptions of modernization and modernity; conflicts between technology and society, the individual, the mind and the body.

The thesis has been structured in such a way as to provide a progressively tightening focus, leading from a chapter of general contextualization through two chapters of gradually narrowing scope to a final chapter in which the phenomenon of 'railway spine' is considered in detail. The first chapter, 'The Railway Perceived' is thus the most wide-ranging, chronologically and thematically. It attempts to delineate the railway as a cultural phenomenon, a focus of perception, experience and imagination, from the mid-nineteenth century through to the early years of the twentieth. This chapter seeks in particular to define, interrogate and reconsider the cultural significances acquired by the nineteenth-century railway more precisely and more deeply than has been attempted before. The associations of the railway with progress, and with social and economic improvement, and with

anxiety and pessimism, are well-known historically but not well-understood; they are more often referred to than they are examined. This chapter attempts to analyse them, and to find out what the Victorians meant when they used them and what that usage tells us about the way they saw, experienced and imagined the railway as an aspect of their environment. This chapter is also intended to clarify the chronology of Victorian perceptions and responses to the railway, and in particular to establish the widespread, deep-rooted and enduring nature of railway-related fear and anxiety in the nineteenth century. One of the most important themes of this thesis is the pervasiveness and persistence of such anxiety; railway phobia was not, as has too often been assumed, significant only in the early years of railway development but remained an important component of public response to the railway throughout the nineteenth century. The railway has too often been seen as exemplifying a progressive, teleological interpretation of technological improvement in which society becomes accustomed to technical innovations and the relationship between society and machinery is characterized as one of progressive and uninterrupted assimilation; it is argued here that this is not the case, and that the continuing disquiet provoked by the railway reflects and embodies the more general Victorian cultural landscape of enduring ambivalence towards the machine.

The second chapter, 'The Railway Journey', tightens the focus from the general to one particular aspect of the railway as it was experienced by the Victorians: the railway journey. Many of the negative aspects of the railway defined and discussed in the first chapter are here reconsidered in the light of the significance of the journey as the aspect of the railway which brought the Victorians most directly into close interaction with the mechanized transport, and which compelled them to risk their safety and comfort most directly in close interaction with the machine. Through the experiences, perceptions and associations clustered around the image and the reality of the railway journey,

themes of modernity, danger, assimilation and anxiety are traced, explored and examined in the context of the 'neuroses of the railway' as a cultural phenomenon.

The third chapter, 'The Railway Accident', draws out one particularly significant instance of railway danger: the accident. In the railway accident all the dangers of the railway were concentrated and focussed in a single instant of terror, violence and destruction; and similarly when we study the significance of the accident in detail we can find embedded in the reactions it provoked the various anxieties, fears and neuroses of the railway in their most potent and focussed forms. These responses did not necessarily take the specific form of psychological or pathological disorders, although these were one important aspect of the phenomenon, but they were still 'neuroses' in a wider sense; they constituted a neurosis of the collective psychological and pathological constitution of the age, a response characterized by anxiety, fear, tension, and mental and nervous disorder on the part of a railway-travelling, railway-dominated, railway-anxious society.

The final chapter, 'Railway Spine', brings the three themes underlying the whole of the thesis — the technological, the medical, and the legal — together in a detailed study of the 'railway spine' disorder, and the way in which this seemingly non-organic ailment gave expression to the deeply-rooted anxieties provoked by the railway. This chapter thus attempts not only to provide a detailed medical and medico-legal account of the origins, development and significance of 'railway spine', but also to embed that account in the wider social and cultural context explored in the preceding chapters.

TABLE OF CONTENTS

Preface	ii
Abstract	v
Extended abstract	vii
List of illustrations	xvi
Introduction	1
Aims and themes	1
<i>Contexts: mechanisms and mentalities</i>	3
<i>Desire and repulsion: Ruskin and the locomotive</i>	4
<i>Railways, culture, degeneration</i>	7
Railway history: problems and new approaches	9
Thesis organization	14
1. The railway perceived	17
The railway in the Victorian imagination	17
The spectacle of progress	21
<i>The railway and the politics of progress</i>	22
<i>A new age: change, speed and novelty</i>	29
The railway and the aesthetics of ambivalence	32
<i>The railway poetic/pastoral/apocalyptic</i>	33
<i>Turner's Great Western and the railway sublime</i>	36
The railway in the landscape	40
<i>Territorial imperatives</i>	44
<i>The railway underworld</i>	49

Modernity, machines and mentalities	60
<i>Networks of progress</i>	60
<i>Mechanization and the dark side of progress</i>	63
<i>The railway and the neuroses of modernity</i>	67
2. The railway journey	71
The journey and society	71
<i>Mobs, masses and mobility</i>	72
<i>Crime and the railways</i>	81
<i>Gendered spaces</i>	87
The journey and the passenger	90
<i>Passengers as parcels: the industrialization of travel</i>	92
<i>The railway station</i>	95
<i>Passengers as prisoners: enclosure and isolation</i>	100
<i>Railway readings</i>	107
The journey and the body	110
<i>Health and the railway traveller</i>	111
3. The railway accident	121
Railway safety and railway slaughter	121
<i>Railways, press and public</i>	127
<i>'An unwieldy, unmanageable & wild power'</i>	132
<i>The safety of the public</i>	139
Anatomizing the accident	143
<i>Progress, instability and accident</i>	144
<i>Working the railway</i>	150
Accident, anxiety and assimilation	152
<i>Technologies and mythologies</i>	158
<i>Trajectories of destruction</i>	162
Industrial transport, fatigue and crisis	164

4. Railway spine	169
The accident and the dark side of modernity	169
<i>The 'railway spine' phenomenon</i>	171
Accident and aftermath: the medico-legal context	173
<i>Railways and responsibilities: establishing liability</i>	176
<i>Lord Campbell's Act</i>	178
<i>The limits of liability</i>	182
<i>Railway accidents and railway doctors</i>	183
<i>The medical context, c.1830 - c.1860</i>	191
<i>Railway travel and public health in The Lancet</i>	197
<i>John Erichsen and 'railway spine'</i>	204
Nervous shock and the moment of terror	211
<i>The work of H. W. Page</i>	214
<i>From shaken spines to splintered minds</i>	220
Conclusion: the neuroses of the railway	223
Ambivalence and anxiety	223
The railway and degeneration	226
'Market culture and machine culture'	227
Railway, mind and body: 'from railway spine to shellshock'	230
Appendix: railway accident statistics, 1860-1914	234
Bibliography	247

LIST OF ILLUSTRATIONS

The illustrations are grouped between the end of chapter two and the beginning of chapter three. The pages of the illustration insert are numbered I to XIX. Where an illustration is referred to in the text, the figure number is used.

1. Station clock from c.1850	I
2. Clock in Edinburgh Waverley station booking hall	I
3. The railway pastoral: bridge over the Tees at Croft	II
4. The railway pastoral: the Great Western Railway west of Bath	II
5. J. M. W. Turner, <i>Rain Steam and Speed</i> (1844)	III
6. Composition of <i>Rain Steam and Speed</i>	III
7. The chaos of railway construction: Camden, 1836	IV
8. Building the Great Central Railway: tunnel construction	IV
9. Reshaping the urban fabric: building the line through Southwark, 1860s .	V
10. The railway re-orders and divides the landscape: Crimple Valley Viaduct	V
11. The railway underworld: cutting on the Dublin & Kingstown Railway	VI
12. The western portal of Box Tunnel	VI
13. The railway sublime: No. 1 Tunnel, Bristol	VII
14. The battlemented east portal of Twerton Tunnel	VII
15. The Egyptian-style west portal of Summit Tunnel	VIII
16. Crowds on the move: commuters at Liverpool Street station, 1910 . .	VIII

17. William Powell Frith, <i>The Railway Station</i> (1863)	IX
18. 'Scene in a tunnel': cartoon from <i>Punch</i> , 1864	X
19. Augustus Leopold Egg, <i>Travelling Companions</i> (1862)	X
20. Staff at Clapham Junction, 1880s	XI
21. Police and armed soldiers at Pouparts' Junction, 1911	XI
22. Landau being carried on a flat wagon, London & Greenwich Railway	XII
23. The railway bookstall	XII
24. Advertisement for the Railway Passengers Assurance Company	XIII
25. The Abergele disaster, 1868	XIV
26. Aftermath of the head-on collision at Norwich Thorpe, 1874	XIV
27. The devastated station at Wigan, 1873	XV
28. Collision at Kentish Town, 1861	XV
29. Emblem of the Furness Railway Company	XVI
30. London & North Western Railway poster, 1911	XVI
31. The tumult of the express locomotive footplate, c. 1870	XVII
32. Signalling equipment at Cannon Street station, c. 1860	XVIII
33. Disraelian politics as a locomotive speeding into danger, 1868	XVIII
34. 'A railway undertaking': cartoon from <i>Punch</i> , 1852	XIX
35. 'Safety dress for railway travellers': cartoon from <i>Punch</i> , 1864	XIX

The Neuroses of the Railway:
Trains, Travel and Trauma in Britain,
c.1850 - c.1900

INTRODUCTION

Aims and themes

This thesis is a study in the socio-cultural history of technology. It seeks to explore aspects of the social and cultural histories of the railway in nineteenth-century Britain, and in particular to examine its significance as a symbol and an embodiment of the perceived degenerative threat of technological modernity. Among the most striking features of the later nineteenth century was the proliferation and spread of powerful, large-scale technologies, a phenomenon which many at the time found disturbing and threatening.¹ Arguably, the railway was the most dramatic, visible, and — for many — alarming of these technologies, and it occupies a central place in contemporary perceptions of the relationship between the machine, human society, the human mind, and the human body.

The railways constituted one of the most significant technological phenomena of the nineteenth century, and from the beginning they compelled attention. The responses of contemporaries ranged from exhilaration and celebration to hostility and dread, and it took some years for these emotions to begin to be submerged in a general indifference.² As a presence in the nineteenth-century landscape, the railway was a source of a highly significant collective experience of technology, and of a powerful, liberating and disturbing vision of what technology could symbolize, offer, and threaten. Railways could be seen as a beautiful, stirring,

¹ For more on this, see W. Leiss, 'Technology and degeneration: the sublime machine', in J. E. Chamberlin & S. L. Gilman (eds.), *Degeneration: the Dark Side of Progress* (New York: Columbia University Press, 1985).

² Contemporary evidence suggests that, more than 170 years into the railway age, indifference has yet to become universal. The railway still inspires strong emotions, both positive and negative, and its associations with many of the themes examined in this study — fear, anxiety, alienation — remain potent. Consider, for example, the 1994 BBC television science-fiction series *Underground*, which used the London Underground system as the location for a dystopian vision of future society; and even that perennial fairground favourite, the 'ghost train' ride, relies for its effectiveness on many of the aspects of the railway which are examined in this study — speed, danger, helplessness, sensory dislocation.

optimistic symbol of progress, promising economic and social betterment, freedom from old restrictions, democracy, energy, all the benefits and opportunities of the constantly circulating liberty of modern mechanized civilization. Yet they were also associated with pollution, destruction, disaster and danger, bringing about the destabilization and corruption of social order, the vulgarization of culture, the despoliation and defilement of rural beauty.

Railway historians have generally taken the view that such negative perceptions were characteristic only of the early days of the railway, and that the general public's attitude to the new form of transport soon matured as the early predictions of death and disaster were proved unfounded. Both enthusiasm and alarm, it has been argued, were quickly replaced by indifference and a universal taking for granted of all the benefits which the railway had to offer. Thus, according to Dyos and Aldcroft's *British Transport: an Economic Survey* (1969), the anxiety provoked by the railways was largely associated with the period preceding a line's construction, and quickly faded once the line was in operation and its benefits were apparent: 'The evils that were so much feared', claim the authors, 'either evaporated or were more than counterbalanced by the advantages' of the completed railway.³ Similarly, P. J. Cain writes that 'the novelty of steam had worn off by 1870. Railways were no longer regarded as technological marvels but merely as an everyday part of business life'.⁴ This is not entirely inaccurate; by the 1860s, the railway had indeed been accepted as an unremarkable part of everyday life for millions. But it is misleading, in presenting only a partial picture. Fear and anxiety remained, beneath the surface of outward acceptance, as Professor Jack Simmons registers when he notes that expressions of alarm, fear and hostility did not come to an end in the 1840s but continued to be recorded far down into the Victorian age.⁵ It is the contours of these continuing negative responses to the railway, and the socio-cultural geology underlying them, which this work seeks to study.

³ H. J. Dyos & D. H. Aldcroft, *British Transport: an Economic Survey from the Seventeenth Century to the Twentieth* (Leicester: Leicester University Press, 1969), p. 188.

⁴ P. J. Cain, 'Railways 1870-1914: the maturity of the private system', in Michael J. Freeman & D. H. Aldcroft (eds.), *Transport in Victorian Britain* (Manchester: Manchester University Press, 1988), p. 92.

⁵ Jack Simmons, *The Victorian Railway* (London: Thames & Hudson, 1991), p. 16.

Contexts: mechanisms and mentalities

Mechanization as an aspect of human existence is as old as civilization itself. It was not until the European and trans-Atlantic 'Industrial Revolutions' of the early modern and modern periods, however, that machines decisively altered the course of civilization. This is not the place to enter into the complex debates surrounding the causes, nature and chronology of the Industrial Revolution, but whatever claims are made for the gradual nature of the process and the importance of continuity rather than revolutionary transformation it is clear that from the mid-eighteenth century onwards machinery was having a wider and more significant impact on society as a whole than it had ever had before. In the words of the twentieth-century American social thinker and critic Lewis Mumford:

Mechanization and regimentation are not new phenomena in history: what is new is the fact that these functions have been projected and embodied in organized forms which dominate every aspect of our existence. Other civilizations reached a high degree of technical proficiency without, apparently, being profoundly influenced by the methods and aims of technics.⁶

The development of an industrial, mechanized society — as distinct from a society in which machines play certain limited roles — was characterized by society's increasing adaptation to meet the exigencies of the machine. The development of the machine was cumulative, and as the types of machinery became more diverse and complex their influence on habits, lifestyles and modes of thought increased. By the middle of the nineteenth century, in the most industrially and technologically developed parts of the world — notably in Great Britain — the power of the machine in many ways dominated both the lives of individuals and the collective life of society. Technology was in the process of transforming not only everyday habits of life but also the psychological, spiritual and cultural orientation, and modes of thought, imagination and perception, of society as a whole.

⁶ Lewis Mumford, *Technics and Civilization* (New York: Harcourt Brace Jovanovich, 1934), p. 4.

For many, adjustment to this process of transition brought anxiety and trauma. Contemporaries were aware of the transformation through which they were living, and to many it seemed bewildering, incomprehensible, out of control. People felt cut off from the past; former certainties, the seeming security of tradition, once dependable cultural landmarks, were undermined and swept aside. Insecurity and uncertainty took their places. Ever more powerful technologies promised new opportunities, freedoms and abilities, but also threatened to undermine the foundations of society, to poison and corrupt the environment, and to assault the human mind and body. A deeply-rooted ambivalence pervaded nineteenth-century attitudes towards the machine. Technology was a human creation; indeed the making of tools and mechanisms was perhaps the essential defining feature of human intelligence and creativity, and the apparent dominance of the machine occurred only because individuals and societies had allowed it to become dominant, 'had, by an inner accommodation, surrendered to the machine'.⁷ The machine brought about a conflict of desire and repulsion in the Victorian mentality; desire for the benefits of mechanization, repulsion at the price it often seemed to demand.

Desire and repulsion: Ruskin and the locomotive

For those Victorians who celebrated progress, industry and the machine, the railway was the foremost expression of their age: an age of unparalleled industrial, economic and technological achievement.⁸ Speeding express trains; vast, teeming stations; the great network of shining, intertwining lines; the intricacy and precision of timetables; the statistical proofs of ever-growing traffic; the scale and complexity of railway companies as business organizations: all could be seen as sustaining the acknowledged position of the railway as the most powerful demonstration of human mastery over the forces of nature, and in particular as an expression of British mechanical genius. The steam railway locomotive itself, built of metal, powered by coal, seemed to embody nineteenth-century Britain's industrial know-how and energy in a single, highly dramatic, universally successful

⁷ Mumford, *Technics and Civilization*, p. 4.

⁸ For more on such positive nineteenth-century cultural constructions of technology, see Asa Briggs, *The Power of Steam* (London: Sheldrake Press, 1982), pp. 70-93, esp. pp. 92-3.

and thoroughly practical form. Even John Ruskin, no friend to railways in general, acknowledged the power of this vision:

I cannot express the amazed awe, the crushed humility, with which I sometimes watch a locomotive take its breath at a railway station, and think what work there is in its bars and wheels, and what manner of men they must be who dig brown iron-stone out of the ground and forge it into that! What assemblage of accurate and mighty faculties in them; more than fleshly power over melting crag and coiling fire, fettered, and finessed at last into the precision of watchmaking; Titanian hammer-strokes beating, out of lava, these glittering cylinders and timely-respondent valves, and fine ribbed rods, which touch each other as a serpent writhes, in noiseless gliding, and omnipotence of grasp; infinitely complex anatomy of active steel, compared with which the skeleton of a living creature would seem, to a careless observer, clumsy and vile — a mere morbid secretion and phosphatous prop of flesh!⁹

For Ruskin the locomotive builders are ‘the men who thought out this — who beat it out, who touched it into its polished calm of power, who set it to its appointed task, and triumphantly saw it fulfil this task to the utmost of their will’.¹⁰ He compares the precise application of technical knowledge and skill apparent in their mechanical creation to the imprecise, tentative, feeble nature of the artist’s enterprise: ‘this weak hand of mine, timidly leading a little stain of water-colour, which I cannot manage, into an imperfect shadow of something else — mere failure in every motion, and endless disappointment’.¹¹ He sees the locomotive as a uniquely powerful expression of the genius of the time, of the ability of the men of the nineteenth century — ‘these Iron-dominant Genii’¹² — to extract the raw materials of the earth, master them, and transform them into a

⁹ John Ruskin, *Cestus of Aglaia* (1865-6); in *The Works of John Ruskin*, ed. E. T. Cook & Alexander Wedderburn (39 vols., London: George Allen, 1903-12), vol. 19, pp. 60-1.

¹⁰ Ruskin, *Works*, vol. 19, p. 61.

¹¹ *Ibid.*

¹² *Ibid.*

device shaped to serve their purposes and do their will. Many of Ruskin's abiding concerns are reflected in his response to the railway locomotive: the nature and value of work, the importance of skilled craftsmanship, the relationship between raw material and finished product, and the transforming power of human agency in making the one into the other. But for Ruskin all human creations, whether architectural, artistic, or mechanical, are expressions not only of expertise and physical skill but of the morality of the society which produces them; and the railway locomotive reveals the shortcomings of the society that gave it birth, as well as expressing its achievements:

But, as I reach this point of reverence, the unreasonable thing is sure to give a shriek as of a thousand unanimous vultures, which leaves me shuddering in real physical pain for some half minute following; and assures me, during slow recovery, that a people which can endure such fluting and piping among them is not likely soon to have its modest ear pleased by aught of oaten stop, or pastoral song. Perhaps I am then led on into meditation respecting the spiritual nature of the Tenth Muse, who invented this gracious instrument, and guides its modulation by stokers' finger; meditation, also, as to the influence of her invention amidst the other parts of the Parnassian melody of English education.¹³

The real nature of the railway locomotive, the real end of all the skill, precision and strength embodied in its construction, is betrayed by the sudden strident sound of its whistle: dehumanized, profoundly unnatural, productive of actual physical pain in the sensitive hearer.¹⁴ The image of the steam-whistle relates the locomotive to a complex of other ideas about the character of nineteenth-century industrial civilization with which Ruskin was preoccupied, for in engine-

¹³ Ruskin, *Works*, vol. 19, pp. 61-2.

¹⁴ The locomotive whistle, loudly and persistently sounded wherever railways were found, was a widely detested aspect of the railways' presence in the Victorian environment. For a fascinating study of such nineteenth- and early twentieth-century industrial noise pollution, and opposition to it, see L. Baron, 'Noise and degeneration: Theodor Lessing's crusade for quiet', *Journal of Contemporary History*, vol. 17, no. 1 (1982), pp. 165-78.

houses, at railway stations, in factories, mines and mills, the whistle symbolized the mastery of the machine and the regulated, inhuman toil which sustained the modern industrial economy.¹⁵ This densely interwoven string of associations reinforces Ruskin's depiction of the locomotive as symbol of the nineteenth century's particular genius, and as index of the age's degenerate spirit. Ruskin's invocation of 'oaten stop, or pastoral song', a reference to the poem 'Ode to Evening' by the eighteenth century poet William Collins, stresses the break with the past which the locomotive represents. Collins's verse was aligned with the pastoral poetic tradition which had its origins in ancient Greece; Ruskin sees in such work a harmony and a continuity which links the present with the past and unifies poetry, human society, and nature. In the modern age, by contrast, these lines of continuity and harmony have been shattered: the shrieking of the locomotive whistle is the music of the modern age, expressing the cultural disharmony and degeneracy of an era dominated by 'the Tenth Muse', the muse of mechanism.¹⁶

Railways, culture, degeneration

Ruskin's response to the locomotive is cited here as an illustration of the deep ambivalence with which the railway was viewed in the nineteenth century, and because it incorporates many of the themes which will recur in the course of this study. The railway, then, could be seen as a uniquely potent demonstration of human progress; but it was also associated with pollution, destruction and danger, the destabilization of social order, the vulgarization of culture, the violation of the environment. If the railway represented the triumph of mechanization and industrial progress, it was also instinct with danger, bearing all the threatening ills of neurosis, destruction and degeneration which lay behind the façade of

¹⁵ Ruskin accorded the whistle emblematic significance as a symbol of modern industrial society and the ideas which sustained it: as in his reference to Dickens as 'a pure modernist — a leader of the steam-whistle party *par excellence*'; letter to Charles Eliot Norton, 19 June 1870; in *Works*, vol. 37, p. 7.

¹⁶ The nineteenth-century literary conceit of a peaceful pastoral scene disrupted by the sound of a railway locomotive whistle is discussed, in an American context, by Leo Marx in *The Machine in the Garden: Technology and the Pastoral Ideal in America* (New York: Oxford University Press, 1964), pp. 11-33. For the passage from Thoreau's *Walden* which is the focus of Marx's study, and which makes an interesting comparison with Ruskin's comments in *The Cestus of Aglaia*, see Henry David Thoreau, *Walden* (1854; repr. Oxford: Oxford University Press, 1997), 'Sounds', pp. 105ff.

modernity. The railway carried people at unheard-of speeds, and forced them to place complete trust in its technology; it trapped them in noisy, unsteady, claustrophobic wooden boxes, isolating them from the world beyond the carriage window; it subjected them to violent jolts and constant vibrations, and assaulted their ears with rattles, roars and deafening shrieks; it reshaped their physical environment with its tracks, vast structures and earthworks, and increasingly dominated their mental world with the demands of its timetables, connections and bureaucratic procedures. In short, it is little wonder that many people saw themselves as the victims of a technology which, rather than serving human needs, forced human beings to conform to its own requirements; and that the belief that the railway posed an insidious degenerative threat to the human mind and body became steadily more widespread from the 1860s onwards. The common factor in much anti-railway discourse — whether couched in environmental, medical, social, or aesthetic terms — was a perception of the railways as fundamentally unnatural, as intrinsically at odds with the established order. For all the mainstream acceptance of the railway in Britain by the mid-nineteenth century, such concerns were not limited to an uninfluential few: they were deeply rooted in nineteenth-century sensibilities, constantly present just beneath the surface of outward acquiescence.

This study seeks to trace and analyze some of the ways in which those concerns found expression in British culture from the middle of the nineteenth century to the eve of the first world war. The term 'culture' here is broadly conceived as referring to those aspects of human activity which record and communicate, whether implicitly or explicitly, some of the responses, meanings, values and ideas which characterize the society which produces them. Thus, the sociological approach underlying my selection and interpretation of cultural evidence can be understood in terms of the Weberian 'web' of culture described by the sociologist Clifford Geertz: 'the concept of culture I espouse . . . is essentially a semiotic one. Believing with Max Weber, that man is an animal suspended in webs of significance he himself has spun, I take culture to be those webs'.¹⁷ The railway had immense impact upon social structures, economic activities, patterns of leisure and work, attitudes towards rural and urban

¹⁷ Clifford Geertz, *The Interpretation of Cultures: Selected Essays* (New York: Basic Books, 1973), p. 14. I would like to thank Don Ulin, of Indiana University, for his advice on this section.

landscape, attitudes towards and experiences of travel and mobility itself. This impact inevitably affected the constantly evolving pattern of cultural significances within which the railway existed, a pattern which reflected a complex of other ideas and concerns: about society, progress, technology. The evidence I use in this study reflects this process of forming, assigning and negotiating cultural significances around the image and reality of the railway, across a range of discourses. Responses to and representations of the railway, whether in fiction, poetry, visual art, technical and medical texts, architecture and other material evidence, inevitably engage with this process, and reveal the preoccupations and tensions of a society constantly responding to the threat and the promise offered by technologically-dominated modernity. The railway occupies a central place in all considerations of the nature of the social and cultural ramifications of the perceptions and significances of technological modernity in the nineteenth century.

The thread of perception and response which forms the central focus of this study is degenerationism, considered as a general cultural rather than a specifically biological or medical phenomenon, although there are very significant bio-medical ramifications to the varieties of degenerationist fears associated with the Victorian railway. Degenerationism is interpreted here as the belief that not only is progress not inevitable, but that many aspects of the social, economic and cultural phenomena generally considered as evidence of progress are in fact regressive, having the potential to attack and undermine essential structures of stability and harmony. In terms specifically of mid- and late-nineteenth century attitudes to technology, this complex of ideas can be related to the perception that, with ever more powerful technologies dominating more and more aspects of life, humanity had abrogated freedom of action and agency to the machine. There are few more potent images of this fear than the runaway train, plunging inexorably onward to disaster in a forward rush which, paradoxically, owes everything to 'progress' but which can end only in terror, violence and destruction.

Railway history: problems and new approaches

It is part of the function of this study to suggest new ways of approaching and practising railway history, and to indicate some of the ways in which the history of railways can be related to more general historical concerns. Having said that, it

must be admitted that there is no shortage of historical writing about railways. George Ottley's *Bibliography of British Railway History* lists hundreds of books, pamphlets and other publications,¹⁸ and in the years since the most recent edition and its supplement appeared in the mid- and late-1980s the volume of published material dealing with historical aspects of railways has expanded relentlessly. The main difficulty facing the serious academic historian approaching this vast corpus of secondary literature is not one of quantity, but of quality.

There is a vast accumulation of popular railway history dealing in the nostalgic, the anecdotal, and the antiquarian, and in the trivia of operations and technology, much of which is of minimal scholarly value and of no more than ephemeral interest. On a slightly more sophisticated level are the works of history and biography produced by the older generation of 'amateur' (in the sense of non-academic) British railway historians, notably L. T. C. Rolt, O. S. Nock, and C. Hamilton Ellis.¹⁹ These authors tend to be more analytical, and show greater historical awareness, than is the case with the less sophisticated reaches of railway 'history', but have nonetheless a similar preoccupation with the technical and operational (a bias which, in the cases of Rolt and Nock, reflected their professional interests), and an over-emphasis on the roles played by 'heroic' figures and 'great men' such as the Stephensons, I. K. Brunel, Joseph Locke, Daniel Gooch and others. Perhaps the most salient characteristics of this school are its 'whiggish' tendency to see the story of railways, especially in the British context, as one of steady advance and improvement;²⁰ and its narrow definition of what falls within the confines of railway history. The assumption tends to be that railway history is essentially a matter of machines and their movements; the chief objects of

¹⁸ George Ottley, *A Bibliography of British Railway History* (1965; 2nd edn., London: HMSO, 1983, supplement 1988). A further supplement is due to appear in the summer of 1998.

¹⁹ O. S. Nock, *150 Years of Main Line Railways* (Newton Abbot: David & Charles, 1980); L. T. C. Rolt, *George and Robert Stephenson: a Railway Revolution* (1960; pbk. edn., Harmondsworth: Penguin, 1989); C. Hamilton Ellis, *British Railway History* (2 vols., London: Allen & Unwin, 1954-1959).

²⁰ O. S. Nock's *150 Years of Main Line Railways* indicates that, for one railway writer at least, the widely accepted Victorian characterization of colonial railway building as an expression of the triumph of western civilization over primitive and backward indigenous cultures remained valid. Describing the construction of a line in east Africa in the early years of the twentieth century, Nock writes that 'The working parties had to be protected by escorts armed to the teeth, while night after night the dense jungle surrounding the encampments resounded with the trumpeting of elephants, the roaring of lions and the war-cries and tom-toms of savages': Nock, *150 Years*, pp. 185-6.

interest are the details of locomotives, rolling stock, track layouts and signalling, the construction of lines and the opening of stations. This type of history is presented (when the authors who profess it reflect upon it at all) as a factual, neutral account, but in reality such an attitude has important ideological consequences. Technology, in these works, is seen as value-free, and technological advance as inevitable and driven by an imperative of constant development which exists independent of any social, political or cultural context (it is noticeable that a similar whiggish, artefact-centred approach can be seen in the displays of many transport history museums²¹). As a result, those aspects of history which are deemed to be consistent with this dynamic of constant improvement are emphasized, while those aspects which are seen as not contributing to 'progress' are marginalized or ignored.

It is important to move beyond these limited, often distorted, perspectives, which continue to dominate much supposedly serious railway history even today.²² It is important, not only for the sake of railway history itself, but for the sake of a more fertile engagement between railway history and the wider histories of society, culture, politics, medicine, and other spheres. Among serious academic historians, railway history (perhaps largely because of its association with enthusiasts rather than scholars, and its reputation for obsession with trivia and minutiae) has been seen as occupying a field of its own, largely isolated from mainstream historical study. Relatively few academic historians have interested themselves in the serious study of railway history, or have sought to integrate the fruits of such study into the mainstream.²³ Generally speaking, serious railway history still tends to be restricted to economic, managerial, or narrowly technical fields of interest. Much of the resulting work, particularly in recent years, has been of the highest quality and the greatest scholarly importance, but there remains a distinct lack of academic investigation of the social and cultural histories of the

²¹ See the comments of Richard Sykes *et al* on the National Railway Museum, York: 'Steam attraction: railways in Britain's national heritage', *Journal of Transport History*, 3rd ser., vol. 18, no. 2 (September 1997), pp. 156-75.

²² For example, Adrian Vaughan's *Railwaymen, Politics and Money: the Great Age of Railways in Britain* (London: John Murray, 1997). For particularly striking examples of Vaughan's selective and teleological approach to history, see his chapters on the Liverpool and Manchester Railway, pp. 44-52, and on 'The triumph of George Stephenson', pp. 53-61.

²³ There are some important exceptions: Edward Royle, *Modern Britain: a Social History, 1750-1914* (London: Edward Arnold, 1987; 2nd edn., 1997) is a distinguished recent example.

railway. In particular, there has been little inclination among historians to look below the surface of the impact of the railway upon society, at the cultural, social and intellectual dimensions of the railway age. Even the more detailed and scholarly of the conventional railway histories, such as Macdermott et al on the Great Western Railway,²⁴ Dow on the Great Central Railway,²⁵ or Barker and Robbins on London Transport,²⁶ have little to say on the sociocultural contexts within which the railways existed. Other works of serious railway history, such as Harold Perkin's *The Age of the Railway*,²⁷ are essentially histories of the development of the railways as a physical artefact, a transport system, with the social context sketched in and the cultural context omitted altogether.²⁸

This failure to engage with the cultural history of the railway, a centrally important manifestation of modern technological development, stands out all the more given that the cultural history of technology is a field which has recently seen great expansion.²⁹ That the railway has had a vast impact upon the world is taken for granted, but the ramifications of that impact at a deeper level — upon minds, imaginations, intellectual processes, human relationships, human bodies — have been little considered. The cultural history of the railway, a centrally important manifestation of modern technological development, has yet to be

²⁴ E. T. Macdermott, C. R. Clinker & O. S. Nock, *Great Western* (3 vols., London: Ian Allan, 1964-7).

²⁵ George Dow, *Great Central* (3 vols., London: Locomotive Publishing, 1959-65).

²⁶ T. C. Barker & Michael Robbins, *A History of London Transport* (2 vols., London: Allen & Unwin, 1975-6).

²⁷ Harold Perkin, *The Age of the Railway* (London: Granada, 1970).

²⁸ Railway history in the United States has generally displayed more openness towards social and cultural history than has been the case in Britain, and both railway history and history generally have benefitted from this approach. There is simply no equivalent in Britain of the American tradition of sophisticated social and cultural railway history represented by Stewart H. Holbrook's *The Story of the American Railroads* (New York: Crown, 1947), Dee Brown's *Hear That Lonesome Whistle Blow: Railroads in the West* (New York: Hope, Rinehart & Winston, 1977), and George H. Douglas's, *All Aboard! The Railroad in American Life* (New York: Paragon House, 1992).

²⁹ An excellent recent example is Robert Wohl's *A Passion for Wings: Aviation and the Western Imagination 1908-1918* (New Haven, Conn.: Yale University Press, 1994). See also Wolfgang Sachs, *For Love of the Automobile: Looking Back into the History of our Desires* (Berkeley & Los Angeles, Calif.: University of California Press, 1992), first published in Germany as *Die Liebe zum Automobil: ein Rückblick in die Geschichte unserer Wünsche* (Reinbek bei Hamburg: Rowohlt, 1984). Carolyn Marvin's *When Old Technologies were New: Thinking about Electric Communication in the Late Nineteenth Century* (New York & Oxford: Oxford University Press, 1988) is fascinating and provocative, as is Cecilia Tichi, *Shifting Gears: Technology, Literature, Culture in Modernist America* (Chapel Hill, N.C.: University of North Carolina Press, 1987).

written. A notable exception is Wolfgang Schivelbusch's *The Railway Journey*,³⁰ a work to which the present study is indebted. Schivelbusch's richly insightful book deals with the same broad themes as this thesis, and indeed I envisage my own work as continuing and deepening some of the lines of investigation addressed by Schivelbusch. However, more than twenty years after its first appearance, *The Railway Journey* remains alone as a significant, socio-cultural historical study of the impact of the railway upon mind, body and imagination in the nineteenth century. Furthermore, the insights offered by Schivelbusch were not entirely new; much of what he has to say about the railway as an agent of 'the industrialization of consciousness', and the significance of the railway traveller's 'panoramic vision' was discussed by Dolf Sternberger (as Schivelbusch acknowledges) in his *Panorama, oder Ansichten vom 19. Jahrhundert* in the 1950s,³¹ but British railway historians then and since have, in general, made nothing of these ideas.

Reflecting upon the poverty of vision afflicting British railway history, Professor Jack Simmons has expressed the view that the railway 'has been . . . too much treated on its own, as a piece of mechanism, a device', and has emphasized the importance for historians of assigning to the railways their full place 'in the general life of the age' by going beyond the economic and the technical to examine the effects which the railway had on the minds, imaginations, senses and perceptions of those who experienced its presence in their environment and in their daily lives.³² Simmons's own work over more than five decades has been characterized by an attempt to relate the 'device' to the society it served, and to trace the changes it brought, to patterns of life and work, social behaviour, perceptions, ideas and activities. This body of work stands on its own merits as social history of a high standard,³³ and — as a glance through the footnotes of the

³⁰ Wolfgang Schivelbusch, *The Railway Journey: the Industrialization of Time and Space in the Nineteenth Century* (1977; pbk. edn., Leamington Spa: Berg, 1986). Schivelbusch's book first appeared in Germany as *Geschichte der Eisenbahnreise* (Hamburg: Carl Hanser, 1977), and the first English translation, under the title *The Railway Journey*, was published three years later (Oxford: Blackwell, 1979). The paperback edition of 1986 has been used throughout this study.

³¹ Dolf Sternberger, *Panorama of the Nineteenth Century*, trans. Joachim Neugroschel (1955; repr. Oxford: Blackwell, 1977).

³² Simmons, *Victorian Railway*, p. 10.

³³ Jack Simmons, *The Railways of Britain* (1961; 4th edn., London: Macmillan, 1986); *The Railway in Town and Country 1830-1914* (Newton Abbot: David & Charles, 1986); *The Victorian Railway* (London: Thames & Hudson, 1991). A valuable collection of Simmons's essays is collected in *The Express Train and Other Railway Studies* (Nairn: Thomas & Lochar, 1995).

present text will show — it is work no modern railway historian can readily do without. Yet even Simmons has his failings; his railway history, too, is essentially whiggish in character, treating the railways as intrinsically good and beneficial and tending to write out of the picture those who responded to the railways with hostility, criticism and anxiety. The assumption is that such discontents were ultimately swimming against the tide of history, and that their story has nothing to contribute to mainstream railway history. As should now be clear, this study proceeds on the assumption that on the contrary the discontents have a history which is worthy of study in its own right. The railways were a hugely important innovation; no proper understanding of the nineteenth century is possible that does not take account of their transforming power and their pervasive influence, and for that very reason those who felt anxiety and alarm at their power are representative of an important strand of contemporary opinion. In that sense, this study seeks to question some of the assumptions of Simmons's own work; but it also attempts, in a limited way, to follow the agenda he has indicated.

Thesis organization

This study is organized into four chapters. The first, 'The railway perceived', traces and analyzes some of the meanings and significances attached to the railway during the nineteenth century. After a section outlining the main themes which emerge in Victorian perceptions of the railway, and the place of the railway in the Victorians' perceptions of themselves, it examines the ways in which nineteenth-century attitudes to the railway were reflected in its association with progress, in the aesthetic responses it provoked, its effect on the landscape, and the association of railways and railway travel with the increasingly influential later-nineteenth-century theorizations of nervous disorder and neurasthenia. In particular, this chapter seeks to trace the origins of negative reactions to the railway: it explores the association of the railway with pollution, upheaval, ugliness, and seeks to establish a context for the chapters which follow by outlining the persistent, deep-rooted and widespread association of the railway with the unnatural, the disruptive, the threatening. In order adequately to trace and define these themes, this first chapter ranges chronologically beyond the periodization set out in the subtitle of this study, to take account of evidence from the 1840s to the 1920s.

If chapter one can be summed up as 'the railway experienced from outside', the focus of chapter two, 'The Railway Journey' could be described as essentially 'the railway experienced from inside.' The chapter focuses on the journey as a particularly significant aspect of the experiencing of the nineteenth-century railway. As both a collective and an individual experience, the journey was at the heart of evolving perceptions of the railway, and through its supposed physiological and psychological consequences it assumed a central role in the theorization of the railway as the source of a degenerative assault on the human mind and body. The chapter considers the railway journey in its collective and its individual aspects, and seeks to define and contextualize its significance as a source of trauma. The bureaucratic demands of the crowded booking hall, the claustrophobia of the compartment, the bumps and vibrations associated with the journey, the view from the train window, are all aspects of the mechanization of travel which the railway represented; and that process of mechanization was often experienced as an assault on the human constitution and sensorium, an interaction between the mechanical and the biological which constantly threatened the health and well-being of the latter.

This threat attained its fullest expression in the accident. For the Victorians, as well as being an appalling event in its own right, the railway accident had wide-ranging consequences for ideas of progressive evolutionary development, as applied to individuals, society, and to economic and technological change. As a moment of crisis in the functioning of industrial society, it embodied the degenerative threat of technological modernity in its most violent and disruptive form. Chapter three examines perceptions of the train and the locomotive as projectiles, out of human control, and the application of such images to industrial civilization at large; it goes on to look at the significance of the accident in the public mind, and its central role in reinforcing perceptions of the railway as a source of dangerous and ungovernable energies. Finally, the association of the accident with new theorizations of industrial fatigue and breakdown is examined.

The final chapter, 'Railway spine', examines the convergence of the technological, the medical and the legal in the phenomenon of the so-called 'railway spine' disorder suffered by accident victims. The appearance of apparently severe disorders in railway accident victims who had seemingly suffered no significant organic injury raised questions as to the potential of the railway to disrupt the constitution of the human mind and body in novel ways. In keeping with the

orientation of the study as a whole towards the cultural history of technology, this chapter seeks, not only to provide some account of the origins, development and significance of 'railway spine' but to embed the medical and medico-legal histories of the condition firmly in their social and cultural context — a context in which the railway was uniquely vast and powerful presence, and the railway accident a uniquely terrible and traumatic event.

The four chapters thus focus upon different aspects of the railway as it was perceived and experienced during the nineteenth century, but these aspects are bound together by their relationship to the central theme of the railway as a disruptive, destructive, degenerative agent of technological modernity. It is the essential contention of the account which follows that there is a traceable link between the railway as a focus of the negative imaginings of industrial modernity, the psychological and physiological accompaniments of the railway journey, and the railway accident and its consequences; and that these aspects can in turn be related to wider issues: the threat of biological and cultural degeneration; the dangers posed by the complexity and the uncontrollable energy of technological modernity; the perceived assault of modernity on the human mind and body.

THE RAILWAY PERCEIVED

The railway in the Victorian imagination

When H. G. Wells, looking back on the nineteenth century from the beginning of the twentieth, sought a symbol for the Victorian age, he chose the railway: 'The nineteenth century, when it takes its place with the other centuries in the chronological charts of the future, will, if it needs a symbol, almost inevitably have as that symbol a steam engine running upon a railway'.¹ Wells did not summon up the image of the Victorian railway in order to praise it; on the contrary, he described it as 'really only a vast system of trains of horse-waggon and coaches drawn along rails by pumping-engines on wheels',² and was very critical of its inefficiency, slowness, lack of comfort, and technical obsolescence. What his comment reflected and affirmed, however, was the centrality of the railway to the identity and character of the nineteenth century.

When the Victorians themselves thought of the achievements of their time, the creation of the railways came immediately into their minds. Many observers, before and after Wells, saw the railway as the essential invention of the Victorian age, expressive both of its achievements and of its failures, symbolic above all of an age of change. 'We who have lived before railways were made, belong to another world', wrote William Makepeace Thackeray in 1860, 'your railroad starts a new era'.³ Thackeray, born in 1811, had grown up in a world without railways, and counted himself a figure of the pre-railway era; he saw the railway erupt into, and transform, the world around him. The political thinker Walter Bagehot had a slightly different perspective. He was born in 1826, only fifteen years after

¹ H. G. Wells, *Anticipations of the Reaction of Mechanical and Scientific Progress upon Human Life and Thought* (London: Chapman & Hall, 1902), p. 4.

² *Ibid.*, p. 12.

³ William Makepeace Thackeray, *Roundabout Papers*, no. 10 'De Juventute', in *The Oxford Thackeray* (18 vols., Oxford: Oxford University Press, n.d. [c.1908]), vol. 17, p. 424.

Thackeray — but in terms of railway development these were crucial years. Bagehot's childhood and early youth paralleled the birth and early growth of the railway system. Whereas Thackeray had seen an old order transformed by the railway, Bagehot never knew a world unaffected by its transforming power. For him, the railway was an icon of the new order rather than an overturner of the old, and he pointed to it as the most obvious example of the progress of 'physical knowledge' in his time: 'a new world of inventions — of railways and telegraphs — has grown up around us, which we cannot help seeing'.⁴ By the time of H. G. Wells's birth in 1866, the railways were an established, inevitable, dominant fact of life, and his attitude towards them reflected this reality: 'People of today', he wrote in *Anticipations*, 'take the railways for granted as they take sea and sky; they were born in a railway world, and they expect to die in one'.⁵ The poet John Davidson, born in 1857, was of the same generation as Wells, and, like Thackeray, saw the railways in a historical perspective; but to him, writing at the threshold of the automobile age, it was the railways that were the obsolete relics of an archaic and primitive era. 'That railways are inadequate appears / Indubitable now' wrote Davidson in 1907, seeing them as symbolic of a dying civilization:

The railway was the herald and the sign,
And powerful agent in the swift decline
Of Europe and the West. The future sage
Will blame sententiously the railway age,
Preachers upon its obvious vices pounce,
And poets, wits, and journalists pronounce
The nineteenth century in prose and rhyme
The most unhappy period of time.⁶

Davidson saw the railway as the embodiment of ugly, mediocre, mass-society nineteenth-century civilization, dominated by the 'mob': 'Class, mass and mob for fifty years and more / Had all to travel in the jangling roar / Of railways, the

⁴ Quoted in Jack Simmons, *The Victorian Railway* (London: Thames & Hudson, 1991), p. 13.

⁵ Wells, *Anticipations*, p. 12.

⁶ John Davidson, 'The Testament of Sir John Simplex Concerning Automobilmism', in *The Poems of John Davidson*, ed. Andrew Turnbull (2 vols., Edinburgh & London: Scottish Academic Press, 1973), vol. 2, p. 373.

nomadic caravan / That stifled individual mind in man'.⁷ By the inter-war years, this critique had become commonplace; in an advertisement of circa 1920, the British car-maker Jowett contrasted the 'freedom' of motoring on 'the Broad High Way' with travelling on the 'humdrum, crowded railway train',⁸ while in 1935 Osbert Sitwell followed Davidson in linking the image of the railway with the nature of the society it served, but in a more impressionistic vein, declaring in *Penny Foolish* that 'Trains sum up, to my mind, all the fogs and muddled misery of the nineteenth century. They constitute, in fact, so many slums on wheels'.⁹

What unites these writers across their differing perspectives is their recognition of the central importance of the railway as a symbol of its age. In this context, the point of the quotation from H. G. Wells with which we began is not merely that the railway was big, ubiquitous and obvious, and constituted an almost universal feature of Victorian daily life; nor is it simply a comment on the huge economic, social and industrial importance that the railway possessed. Wells's concern was with symbols, and he recognized in the railway a uniquely potent symbol of the Victorian age. That symbolism was not ideologically neutral; it reflected a characteristic Victorian belief system in which engineering achievement was identified with economic expansion and social progress. Thackeray and Bagehot, in different ways, acknowledge the validity of that ideological linkage; Wells and Davidson are equivocal; Sitwell's attitude is one of rejection; but each accepts the significance of the railway as the quintessential symbol not only of the physical realities of the nineteenth century but also of that Victorian world-view and the idea of progress which it comprehended.

The railway acquired this symbolic significance very quickly, its importance in the imagination growing in step with its rapid physical development. From the outset railways served as a focus for strong feelings, inspiring both enthusiastic praise and deeply felt hostility. The speed with which the railways expanded, the scale of their impact on the environment, their transformation of the economic and social relations of the community, their dramatic qualities of fire, smoke, steam and rapid movement, and the novelty and excitement of rail travel, ensured that they compelled attention and demanded reaction. That the railway would

⁷ *Poems of John Davidson*, vol. 2, p. 377.

⁸ The advertisement is reproduced in Colin Chant (ed.), *Science, Technology and Everyday Life 1870-1950* (London: Routledge/Open University, 1989), p. 179.

⁹ Quoted in Jack Simmons (ed.), *Railways: An Anthology* (London: Collins, 1991), p. 254.

have a profound impact on national life was anticipated from an early stage. In 1830, the *Quarterly Review* was writing of the railway as a 'well-spring of intellectual, moral, and political benefits, beyond all measurement and all price'.¹⁰ Henry Booth, Liverpool merchant and treasurer of the Liverpool and Manchester Railway (who admittedly had a strong interest in talking up the prospects of railways) also foresaw vast potential for the new mode of transport, writing that the railway had completely transformed human ideas of time and space: 'what was quick is now slow; what was distant is now near; and this change in our ideas will not be limited to the environs of Liverpool and Manchester — it will pervade society at large'.¹¹

Railway development began gradually against the troubled political and social background of the 1830s,¹² as people waited to see whether the pioneering projects would fulfil their promise; but by 1836 the first great wave of railway speculation had begun¹³ and the subsequent expansion of the system, even allowing for intermittent slumps, confirmed that the railway would have a huge impact. The exact form that impact would take, and whether its effects would be entirely desirable, were more debatable issues. Contemporaries could not be sure where these mechanical innovations were taking them, and their views of the railway and the future which it symbolized were accordingly multi-layered and complex, fraught with questions about the amorality and ungovernability of the new technology. The railway undermined old certainties and long-established structures of thought, activity and feeling; it brought new freedoms and possibilities, but it also threatened new risks and dangers. The nineteenth century became the 'railway age', but the powerful tide of the railways' expansion and consolidation, and their dominance of economic and social life, would be accompanied throughout the century by a constant undercurrent of doubt and anxiety.

¹⁰ *Quarterly Review*, vol. 42 (1830), p. 404.

¹¹ Henry Booth, *An Account of the Liverpool and Manchester Railway* (Liverpool: Wales & Baines, 1830), p. 90.

¹² For the pattern of railway investment, see M. C. Reed, *Investment in Railways in Britain 1820-1844: A Study in the Development of the Capital Market* (Oxford: Oxford University Press, 1975).

¹³ On early railway development generally see H. J. Dyos and D. H. Aldcroft, *British Transport: An Economic Survey from the Seventeenth Century to the Twentieth* (Leicester: Leicester University Press, 1969), pp. 116-32; Jack Simmons, *The Railways of Britain* (1961; 4th edn., London: Macmillan, 1986), pp. 12-16.

The spectacle of progress

The railway was the most public and ubiquitous of the large-scale technologies of the nineteenth century: of all the steam powered machinery of the age, notes Eric Hobsbawm, railway locomotives 'were the most visible and audible of all'.¹⁴ In England, the rapid extension of the railway system ensured that by the middle of the century it was difficult to find anywhere more than thirty miles from a railway line.¹⁵ Thus, the spectacle of the railway, its sights, sounds and experiences, became available to almost everyone; and, as a spectacle, the railway was uniquely dramatic and striking. As the modern transport historians Dyos and Aldcroft have noted,

The railways had in every sense a presence. Their very appearance quickly kindled a kind of awe and sense of poetry that seems to have been shared to some degree by people of every class: steam, speed, controlled power, new sounds, spontaneous movement — there was an excitement here that communicated itself to the press, the board-room, the stock-market, the arts, and everyday speech . . .¹⁶

Railways were noisy, dramatic, frightening, exciting, a focus of exhilaration and of awe; they redefined time and reordered space. There was something deeply stirring about their size and power, their speed, their use of the elemental forces of fire and water. Just as the railway network ultimately came to penetrate and connect every corner of the physical, social and economic environment of nineteenth-century Britain, so the railway as a symbol permeated the cultural and imaginative landscape of the age. At a profound level, as Thackeray, Wells and other observers understood, the railway symbolized the nineteenth century, its achievements and its anxieties.

¹⁴ E. J. Hobsbawm, *The Age of Empire 1875-1914* (London: Weidenfeld & Nicolson, 1987), p. 27.

¹⁵ See the map in Dyos and Aldcroft, *British Transport*, pp. 152-3. Within England, only some remote areas of Devon and Cornwall were more than thirty miles from a railway by 1852.

¹⁶ Dyos & Aldcroft, *British Transport*, p. 221.

The railway and the politics of progress

Modern historians have observed that for the Victorians, the railway was a powerful symbol of progress. 'It was the railway, above all else', writes Asa Briggs, 'that carried the Victorians into the future',¹⁷ while Herbert Sussman has commented that 'As a metonymy for the constellation of changes that we, like the Victorians, call "progress," the machine, especially the railroad, was the most public, the most visual of emblems'.¹⁸ As indicated by the words of the *Quarterly Review* from 1830, quoted above, the discourse linking the railway with progress was as old as the steam-powered railway itself. In the same article, the *Review* looked to the railway as 'the source of a better physical distribution of our population — a check to the alarming growth of cities . . . and the source, above all, of such a diffusion of intelligence over the whole country as those statesmen who think the most worthily of human nature will be the least afraid to contemplate'.¹⁹ The belief that railways were the enemies of ignorance and backwardness was widespread, and had, for some, clear political concomitants. Sir Robert Peel, speaking in Glasgow in 1837, made an explicit link between the railway's role as a commercial connector and its significance as a distributor of ideas:

The steam engine and the railroad are not merely facilitating the transport of merchandise, they are not merely shortening the duration of journeys, or administering to the supply of material wants. They are speeding the intercourse between mind and mind — they are creating new demands for knowledge — they are fertilising the intellectual as well as the material waste.²⁰

¹⁷ Asa Briggs, 'The imaginative response of the Victorians to new technology: the case of the railways', in Chris Wrigley & John Shepherd (eds.), *On the Move: Essays in Labour and Transport History presented to Philip Bagwell* (London & Rio Grande: The Hambledon Press, 1995), p. 75.

¹⁸ H. L. Sussman, *Victorians and the Machine: The Literary Response to Technology* (Cambridge, Mass.: Harvard University Press, 1968), pp. 3-4.

¹⁹ *Quarterly Review*, vol. 42 (1830), p. 404.

²⁰ Anon., *A Correct Report of the Speeches delivered by the Right Honourable Sir Robert Peel, Bart., M.P., on his Inauguration into the Office of Lord Rector of the University of Glasgow, January 11. 1837* (London: John Murray, 7th edn., 1837), p. 22.

Peel looked to the railway to remove 'the impediments which obscurity or remoteness, or poverty may have heretofore opposed to the emerging of real merit'.²¹ He did not see the railway as an agent of egalitarianism or revolutionary social transformation; rather, he believed it would increase freedom by giving everyone access to the same opportunities. In this analysis, the railway was an alternative to more violent avenues of social and political change. Railways would give the working classes the opportunity to better themselves, through a free trade in movement to parallel the free trade in commerce to which Peel was committed. The same attitude lies behind the famous words which Samuel Smiles attributed to Dr Thomas Arnold, father of Matthew Arnold and headmaster of Rugby School: 'The late Dr. Arnold, of Rugby, regarded the opening of the London and Birmingham line as another great step accomplished in the march of civilization. "I rejoice to see it," he said . . . "and to think that feudality is gone for ever"'.²² For the constituency of reform-minded economic liberals represented by Arnold and Smiles,²³ the railway — available to all, benefiting poor and rich alike, the universal connector — was a destroyer of unearned and unjustly exercised privilege. By breaking down the barriers which allowed such privilege to exist, it rendered revolutionary change unnecessary and irrelevant.

The observations of Henry Booth on the effects of railways can be seen as expressing the same socio-political agenda — an agenda given extra force in the years following the Chartist disturbances of the 1840s (in which, ironically, the railways had proved their value to the authorities by permitting large numbers of troops to be easily moved around the country²⁴). He looked to the railways as offering the working classes avenues to material, intellectual, and moral self-improvement which would prevent them seeking redress for their grievances through radical politics. In 1852 he wrote of the 'mass of ignorance and prejudice . . . now in the course of being removed by the facility of travelling from place to

²¹ *Correct Report of the Speeches delivered by the Right Honourable Sir Robert Peel*, p. 22.

²² Samuel Smiles, *Lives of the Engineers, with an Account of their Principal Works, comprising also a History of Inland Communication in Britain* (3 vols., London: John Murray, 1862), vol. 3, p. 355.

²³ For a discussion of Smiles's attitude to the railways, see Adrian Jarvis, *Samuel Smiles and the Construction of Victorian Values* (Stroud: Alan Sutton, 1997), pp. 72ff, 134-5.

²⁴ Simmons, *Victorian Railway*, p. 365; F. C. Mather, *Public Order in the Age of the Chartists* (Manchester: Manchester University Press, 1959, repr. 1966), pp. 161-3.

place, of seeing and judging for ourselves',²⁵ and observed that 'the very process of locomotion, our actual journeying from place to place, is made subservient to educational purposes':

We have bookstalls on every platform, where amusement and instruction, in standard works suited to the various tastes of those who search after knowledge, may be purchased at a reasonable price; we have, in fact, a 'Literature of the Rail', of which thousands and tens of thousands eagerly partake, and which seems destined materially to improve the intellectual and moral culture of the people . . . We entreat directors to lend their aid to give a healthful development to this new instrumentality of progress, to stimulate a taste for moral and intellectual improvement, and so endow with a higher aim one section at least of the miscellaneous literature of the country.²⁶

Booth's emphasis on a morally and intellectually improving 'Literature of the Rail' — perhaps envisaged as a socially conservative alternative to the more politically dangerous mutual improvement societies and educational classes associated with Chartism and other radical movements²⁷ — is not without irony, given the reputation which railway reading quickly gained for lowbrow sensationalism and vulgarity.²⁸

Alexander Somerville, the farm worker, sometime soldier, self-taught poet and writer and idealistic radical, whose *Autobiography of a Working Man* was published in 1848, expresses a similar faith in the ability of the railway to mitigate the effects of alienating distance — social and geographical — between man and man, facilitating the creation of a society held together by the bonds of common humanity and freed from unjust privilege. He described the railway as 'that most

²⁵ 'A Shareholder' [Henry Booth], *The Case of the Railways Considered* (London: W. H. Smith & Son, and Liverpool: Baines & Herbert, 1852), p. 7.

²⁶ *Ibid.*, pp. 8-9.

²⁷ See the discussion of the role of education in political radicalism in James Epstein and Dorothy Thompson (eds.), *The Chartist Experience: Studies in Working-Class Radicalism and Culture, 1830-1860* (Basingstoke: Macmillan, 1982), p. 352.

²⁸ On railway reading, see below, chapter 2, 'Railway Readings'.

poetical and most practical of the grand achievements of human intellect', and looked forward to a world harmoniously united through its agency:

There is a time coming when realities shall go beyond any dreams that have yet been told of these things. Nation exchanging with nation their products freely; thoughts exchanging themselves for thoughts, and never taking note of the geographical space they have to pass over . . . man holding free fellowship with man; without taking note of the social distance which used to separate them . . . Universal enfranchisement, railways, electric telegraphs, public schools . . . these are some of the elements of a moral faith, believing in the universal brotherhood of mankind, which I daily hold . . .²⁹

Somerville links universal enfranchisement and public education with the railway, but his moderate radicalism does not offer a vision of revolutionary social and political transformation. The 'lord (landed lord or cotton lord)', he writes, will communicate with the 'working man, at the opposite end of the social pole, who used to be very distant', conveying 'the instantaneous message of one feeling, one interest, one object, one hope of success from the lordly end, to the working man's end of the social world';³⁰ but the distinctions between lord and working man, existing at different ends of a still polarized society, remain.

For others, the railway was associated directly with progressive and radical politics. The socialist Charles Mackay proclaimed in 1846 that war and tyranny would find no place in a world united by railways:

Lay down your rails, ye nations, near and far —
Yoke your full trains to Steam's triumphal car;
Link town to town; unite in iron bands
The long-estranged and oft-embattled lands.³¹

²⁹ Alexander Somerville, *The Autobiography of a Working Man* (1848; London: Macgibbon & Kee, 1967), p. 247.

³⁰ Ibid.

³¹ 'Railways, 1846', quoted in Simmons, *Victorian Railway*, p. 197.

For radicals and socialists such as Mackay, railways promised to end repression by allowing ordinary people to travel freely and share ideas, facilitating the wider experience of the world and the spread of liberating ideas which would lead to tyrants being overthrown. The railway itself provided a stock of powerful imagery appropriate to revolutionary endeavours — fire, sparks, steam, energy, movement.³² The believers in socialist revolution and the adherents of free trade and laissez-faire had in common an idealistic view of the railway as creating a universal zone of free movement — of ideas, or of goods and money — unhampered by artificial barriers of national rivalry, protectionism and trade restrictions, narrow nationalisms or local despotisms. For both, it was the promise of a world bound more closely together, of barriers of all kinds being overthrown, just as the railway engineers had overthrown mountains and vaulted valleys to build their lines. Railway space and railway time reach a metaphysical significance in these analyses, constituting a new, transcendent, universal dimension of existence for all humanity. In both cases, the railway is the ideal of progress given concrete form.

Nowhere was the association between the railway and the ideals of modernity, progress and the advance of civilization clearer than in the celebrations which attended the opening of each new extension of the railway network. 'Hail, Steam the Civilizer!' proclaimed a banner hung across the main street of Williton, Somerset, when the West Somerset Railway reached the town in 1862,³³ and Glastonbury greeted the same railway with the slogan 'Railways and Civilization'.³⁴ Such communal responses to railway development suggest that an enthusiastic, welcoming attitude to the railway was deeply embedded in popular culture; an impression confirmed by the cheering crowds who feature in so many prints of new railways, and by evidence such as the complaints of the Hampshire

³² For more on the railways as a progressive and politically revolutionary symbol, both in Great Britain and abroad, see Nicholas Faith, *The World the Railways Made* (London: The Bodley Head, 1990), pp. 58-60.

³³ P. S. Bagwell, 'The decline of rural isolation', in G. E. Mingay (ed.), *The Victorian Countryside* (2 vols., London: Routledge, 1981), vol. 1, p. 36.

³⁴ David St John Thomas, *The Country Railway* (1976; pbk. edn. Harmondsworth, Penguin: 1979), p. 33.

clergy who petitioned against a new railway in 1836 'because the rustics kept away from church to see the train pass by'.³⁵

Such popular enthusiasm was doubtless partly motivated by enjoyment of the holidays and festivities associated with the opening of a new railway, and by a liking of the spectacle offered by a passing train (a phenomenon which long outlasted the period in which railways could still be seen as a novelty). The anticipation of material benefits certainly played a part — access to cheaper coal, a wider range of domestic goods, better markets for farm produce and local manufacturers, more job and business opportunities. But widespread enthusiasm for railways also reflected a more abstract idealism, a belief in the railway as synonymous with spiritual and intellectual progress. 'It can no longer be said of us . . . that darkness covered their land and gross darkness their people',³⁶ asserted a member of the small Welsh farming community of Llanidloes, greeting the arrival of the railway there in 1859. The railway was seen as the bringer of light and activity, the guarantor that even the smallest community was connected to the material, cultural and intellectual commerce of the nation. Isolation and disconnection were seen as obstacles to be overcome in the progress of modern civilization. Exposure to, and involvement in, the circulatory system of modern commerce would prevent economic stagnation and intellectual degeneration, as Harriet Martineau argued in 1855, in response to those — Wordsworth among them — who opposed the introduction of railways into the Lake District:

Any infusion of the intelligence and varied interests of the townspeople must, it appears, be eminently beneficial: and the order of workpeople brought by the railways is of a desirable kind. And as to the economical effect — it cannot but be good, considering that mental stimulus and improved education are above everything wanted. Under the old seclusion, the material comfort of the inhabitants had long been dwindling; and their best chance of recovery is clearly in the widest possible

³⁵ Cited in Stephen Daniels, 'Images of the railway in nineteenth century paintings and prints', in *Train Spotting: Images of the Railway in Art* (Nottingham: Nottingham Castle Museum, 1985), p. 12.

³⁶ *Oswestry Advertiser and Montgomeryshire Mercury*, 7 September 1859; quoted in Thomas, *Country Railway*, p. 38.

intercourse with classes which, parallel in social rank, are more intelligent and better informed than themselves.³⁷

Thus the railway brought not only economic but intellectual and spiritual renewal. As well as connecting town to town and region to region it linked mind to mind, permitting the mental energies of the nation to be diffused more evenly and widely among the population.

The traveller and writer George Borrow claimed to dislike railways. 'I despise railroads . . . and those who travel by them', he told a railwayman while passing through Anglesey on his journey around Wales in 1861, and, spurning the train, which passed him 'voiding fierce sparks, and making a terrible noise', he walked to Holyhead.³⁸ The beautiful scenery of the vale of Neath was spoilt for him, he complained, by the presence of 'one of those detestable contrivances a railroad . . . along which trains were passing, rumbling and screaming'.³⁹ Yet when he describes travelling from Peterborough to Birmingham in 1861 on the way to begin his journey through Wales his prose betrays the exhilaration he felt at the speed and energy of the railway: 'With dragon speed, and dragon noise, fire, smoke, and fury, the train dashed along its road'.⁴⁰ And in Birmingham station itself, and in the industrial Black Country to the city's north-west, he saw the energy, inventiveness and enterprise of nineteenth century England in microcosm:

At Birmingham station I became a modern Englishman, enthusiastically proud of modern England's science and energy. That station alone is enough to make one proud of being a modern Englishman. Oh, what an idea does that station, with its thousand trains dashing off in all directions, or coming from all quarters, give of modern English science and energy. My modern English pride accompanied me all the way to Tipton; for all along the route there were wonderful evidences of English skill and enterprise; in chimneys high as cathedral spires, vomiting

³⁷ Harriet Martineau, *Guide to the English Lakes* (London: John Murray, 1855), pp. 143-4.

³⁸ George Borrow, *Wild Wales* (3 vols., London: John Murray, 1862), vol. 2, p. 77.

³⁹ Borrow, *Wild Wales*, vol. 3, p. 406.

⁴⁰ *Ibid.*, vol. 1, p. 13.

forth smoke, furnaces emitting flame and lava, and in the sound of gigantic hammers, wielded by steam, the Englishman's slave.⁴¹

Borrow's account reflects the importance of the railway, not only as an example of technological progress itself, but as a means through which all the other evidence of industrial progress could be seen as never before. From a railway train passing through the midlands, south Wales, the north-east of England or the lowlands of Scotland, the spectacle of British industrial power and enterprise could be viewed and admired by all. The train was not only a spectacle in its own right; it also increased the availability of spectacles of all kinds. It served as a mobile grandstand from which the panorama of progress could be surveyed.

A new age: change, speed, and novelty

The railway was the most profoundly transformative innovation of the nineteenth century, and was recognized as such by contemporaries.⁴² It was widely suggested from the 1830s and 40s that the coming of the railway marked a new age, and by the 1850s the extent and influence of the railway system was such that the development of the railway was seen as marking the beginning of a distinctive, modern, epoch. It was the railway, claimed the economist and journalist James Jeans, which distinguished the modern age most strikingly from all the eras which had gone before: 'If we analyse the comparative circumstances of ancient Rome and modern London, — of ancient Babylon and modern Babylon, — what single characteristic can we point to as "toeing the line" of division so marked, so palpable, so essential, as that of the railway?'⁴³ The railway tracks marked the divide between the old, rural, small-town, slow-moving Britain and the modern industrial nation of great towns and cities, factories, and constant rapid travel and communication. W. M. Thackeray wrote with feeling in 1860 about the 'gulf' which the railway had opened up between the old world and the new:

⁴¹ Borrow, *Wild Wales*, vol. 1, pp. 15-16.

⁴² For a survey of perceptions of change and innovation in the Victorian era, and the role played by the railway in nineteenth-century conceptualizations of modernity and transformation, see David Newsome, *The Victorian World Picture* (London: John Murray, 1997), pp. 27-38.

⁴³ J. S. Jeans, *Railway Problems: An Inquiry into the Economic Conditions of Railway Working in Different Countries* (London: Longmans, Green & Co., 1887), p. xix.

Stage-coaches, more or less swift, riding-horses, pack-horses, highwaymen, knights in armour, Norman invaders, Roman legions, Druids, Ancient Britons painted blue, and so forth — all these belong to the old period. I will concede a halt in the midst of it, and allow that gunpowder and printing tend to modernize the world. But your railway starts a new era . . .⁴⁴

There was a continuity, Thackeray suggested, between the distant age of ‘Ancient Britons painted blue’ and the early nineteenth century, the period of his own youth. The railway had, in a few short years, destroyed that continuity. Permanence, tradition and stability were replaced by transience, innovation and uncertainty. Thomas Carlyle shared the view that the railways were transforming the world with a quite bewildering rapidity. His 1850 essay ‘Hudson’s Statue’ was addressed to the great railway promoter and manager George Hudson, whose business empire had collapsed the previous year; but his words were aimed not at that ‘big swollen Gambler’ alone but at the whole of railway-obsessed society when he expressed the wish:

That you had made your railways not in haste; that, at least, you had spread the huge process, sure to alter all men’s mutual position and relations, over a reasonable breadth of time! For all manner of reasons, how much could one have wished that the making of our British railways had gone on with deliberation; that these great works had made themselves not in five years but in fifty-and-five!⁴⁵

Speed was seen as one of the defining characteristics of the modern world; and with the coming of the railway age, change itself seemed to be moving at an alarming and ever-accelerating pace. ‘Many, if not most, of the distinctive phenomena that constitute “the nineteenth century” are directly due to railway speed’, observed the authors of a book on *Express Trains English and Foreign* in

⁴⁴ W. M. Thackeray, ‘De Juventute’, from *Roundabout Papers* (1860); in *The Oxford Thackeray*, vol. 17, p. 424.

⁴⁵ Thomas Carlyle, ‘Hudson’s Statue’ (1850), from *The Collected Works of Thomas Carlyle* (30 vols., London: Chapman & Hall, 1870-1), vol. 13, p. 230.

1889.⁴⁶ The influence of 'railway speed' spread far beyond the railways, to affect the whole of society. The perception that railways had accelerated every aspect of life was as deep-rooted and as influential as the connection made between railways and progress. For some, the two factors were interconnected; railways could hardly have brought the benefits claimed for them if they had not enabled people to do so much more in the time available. For Henry Booth, the railways had brought a revolution 'in our value of time! Our amended estimate of the occupation of an hour, or a day, when generalized, affecting the duration of life itself'.⁴⁷ Samuel Smiles commented in 1862 that 'In no country in the world is time worth more money than in England; and by saving time . . . the railway proved a great benefactor to men of industry in all classes'.⁴⁸ Others questioned whether the saving of time permitted by rail travel was worthwhile. An anonymous pamphleteer declared in 1844 that railway promoters were mistaken in suggesting:

that the public valued their time rather than their money, and should prefer the velocity of the railway, even at higher charges, than the slower speed of the stage-coach, at lower charges . . . the novelty of the system, which alone created an artificial traffic for a few years, soon wore off; and the fact is now irrefragable, that the travelling community, as a whole, prefer money to time.⁴⁹

Few would have agreed with that final assertion, in 1844 or subsequently. The general impression was rather that speed, and the saving of time, were desired above all other considerations — and regardless of the consequences. Two years later, the author of a set of satirical *Railway Eclogues* had a character lament that 'our world's a world of hurly-burly; / We're late to bed, and we arise right early. / Time's precious — up! — would you a fortune make, / Your journey by express train take. / Sounds a loud whistle — but, with all this pother, / Time saved one

⁴⁶ E. Foxwell and T. C. Farrer, *Express Trains English and Foreign* (London: Smith, Elder & Co., 1889), p. 70.

⁴⁷ Booth, *Case of the Railways Considered*, p. 7.

⁴⁸ Smiles, *Lives of the Engineers*, vol. 3, p. 351.

⁴⁹ Anon., *Horse-power Applied to Railways at Higher Rates of Speed than by Ordinary Draught* (London: John Ollivier, 1844), p. 3. The writer's aim was to promote the use of horses rather than steam locomotives as railway motive power.

way is wasted in another'.⁵⁰ The train, it seemed, freed time by shortening journeys, but filled much more time with 'pother'; the benefits of railway speed were counterbalanced by the confusion and pressure of a speeded-up society.

The new pressures of time imposed by the railway were a sign of the power it had to transform society into an image of itself — timetabled, regulated, precise (see figures 1 and 2). The establishment of uniform 'railway time',⁵¹ the imposition of railway timetables on all manner of social activities, the constant pressure on travellers to hurry, to fit more into the time available, were some of the outward expressions of a process of evolutionary change, as the railways brought the national organism to a greater pitch of uniformity and efficiency. In Exeter, the cathedral clock was the principal clock of the city and showed local time — fourteen minutes behind the time in London. When in the early 1850s the Dean of Exeter declined to alter the clock to accord with the Greenwich time shown at the railway station (the Bristol and Exeter Railway having run to Greenwich time since 1847) he was criticized for condemning his city 'to keep in the rear of the world's great movement'.⁵² By the mid-nineteenth century, the power of the railway over people's lives could not be better exemplified than in the establishment of uniform, universal railway time, and the dictatorial power of the railway timetable.

The railway and the aesthetics of ambivalence

A powerful sense of the ambivalence these changes provoked can be seen in some of the aesthetic and imaginative approaches to technology which were associated with the coming of the railway. Previously, industry, except for those directly engaged in the activities which it required, had been a world set apart, a world which artists and writers could at least try to ignore, or disguise and downplay, if they chose; as Herbert Sussman notes, 'The standard picture of the industrial

⁵⁰ Anon. [attrib. Basil Montagu], *Railroad Eclogues* (London: William Pickering, 1846), pp. 29-30. The attribution to Montagu, a lawyer, is in the British Library catalogue.

⁵¹ On the establishment of uniform time, see Simmons, *Victorian Railway*, pp. 345-7.

⁵² Quoted in Nigel Thrift, 'The making of a capitalist time consciousness', in John Hassard (ed.), *The Sociology of Time* (Basingstoke: Macmillan, 1990), p. 127.

world in Victorian literature consists of smoke and flame seen from a distance'.⁵³ The railway, however, brought many more people than ever before into direct engagement with the machine; it carried the smoke and flame of industry into the public spaces of everyday life, into towns, villages, the countryside. Responses to this dramatic, pervasive presence varied from the matter-of-fact to the lyrical or apocalyptic; but the dominant impression, across a range of cultural and artistic production, is one of deep ambivalence.⁵⁴

The railway poetic/pastoral/apocalyptic

When Michael Reynolds, a distinguished and experienced railway engineer, wrote an account of the excitement and danger of engine-driving in 1889, he began with a description of the train in the landscape which was poised between the poetic and the apocalyptic. For Reynolds, the railway locomotive was

the most beautiful mechanical construction of this or any other time. We watch it under steam from a distance, from meadows where in sun the cattle graze, and it seems to fly as the swallows fly — skimming above the horizon, and presently we see its colossal form crossing the mighty arches which span the valley of the river. Then we on the platform shrink from it aghast as it rushes past in the full thunder of its power, and, straining on its course like some mighty monster broken loose, it is an object of intense and almost passionate interest.⁵⁵

⁵³ Sussman, *Victorians and the Machine*, p. 10.

⁵⁴ For a discussion of the literary response to railways between the 1830s and circa 1860 which shows full awareness of this ambivalence, see J. M. Joss, *The Impact of the Coming of the Railway on Early Victorian Literature* (unpub. M.Phil. thesis, Liverpool University, 1989). See also Simmons, *Victorian Railway*, ch. 8 'Literature', pp. 195-218, which covers a longer period but is more superficial. Jill Murdoch of the University of York is currently researching the image of the railway in popular culture circa 1830-1860, and my work in this area has benefitted from her comments and advice.

⁵⁵ Michael Reynolds, *Engine Driving Life: Stirring Adventures and Incidents in the Lives of Locomotive Engine-Drivers* (London: Crosby, Lockwood & Son, 1889), p. 4. Reynolds was an engine driver himself and a steam engine engineer of great authority. I am grateful to Professor Iain McLean, of Nuffield College, Oxford, for bringing Reynolds and his work to my attention.

Reynolds begins his account with what appears to be an artful assimilation of a new technology into the pastoral discourse of the pre-industrial age. The presence of the train in the landscape is described in the time-hallowed terms of a rural idyll: sun, meadow, river, grazing animals. The train is located in the countryside and, viewed 'from a distance', blends into the arcadian scene to the extent that its motion is not seen as mechanical at all but as an echo of the low, rapid, swooping flight of the swallow. The train's motion, it is implied, is, like the bird's flight, an organic part of the rural scene; it is a phenomenon which is infiltrated among the meadows, trees and hedges which make up the landscape, rather than artificially cutting through them. When Reynolds comments on the size and power of the locomotive for the first time he acknowledges the scale of the railway's impact on the landscape in his reference to the 'mighty arches' of the viaduct, but the train itself remains distant, one element in an overall scene rather than the dominating focus of the image (the visual counterpart of this account can be seen in figure 3).

This distant focus changes abruptly in the final sentence of the passage, with its dramatic shift in point of view. The pastoral idyll is abruptly replaced with an altogether more ambiguous and threatening image. The landscape setting shrinks, the locomotive suddenly grows and fills the scene. The sudden change in viewpoint, from some undefined point in a formulaically evoked rural scene to the very specific location of the railway station platform brings us, the readers/viewers, very close to the speeding locomotive. It locates us in the scene as railway passengers, and compels us to recognise that we must entrust our safety to this vast and terrifying machine. The locomotive's great size and power are forced upon our consciousness, and the danger inherent in its speed and energy is apparent; it is now a 'mighty monster broken loose', and as it thunders past we 'shrink from it aghast'. The immense and dangerous energies which drive it onward are, it is suggested, only barely contained, for it is 'straining on its course', threatening to break away. The train as a benign presence in the rural landscape, its presence signalled by distant puffs of white steam, has been replaced by a colossal metal monster threatening to overwhelm us with its speed, power and danger.

The careful construction and abrupt destruction of the arcadian idyll in which Reynolds places his locomotive reflect the efforts of many such nineteenth-century commentators to neutralize the anxiety which the railway provoked by assimilating it to the known, the safe, the traditional — and the fragility of that process when confronted with its power and danger. The placing of the railway at

a distance in the rural landscape — a mode of representation which might be called the railway pastoral — constituted an important type of nineteenth-century response to its challenging, alarming presence. Engravings and pictures from the 1830s and 40s often show the railway as an unobtrusive part of the rural scene, harmonized with, and tamed by, picturesque compositions of hill, vale, river and park (see figures 3 and 4).⁵⁶ The railway pastoral can also be found in written form, in guidebooks such as T. R. Potter's *The History and Antiquities of the Ancient Town of Leicester* (1842). Loughborough, Potter observes, 'when viewed from the summit of Long Cliff has a noble, city-like appearance. From this point too, the trains of the Midland Counties Line, may be observed, almost uninterruptedly, from Silesby to Derby and form a pleasing object darting across the grand panorama'.⁵⁷ Here town, countryside and railway form a single harmonious composition in which the railway line with its trains is viewed from a distance and assimilated into the prospect. Even in cases where overt hostility to the railway is being expressed, the terms in which objection to the railway's presence is couched can reveal an underlying adherence to the railway pastoral; as in the following lines, which were recited at a public meeting held to oppose the construction of new railways in Bournemouth in 1882:

'Tis well from far to hear the railway scream
 And watch the curling lingering clouds of steam,
 But let not Bournemouth — health's approved abode,
 Court the near presence of the iron road.⁵⁸

The railway pastoral represents an attempt to constrain the energy and potential danger of the railway. The difficulty was that the essence of the pastoral lay in its passivity, its maintenance of a harmony of stasis. The essence of the railway was movement, noise, fire, smoke, a disharmony of managed violence. As the Bournemouth verse implies, and Reynolds's words make explicit, the railway

⁵⁶ See Daniels, 'Images of the railway', in *Train Spotting*, pp. 7-8.

⁵⁷ T. R. Potter, *The History and Antiquities of the Ancient Town of Leicester* (London: Hamilton, Adams & Co., 1842), p. 187.

⁵⁸ Quoted in Simmons (ed.), *Anthology*, p. 69.

cannot be neutralized; the brute force of its reality inevitably breaks down the restraining constructions of pastoral representation.⁵⁹

Turner's Great Western and the railway sublime

The aesthetic of ambivalence embodied in the written texts of the railway pastoral is also present in the visual arts. For all its dramatic impact, the railway evoked surprisingly little response from artists during the first two decades of its existence. From the early nineteenth century railways were well represented in what might be called 'lower' and 'popular' art-forms, in engravings, topographical views, cartoons and the like, but among more 'academic' artists there was very little interest in the railway as a subject until the 1860s. In this respect, J. M. W. Turner's *Rain Steam and Speed — The Great Western Railway*, painted in 1843-4, stands alone among the art of the period, as it does within Turner's own oeuvre (see figure 5). Turner painted no other railway scenes, but in this one picture he expressed the full significance of the railway in the nineteenth-century imagination, and encapsulated contemporary attitudes towards the railway as a presence in the landscape and in society. *Rain Steam and Speed* is more than a picture of a train in the landscape. It is also an attempt to capture the new speeded-up vision associated with rail travel itself. There are differing stories about the inspiration for the picture,⁶⁰ but it is clear that Turner's experience of travelling on a Great Western train through a rainstorm in the summer of 1843 played a vital role. The painting thus reflects Turner's experience, not only as an observer of the railway from the outside, but as a traveller inside the train, looking out at the blurred and swirling world beyond the window.

Turner as an artist was sensitive not only to light and atmosphere, but to social, political and commercial systems.⁶¹ He was preoccupied by travel and

⁵⁹ See Leo Marx's suggestive discussion of this point in *The Machine in the Garden: Technology and the Pastoral Ideal in America* (New York: Oxford University Press, 1964), pp. 11-33.

⁶⁰ See Simmons, *Victorian Railway*, pp. 127-8. Simmons states that Turner said that he painted this picture to show what he could do with an ugly subject, but it was Ruskin who suggested this when he was asked why he thought Turner had painted a railway scene. Significantly, given Ruskin's antipathy to railways, this was his only comment on *Rain Steam and Speed*. See *The Works of John Ruskin*, ed. E. T. Cook & Alexander Wedderburn (39 vols., London: George Allen, 1903-12), vol. 35, p. 601 (note).

⁶¹ See, *inter alia*, Stephen Daniels, *Fields of Vision: Landscape Imagery and National Identity in England and the United States* (Cambridge: Polity Press, 1993).

traffic, not only as a habitual and dedicated traveller himself, but as one fascinated by the phenomenon of commerce and the way it is embedded in the social and physical environment. As a result, his *Rain Steam and Speed* is alive to the significance of the railway at more levels than the purely visual. The train is an image of speed and power, an expression of the elemental forces of fire and water, but it is also the dictatorial re-orderer of the landscape, an agent of metropolitan expansion and influence, a component of a network with national ramifications, the creator of a new age of commerce and communication.

Turner's choice of setting reflects his concern with these themes. Approaching Maidenhead, 25 miles from London, the Great Western Railway main line crosses the river Thames on a brick-built bridge, slightly downstream from the eighteenth-century stone bridge which carries the London to Bath road. At this spot (in an area of beautiful scenery which Turner had painted several times earlier in the century and which he knew well), road and river, the old conduits of traffic and arteries of the state's commercial and political power, intersected the new metal highway, the railway. It is an intersection rich in symbolism and expressive power, and Turner exploited it to the full.

The picture shows an early morning train from London heading westwards across the Thames on the new bridge, as a rainstorm sweeps through the valley. The railway cuts diagonally across the canvas, from the dead centre to the bottom right-hand corner. To the left of the line is the old Maidenhead road bridge, with the forested escarpments of Cliveden rising above it in the distance. Between the two bridges curves the bank of the river, upon which some people are to be seen, seemingly waving and cheering the train. In front of them, a boat containing two figures drifts across the river. To the right of the railway bridge a ploughman and his team make their way steadily across a field. In the foreground on the bridge, between the broad-gauge rails, a hare races ahead of the speeding train. The picture presents a study in all-comprehending light, its surface a swirling haze of white, gold and blue, out of which the dark shape of the train erupts, prodigious and inexorable.

The painting can be seen as a celebration of the power and beauty of the railway, and by extension of the technological future it heralds; but the composition of the painting (see figure 6) suggests that the railway is also a destabilizing, disruptive force, bursting through existing structures and shattering established distinctions. The bold diagonal of the railway thrusts across the canvas,

cutting directly across the other main structural member of the composition: a horizontal line, formed by the upper edges of trees and foliage on either side of the railway bridge and, significantly, the line of the old road bridge on the left of the picture. This, horizontal, line represents stasis, stability, passivity; the diagonal slash of the railway, energy, purpose, power. Turner has further stressed this distinction by modifying the geography of the site, exaggerating the curve of the river and the divergence of the two bridges to strengthen the contrast between old and new means of transport, and between the old system of commerce which exists within the established order of things and the new system which cuts through it.

The focal point of the picture is the front of the locomotive. The dark masses of the smokebox and chimney are sharply outlined, constituting the most distinct shapes in the painting. Their clarity against the blurred background of rain and mist draws the viewer's eye towards the front of the train and serves to catapult it forward from the canvas, adding energy to its headlong onward rush. When Thackeray saw the picture he was struck by the energy of the train which, he suggested, was barely contained by the confines of the canvas: 'there comes a train down upon you, really moving at the rate of fifty miles an hour, which the reader had better make haste to see, lest it should dash out of the picture, and be away up Charing Cross through the wall opposite'.⁶² The glow at the front of the locomotive is ambiguous. Although fiery in appearance it is in the wrong place to be the glow of the firebox, whether actual or reflected; unless — as has been suggested by Stephen Daniels⁶³ — Turner's art here becomes metaphysical, allowing us to see right through the structure of the locomotive to the blazing fire behind the boiler which is the heart of its strength. Such a conception has no parallel elsewhere in Turner's art, and while it is possible that (as Daniels suggests) he was influenced by cutaway diagrams of locomotives there is no evidence that this was the case. It is perhaps more likely that the glow represents the light of the train's headlamps, scattered and magnified by the mist and rain. The French engraver and painter Félix Bracquemond interpreted it as a headlight in his

⁶² W. M. Thackeray, 'May gambols, or, Titmarsh in the picture-gallery', *Fraser's Magazine*, June 1844; in *The Oxford Thackeray*, vol. 2, p. 630.

⁶³ Daniels, 'Images of the railway', in *Train Spotting*, p. 8; and his *Fields of Vision*, p. 128.

unfinished etching, *La Locomotive. D'Après Turner* (1874);⁶⁴ and when Gautier saw the picture in the 1870s he also read the fiery glow as a headlamp, writing of the engine 'opening its red glass eye in the shadows, and dragging after it, in a huge tail, its vertebrae of carriages'.⁶⁵ Whatever Turner's intentions, the effect is that the locomotive appears as a monster breathing fire as it advances towards us, an effect strengthened, as Gautier observed, by the lizard- or dragon-like tail formed by the train behind, a dark articulated mass tapering into the mist.

The railway bridge itself was a celebrated, but ambivalent, monument of the new railway age, and in Turner's picture it constitutes an ambiguous presence. Built in 1839 by the line's engineer, Isambard Kingdom Brunel, the bridge immediately became one of the notable sights of the railway. So shallow were the two arches Brunel constructed across the one hundred yard width of the river that it was widely believed that the bridge could collapse at any time; but it stood, justifying the faith of its builder and securing its reputation as a marvel of modern engineering.⁶⁶ Turner has shown the red-brick parapets as bold and striking, framing the railway as it surges across the canvas (Turner concentrates the energy of the train further by showing only one line of railway; in reality there were two), but the lower part of the arches and the central support are lost in the mist, seeming to fluctuate and shimmer insubstantially in the golden haze. This ephemeral vision prompts a question in the viewer's mind: is the train of progress secure upon its rails? 'Let the world spin for ever down the ringing grooves of change',⁶⁷ Tennyson had written only a few years before Turner painted *Rain Steam and Speed*, the poet's subliminal desire for reassuring stability perhaps finding expression in his (mistaken) impression that the train was held firm in its path by grooves in the rails. In fact the rails were smooth, and Tennyson's train, like Turner's, could be seen as poised rather precariously above a yawning abyss. If Turner is expressing a faith in technological progress with his image of the

⁶⁴ See John Gage, *Turner: A Wonderful Range of Mind* (New Haven, Conn. & London: Yale University Press, 1987), pp. 9-10, where Bracquemond's etching is reproduced.

⁶⁵ Quoted in John Gage, *Turner: Rain, Steam and Speed* (London: Allen Lane, 1972), p. 33.

⁶⁶ See L. T. C. Rolt, *Isambard Kingdom Brunel: a Biography* (1957; pbk. edn., Harmondsworth: Penguin, 1989), pp. 171-2. Adrian Vaughan, in his more recent (but somewhat unscholarly) biography, gives a slightly different version, but provides no references in support of his account: Adrian Vaughan, *Isambard Kingdom Brunel: Engineering Knight-Errant* (London: John Murray, 1991), pp. 76-8, 96-7.

⁶⁷ Arthur, Lord Tennyson, 'Locksley Hall', in *The Poems of Tennyson*, ed. Christopher Ricks (3 vols., London: Longman, 1969, 2nd edn. 1987), vol. 2, p. 118.

powerful, prodigious train, he also seems to be questioning that faith with his depiction of this daring, debatable bridge.

Rain Steam and Speed, then, is a picture fraught with ambiguities and anxieties. It is too simplistic to see Turner's train as 'a beautiful, extraordinary apparition' celebrating the artist's belief in a future he found 'beautiful' and 'exhilarating'.⁶⁸ Turner's vision is more complex than that. It is a truly sublime vision, a perception of beauty, certainly, but a terrible, awesome beauty redolent of vast imponderable energies and dark forebodings. Furthermore, it is a vision which questions progress. It is not the value of progress that is questioned; Turner was unafraid of change, believing that the world had to undergo a process of constant destruction, recreation and renewal. Rather, Turner is questioning the security of the foundations upon which progress is erected, and the structures through which its energies are channelled and controlled. This is not the art of assimilation; like Michael Reynolds, Turner may appear at first to be neutralizing the train by placing it in a landscape and subjecting it to the conventions of pre-industrial landscape representation, but the train bursts those conventions apart and forces us to confront it, the new age it brings, and the anxieties it provokes within us.

The railway in the landscape

The transformation wrought by the railway on both rural and urban landscapes left contemporaries alarmed and bewildered; nothing quite like it had been seen before (see figures 7-9). No other civil engineering project, whether for canals, roads, mining, urban development, dock construction or military fortification equalled railway works for their scale, the speed with which they were carried out, or the level of disruption they caused.

The average rate of railway construction between 1830 and 1870 was approximately 365 miles per year,⁶⁹ but much of the network was built in brief concentrated periods following the investment 'manias' of 1837-40, 1845-7 and 1862-5; while there were only 400 miles of route open at the end of 1836, for

⁶⁸ Andrew Graham-Dixon, *A History of British Art* (London: BBC Books, 1996), p. 162.

⁶⁹ T. R. Gourvish, 'Railways 1830-70: the formative years', in Michael J. Freeman and D. H. Aldcroft, *Transport in Victorian Britain* (Manchester: Manchester University Press, 1988), p. 57.

example, there were 1,500 miles open only four years later.⁷⁰ During these spells of intensive activity it must have appeared to many contemporaries that the whole world was being dug up for railways. The building of a railway, particularly in an urban area, involved demolitions, excavations, the diversion of streets, rivers, canals, the erection of vast structures; railway works were so extensive that unprecedentedly vast areas were disrupted. The only analogies people could draw when faced with the destruction and turmoil involved in the building of a new railway line were drawn from warfare, or used the imagery of natural disaster. The acquisition of land by railway companies and the construction of lines was referred to by contemporaries as the railway 'invasion' of the land,⁷¹ and the peripatetic and often undisciplined bodies of railway construction workers — 'navvies' — were commonly seen as invading and occupying armies.⁷² A notable instance of the use of natural disaster imagery is Dickens's account in *Dombey and Son* of the building of the railway through Camden Town in north London, renamed by him 'Staggs's Gardens':

The first shock of a great earthquake had, just at that period, rent the whole neighbourhood to its centre. Traces of its course were visible on every side. Houses were knocked down; streets broken through and stopped; deep pits and trenches dug in the ground; enormous heaps of earth and clay thrown up . . . Hot springs and fiery eruptions, the usual attendants upon earthquakes, lent their contributions of confusion to the scene. Boiling water hissed and heaved within dilapidated walls; whence, also, the glare and roar of flames came issuing forth; and mounds of ashes blocked up rights of way, and wholly changed the law and custom of the neighbourhood.

In short, the yet unfinished and unopened Railroad was in progress; and, from the very core of all this dire disorder, trailed

⁷⁰ Ibid, p. 58.

⁷¹ See R. W. Kostal, *Law and English Railway Capitalism 1825-1875* (Oxford: Oxford University Press, 1994), p. 144.

⁷² See Terry Coleman, *The Railway Navvies* (London: Allen Lane, 1976), pp. 93-114, and Rolt, *Brunel*, pp. 207-8.

smoothly away, upon its mighty course of civilisation and improvement.⁷³

In 1909 the poet John Davidson drew on earthquake imagery in his description of London Bridge station, and sought to explain the famously disorganized and chaotic character of that terminus by supposing that it had emerged from the bowels of the earth. In doing so, he re-interpreted the upheaval associated with the great era of railway construction (which by the time he was writing the poem was more than fifty years before) into a new industrial mythology of creation, viewed not in terms of progress but of atavistic regression to an era of formless chaos. The sprawling station and the tangle of tracks, bridges and viaducts which surrounded it, suggested Davidson, arose from some violent primeval cataclysm:

. . . no idea minifies its crude
And yet elaborate ineptitude,
But some fancied cataclysmal birth:—
Out of the noubles of the martyred earth
This old, unhappy terminus was hurled
Back from a day of small things when the world
At twenty miles an hour still stood aghast . . .
. . . Divulged now by an earthquake in the night,
This ancient terminus first saw the light . . .⁷⁴

Railway construction was indeed very often cataclysmic for the communities and landscapes it affected. It brought unprecedented turmoil, involving both physical and social disruption on a huge scale. Thousands of people — the great majority of them poor — were evicted from the vast tracts of urban land the railways required;⁷⁵ some 37,000 were displaced in London during the railway

⁷³ Charles Dickens, *Dombey & Son* (1848; Harmondsworth: Penguin, 1971), chap. 6, pp. 120-1.

⁷⁴ John Davidson, 'Railway Stations. I: London Bridge', in *Poems*, vol. 2, p. 343.

⁷⁵ See J. R. Kellett, *Railways and Victorian Cities* (London: Routledge, 1979), pp. 340ff.; Gareth Stedman Jones, *Outcast London* (Oxford, Oxford University Press, 1971), pp. 162-3, 168; H. J. Dyos, 'Railways and housing in Victorian London', *Journal of Transport History*, vol. 2 (1955), pp. 11-21, 90-100; H. J. Dyos, 'Some social costs of railway building in London', *Journal of Transport History*, vol. 3 (1957-8), pp. 23-31.

building boom of 1859-1867 alone. Misery, poverty and overcrowding were produced on a huge scale by railway construction, as health officers and social commentators were quick to point out,⁷⁶ and the legacy of such construction contributed importantly to the association of railways — particularly in urban areas — with poverty and social deprivation. And once the railways had built their viaducts and embankments and intersecting lines, the districts they enclosed, dismembered and overshadowed were, in the words of the historian J. R. Kellett, 'fixed in dereliction'.⁷⁷ The arches of railway viaducts attracted the refuse of urban society: criminals, alcoholics, prostitutes, the poorest of the poor. The railway arch became symbolic of human degradation. The unfaithful wife whose story is told by the artist Augustus Egg in his 'Past and Present' paintings of 1858 falls from her comfortable bourgeois home to the ultimate misery and squalor of a railway arch.⁷⁸ The contrast between the arteries of modern civilization which were carried upon the great viaducts and bridges and the misery huddled beneath was commented on by many contemporaries; as in *The Railway Accident: A Tale*, a moral tale with an evangelical Christian agenda, published around 1860: 'Right over and right through this labyrinth of wretchedness, straight, high, unbending, runs the line of railway . . . carrying aloft its passengers and its traffic over many an acre of want and misery below'.⁷⁹ The railway cut off streets and courts, sealing them into wretchedness; rather than connecting the various organs of the social body, facilitating circulation and enabling them to function more efficiently, the lines isolated areas, denied them healthy circulation, condemned them to become diseased and degenerate.

When under construction, railways were associated with disorder, confusion and upheaval; once completed, their viaducts, embankments, tunnels, buildings, bridges and other facilities dominated the landscape. The turmoil of railway building, the ugliness of the completed structures, the scale and arrogance of their intrusion, their association with the lowest elements in society, all contributed to the perception of the railway as a disruptive, destructive, degenerative force.

⁷⁶ See Jones, *Outcast London*, pp. 162-3.

⁷⁷ Kellett, *Railways and Victorian Cities*, p. 343.

⁷⁸ Ibid, p. 345; Julian Treuherz, *Victorian Painting* (London: Thames & Hudson, 1993), pp. 112-4.

⁷⁹ Anon., *The Railway Accident: A Tale* (London: John Henry & Jas. Parker, c. 1860), p. 2.

Territorial imperatives

When the railway exercised its territorial imperatives, it disregarded existing geography and imposed its own (see figure 10). The lines followed their own rules, and vast alignments of pitiless, inhuman railway geometry were imposed on town and country alike, seemingly regardless of natural topography and pre-existing street patterns. A system of curves and straight lines, of tunnels, junctions, loops and yards, stations and viaducts was laid across the land; streets which once led somewhere became vestigial stumps, previously productive property was carved into useless fragments of waste.

The unease and discontent this process provoked is illustrated in George Eliot's *Middlemarch*, written in the early 1870s but depicting a English small-town community in the 1830s. Among the innovations viewed with alarm and anxiety by many in the town is the construction of a railway. Dislike and fear of the railway itself underlies this reaction; the new form of transport is viewed as undermining the social structure of the community, as well as threatening life and limb: 'Women both young and old regarded travelling by steam as presumptuous and dangerous'.⁸⁰ Others claimed that cows would cast their calves and mares their foals at the approach of the railway — a further illustration of the perception of the railway as an unnatural eruption into the established order, disrupting the age-old natural cycle of birth and renewal.

The large landowners of the area around Middlemarch were determined to secure substantial compensation for any incursion of the railway into their domains; but among the local smallholders such questions were of less importance than was the effect of the railway on the division of the land itself. The coming of the railway is seen in terms of a shattering impact on the complex network of legal and customary relationships which sustains the local structure of landholding. Locals meet and talk with alarm of 'what it would be to cut Big Pasture in two, and turn it into three-cornered bits, which would be "nohow;"'⁸¹ the railway will 'cut Lowick Parish into sixes and sevens'; it will tear apart the very economic and social structure of daily life:

⁸⁰ George Eliot, *Middlemarch* (1871-2; Oxford: Oxford University Press, 1988), book VI, chap. LVI, p. 451.

⁸¹ Ibid.

‘Why, there’ll be no stirrin’ from one pla-ace to another,’ said Hiram, thinking of his waggon and horses.

‘Not a bit,’ said Mr Solomon. ‘And cutting up fine land such as this parish! Let ’em go into Tipton, say I. But there’s no knowing what there is at the bottom of it. Traffick is what they put for’ard; but it’s to do harm to the land and the poor man in the long-run . . . some say this country’s seen its best days, and the sign is, as it’s being overrun with these fellows trampling right and left, and wanting to cut it up into railways . . .’⁸²

That the agricultural quality of the ‘fine land’ of the parish — for many in Middlemarch, the only true estimate of its value — is suddenly rendered irrelevant by the railway’s imposed scale of values symbolizes a world turned upside down. The arrival of the railway in the district and its imposition of its own geography is thus seen not merely in terms of its physical impact on the landscape. Its arrival threatens the fundamental economic and social bases of rural society itself; it can be seen as a sign of a degenerate age, in which time-honoured values and standards are torn up and sacrificed to the remorselessly encroaching railway.

This sense that the railway is importing and imposing an alien set of values on the landscape, and particularly the rural landscape, is an important component in many mid-nineteenth-century responses to its presence in the environment. In a rural setting, the railway embodied the urban ‘other’. This was true in the physical sense that the coming of a railway encouraged building and development, assisting in the material expansion of towns and cities,⁸³ but it was also the case that in less tangible ways the railway brought the conditions of the city — hurry and bustle, crowds and congestion, noise and pollution, cultural vulgarity — into the countryside.

In 1850, Thomas Carlyle wrote that ‘at Crewe, and other points, I see new ganglions of human population establishing themselves, and the prophecy of metallurgic cities which were not heard of before’.⁸⁴ Carlyle was referring to the new settlements created entirely by the railways to house their own workforces

⁸² Eliot, *Middlemarch*, p. 453.

⁸³ See Kellett, *Railways and Victorian Cities*, *passim*.

⁸⁴ Carlyle, *Latter-day Pamphlets* (1850), from *Collected Works*, vol. 30, p. 229.

and serve their own systems, the most notable examples being Crewe and Swindon. His use of the term 'ganglion' suggests that he saw these railway towns as unnatural and unhealthy growths, but such places were often in many ways model towns, carefully planned, well-built and provided with modern amenities.⁸⁵ Generally speaking, where railway companies constructed purpose-built housing for their workforces, they had a reputation for housing their employees well and furnishing them with good recreational and educational facilities. Less successful were the places which had existed before the coming of the railway and had greatly expanded with its arrival, losing their character amid tracks and works and the speculative housing always attracted to such locations. To many observers, such districts had an unfinished, transitory quality; they were neither town nor country, old or new. One such place is 'Hopkinsville', an imaginary district on the fringes of east London, which features in Anne Manning's 1860 novel, *Town and Forest*. Described as 'the very worst suburb on the borders of London', its name provokes one character to exclaim with disgust, 'What a name! Such a mixture of low and fine'. The district is insalubrious, jerry-built, and dominated by the railway:

'Yes, one of the chief results of railway enterprise; and run up, chiefly, for the accommodation of railway people. But what accommodation! Only one entrance-door and passage to every four houses — neither drained, paved, nor lighted. These houses form numerous small streets, and contain the families of about a thousand men employed in the factory, at the stations, and on the lines.'⁸⁶

⁸⁵ See Frank McKenna, *The Railway Workers 1840-1970* (London: Faber & Faber, 1980), pp. 50-5.

⁸⁶ Anne Manning[published anonymously], *Town and Forest* (London: Richard Bentley, 1860), p. 25. The term 'factory' refers to railway workshops. The book is set in and around Epping Forest and east London, and 'Hopkinsville' is probably a version of Stratford New Town, built by the Eastern Counties Railway from 1847 to house the workforce of its huge Stratford locomotive and rolling stock works. The district was originally called 'Hudson Town' after George Hudson, then chairman of the railway company. See Brian Bailey, *George Hudson: the Rise and Fall of the Railway King* (Stroud: Alan Sutton, 1995), pp. 80-1.

Another fictional example of this phenomenon is 'New Shelfington', from *The Railway Accident: A Tale*. The old town of Shelfington, two miles from the main line of the 'Great Summerford Railway', is solid, permanent, rooted in the past, 'a quiet, respectable, sombre county town', the character of which is embodied in the figure of its parish clerk, Solomon Foster: a man of the old order, 'of the generation when parson and clerk joined in a duet, and the rest of the congregation looked on or listened in mute attention.'⁸⁷ By contrast, New Shelfington 'is one of those places which have sprung up around the first-class stations of our great railways, and of which one wonders what the future destiny will be. At present it looks like a slice of Lambeth, or Walworth, or Bermondsey let down into a ploughed field'.⁸⁸ In style, the town is characterless and mass-produced; in execution, it is slipshod and slovenly:

all the houses having been designed by the celebrated architects Hobbs, Nobbs, and Co., . . . were cast in exactly the same mould. The shops had the same bow-windows, the inns the same passages, drawing-rooms, dining-rooms, best and second-best bed-rooms . . . [the town's streets] look altogether like a child's card erections, that the next breath of wind would sweep away.⁸⁹

For Solomon Foster, not only is New Shelfington ugly and dreary, it is also culturally vicious and degenerate: "I call the people down at New Shelfington barbarians, if you like," growled Solomon: "there are twenty-three beer shops within a mile of the station; and only that one new church, which they built twenty years ago, before ever the railway was thought of".⁹⁰

For many, the presence of the railway was associated with social degeneration and cultural vulgarization. John Ruskin⁹¹ criticized railway development as a new barbarian invasion, destroying in a few short years a culture which was the legacy

⁸⁷ *The Railway Accident*, pp. 13-14.

⁸⁸ *Ibid*, p. 12.

⁸⁹ *Ibid*, pp. 12-13.

⁹⁰ *Ibid*, p. 17.

⁹¹ There is as yet no adequate discussion of Ruskin's attitude to the railways. Jeffrey Richards's essay 'The role of the railways', in Michael Wheeler (ed.), *Ruskin and Environment: The Storm-Cloud of the Nineteenth Century* (Manchester & New York: Manchester University Press, 1995), is rather superficial, but is a start.

of centuries: 'the railroad and the iron wheel have done their work, and the characters of Venice, Florence, and Rouen are yielding day by day to a lifeless extension of those of Paris and Birmingham',⁹² he lamented in 1849; while in 1876 he warned of 'the certainty . . . of the deterioration of moral character in the inhabitants of every district penetrated by the railway'.⁹³ The novelist George Gissing asserted that anybody wanting to see an England unaffected by 'our modern pre-eminence in the creation of ugliness' and 'untouched by the baser tendencies of the time' should visit 'one of those old villages in the midlands or the west, which lie at some distance from a railway station'.⁹⁴ Gissing saw the railway as the agent of the increasingly vulgar mass civilization which he saw around him, and detested;⁹⁵ it is associated in his novels with the ugliness and viciousness of the great city, the idiocy of mass entertainment, the immorality and vulgarity of advertising and cheap literature. King's Cross underground station is plastered with advertisements, the visual hubbub an appropriate counterpart to the noise of trains and people which fills the station:

High and low, on every available yard of wall, advertisements clamoured to the eye: theatres, journals, soaps, medicines, concerts, furniture, wines, prayer-meetings — all the produce and refuse of civilization announced in staring letters, in daubed effigies, base, paltry, grotesque. A battle-ground of advertisements, fitly chosen amid the subterranean din and reek; a symbol to the gaze of that relentless warfare which ceases not, night and day, in the world above.⁹⁶

It is not merely that Gissing despises this base, ugly world of the masses and of mass culture; he fears the seething energy with which its diverse forms expand

⁹² John Ruskin, 'Samuel Prout' (1849), in *Works*, vol. 12, pp. 314-5.

⁹³ John Ruskin, *Railways in the Lake District* (1876), in *Works*, vol. 34, p. 141.

⁹⁴ George Gissing, *The Private Papers of Henry Ryecroft* (1903; London: Phoenix House, 1953), p. 194.

⁹⁵ See John Carey, *The Intellectuals and the Masses: Pride and Prejudice among the Literary Intelligentsia, 1880-1939* (London: Faber & Faber, 1992), pp. 93-117, for a penetrating — if partial — critique of Gissing's attitudes. For a more nuanced view, see John Sloan, *George Gissing: the Cultural Challenge* (Basingstoke: Macmillan, 1989), pp. 131-4, 138-40.

⁹⁶ George Gissing, *In the Year of Jubilee* (1894; Hassocks: Harvester, 1976), part 5, chap. 2, p. 309.

and multiply. This commercial fecundity echoes the uncontrollable breeding of the “baser” orders and “ignoble” types⁹⁷ who inhabit unclassed, working class and lower-middle class society and whom Gissing depicts in *In the Year of Jubilee* and elsewhere. In the face of the boundless, elementary energies of urban, commercial, cynical, vulgar, mechanized modernity, all the nodes of resistance which Gissing identifies — the countryside, high culture, human love — are, he fears, forced into submission and doomed to destruction.⁹⁸ The railway, with its constant ‘smoking traffic’⁹⁹ extending into every corner of the land, its urban, commercial character, its ugliness, its role as an agent of mass transit and mass entertainment, is nothing less than the primary conduit for this process of social and cultural degeneration.

The railway underworld

The railway both reshaped the landscape to accord with its own requirements and created its own environment within those landscapes, cut off from the surrounding world, self-contained and artificial (see figure 11). At the very beginning of the modern railway age, Henry Crabb Robinson observed that the Liverpool and Manchester Railway was ‘generally to a certain extent insulated from the adjacent country’¹⁰⁰ by its many deep cuttings. This isolation from the surrounding landscape contributed to the widespread perception of the railway as an ‘unnatural’ presence in the environment, and which was contrasted with the less obtrusive, more ‘natural’ presence of conventional roads, as in this anonymous pamphlet from 1844:

The highways of the kingdom form a beautiful feature of the country; the population extend their residences along their different lines, and the diversified traffic carried on creates an agreeable interest, not an annoyance. But is it within the scope of the most sanguine imagination to suppose the population, preferring to build their homes along the dreary length of the

⁹⁷ The phrase is H. G. Wells’s, discussing Gissing in his *Experiment in Autobiography* (2 vols., London: Gollancz, 1934), vol. 2, pp. 571-2.

⁹⁸ See Sloan, *George Gissing*, p. 131.

⁹⁹ Gissing, *In the Year of Jubilee*, part 2, chap. 4, p. 109.

¹⁰⁰ Quoted in Humphrey Jennings, *Pandaemonium: the Coming of the Machine as seen by Contemporary Observers* (London: André Deutsch, 1975; pbk. edn., Picador, 1987), p. 186.

railway, to be periodically startled by the unearthly shriek and clatter of the steam locomotive?

In travelling on most of the railways also, the face of nature, the beautiful prospects of hill and dale, are lost or distorted to our view. The alternation of high and low ground, the healthful breezes, and all those exhilarating associations connected with 'the Road,' are lost or changed to doleful cuttings, dismal tunnels, and the noxious effluvia of the screaming engine.¹⁰¹

Roads accommodated themselves to the landscape; railways forced the landscape to accommodate them, and in doing so created a sub-landscape of cuttings, tunnels, embankments and bridges which contributed to the creation of a new travelling experience. 'No one', wrote Ruskin in 1849, 'would travel in that manner who could help it — who had time to go leisurely over hills and between hedges, instead of through tunnels and between banks'.¹⁰² The approach made by railway to towns and cities was strikingly different from the same approach made by road, as William Morris complained when he travelled from Louviers to Rouen during his visit to northern France in 1855. The valley of the Eure, he wrote, 'was all like the country in a beautiful poem . . . but we had to leave it and go to Rouen by a nasty, brimstone, noisy, shrieking, railway train that cares not twopence for hill or valley'. Whereas the roads into Rouen 'dip down into the valley where it lies, from gorgeous hills which command the most splendid views', the railway 'crept into it in the most seedy way', denying Morris any views of the town or the surrounding country, and destroying the experience of arriving at a historic and beautiful city. This experience served to confirm Morris in his opinion that 'verily railways are ABOMINATIONS'.¹⁰³ It was not just that railways were, in his opinion, ugly, dirty and noisy, and railway travelling uncomfortable; it was the effect they had on the journey as an aesthetic and sensory experience which Morris found most objectionable. The variety, the changing pace of travel, the freedom, the character of the road journey, all were lost. The road allowed the traveller to

¹⁰¹ Anon., *Horse-power Applied to Railways at Higher Rates of Speed than Ordinary Draught* (London: John Ollivier, 1844), p. 48.

¹⁰² John Ruskin, *The Seven Lamps of Architecture* (1849), in *Works*, vol. 8, p. 159.

¹⁰³ Norman Kelvin (ed.), *The Collected Letters of William Morris. Vol. I: 1848-1880* (Princeton, N.J.: Princeton University Press, 1984), pp. 21-2.

experience the landscape from differing view-points; varied scenes, wide views and open prospects were presented as the traveller ascended and descended in response to the nature of the ground. The railway, by contrast, either buried the traveller in dark tunnels and cuttings, or whirled the view past in a blurred and incoherent panorama that tired the eyes and brain rather than delighting the senses.

The subterranean nature of much railway travel, which Morris found so wretched, excited a great deal of comment throughout the nineteenth century. Contemporaries were deeply impressed by railway excavations and the unprecedented industrial, engineering and architectural endeavour which they represented. Millions of tons of rock and earth were shifted by an enormous army of workers, in operations of the scale and complexity of military campaigns. Huge shafts were sunk, gigantic trenches were dug, immense tunnels were bored through hill and mountain, and entire stations and railway networks were built beneath the surface of the earth.¹⁰⁴ Contemporaries, looking for a language appropriate to the scale of railway excavation, turned to the ancient world, to Egypt and Rome. No-one, asserted a newspaper editorial of 1844, could contemplate unmoved 'the glorious prospect which will be opened to the world, if merely the vast and important works now in progress — works with which the useless Egyptian pyramids or the vaunted remnants of old Rome's extravagance, will not endure comparison — be carried into existence'.¹⁰⁵ In 1862 Samuel Smiles compared the building of the London and Birmingham Railway with the raising of the Great Pyramid of Egypt, and declared that the railway had involved considerably more labour and had been achieved by a much smaller workforce in a fraction of the time — and stood as a testament to private capital and free enterprise, rather than central planning and monarchical despotism.¹⁰⁶ In the distant, post-apocalyptic future of Richard Jefferies's 1885 novella *After London*, only the earthworks of the Victorian railway system have survived, to become ancient monuments themselves: 'Mounds of earth are said to still exist in the woods, which originally formed the roads for these machines . . . Great holes were made through the very

¹⁰⁴ For an account of the scale of some of these works, and the labours involved in carrying them out, see Anthony Burton, *The Railway Builders* (London: John Murray, 1992), especially pp. 158-81.

¹⁰⁵ Quoted in John Francis, *A History of the English Railway: Its Social Relations and Revelations, 1820-1845* (2 vols., London: Longman, Brown, Green, & Longmans, 1862), vol. 2, p. 139. I have not been able to locate the original source.

¹⁰⁶ Smiles, *Lives of the Engineers*, vol. 3, pp. 320-1.

hills for the passage of the iron chariots, but they are now blocked by the falling roofs, nor dare any one explore such parts as may yet be open'.¹⁰⁷

The engineers who built Britain's railways in the nineteenth century invariably sought as level a course as possible for their tracks, and this resulted in cuttings and tunnels being extremely numerous; on the Great Western, for example, there were no fewer than 11 tunnels on the 18-mile line between Box in Wiltshire and Bristol.¹⁰⁸ Tunnels, too, had a particularly sinister and threatening quality which the railways' bridges and viaducts lacked. Railway bridges were often beautiful, graceful structures, widely admired and regarded as assets to the landscapes they traversed; they also clearly had much in common with road bridges and aqueducts, and did not present an aspect of jarring novelty. Tunnels, however, were another matter. While canals had made use of tunnels since the late eighteenth century (the 5476-yard length of the tunnel at Standedge through the Pennines, built in 1811, was not exceeded by a railway tunnel until 1886¹⁰⁹), the sheer numbers of railway tunnels, their connection with the fire, smoke and speed of railway travel, and the fact that large numbers of people were carried through them, gave them a significance in the public mind which canal tunnels never acquired. The railway tunnel combined the ancient terrors of the underworld with the new anxieties of modern technology.

Railway tunnels were the clearest and most powerful expressions of the railway sublime. John Francis, in his *History of the English Railway*, quotes the forebodings of a medical man whose description of the qualities of travel through a tunnel is almost a catalogue of sublime effects: 'The deafening peel of thunder . . . the sudden immersion in gloom, and the clash of reverberated sounds in a confined space, combine to produce a momentary shudder, or idea of destruction, a thrill of annihilation . . . rattling wheels . . . panting, puffing engine . . . clanking chains . . . dismal glare of lamps . . . darkness made visible'.¹¹⁰ George Gissing's description of the underground station at King's Cross offers a similar evocation of the subterranean sublime: 'This way and that sped the demon engines, whirling

¹⁰⁷ Richard Jefferies, *After London, or Wild England* (1885; Oxford: Oxford University Press, 1980), p. 18.

¹⁰⁸ Adrian Vaughan, *Great Western Architecture* (Sparkford: Oxford Publishing Company, 1977), p. 313. The number was reduced to nine in 1894 when two of the tunnels were opened up into cuttings.

¹⁰⁹ Simmons, *Victorian Railway*, p. 21.

¹¹⁰ Quoted in Francis, *History of the English Railway*, vol. 1, pp. 190-1.

lighted waggons full of people. Shrill whistles, the hiss and roar of steam, the bang, clap, bang of carriage-doors, the clatter of feet on wood and stone — all echoed and reverberated from a huge cloudy vault above them'.¹¹¹

The portals of railway tunnels, where the subterranean world met the world of the surface, were among the most evocative and expressive examples of railway architecture. Many engineers, when designing and embellishing them, seem to have reached naturally for styles which embodied the sublime. At Box tunnel near Bath, the western portal was visible from the nearby London to Bath road, and its engineer, Brunel, used an elegant classical design to provide an attractive advertisement for the railway; but even here the darker associations of the tunnel break through the civilized, classicized facade, for the portal lends itself to anthropomorphization as a vast, open-mouthed face (see figure 12). The same engineer's No. 1 Tunnel, Bristol (see figure 13), is treated in simpler style, with portals reminiscent of Norman church architecture, flanking pilasters topped by cushion capitals, and a spiral decoration within the arch; but the proportions and the segmented arch are classical, and the austerity of the great retaining wall, the smooth ashlar of the central panel contrasting with the rough masonry of the recessed walls on either side, is reminiscent of the work of the eighteenth-century architect and visionary of the sublime, E. L. Boullée. Other portals, such as those of Twerton tunnel in Devon (see figure 14), resembled battlemented gateways; Bangor on the Chester and Holyhead line and Summit Tunnel north of Rochdale (see figure 15) are both in a neo-Egyptian style; while the castellated gothic of Beacon Hill tunnel south portal, at Halifax, is a work of Piranesian power and menace. Such designs reflected the ambitions of tunnel builders; their constructions were to be as monumental and as eternal as the works of the caesars and the pharaohs. But they are also among the most expressive works of the railway sublime, redolent of the fear and awe inspired by the speeding train as it plunges into the earth.

Victorian responses to the railway tunnel must be situated within the context of wider concerns about the railway as a transgressive force. The tunnel delivered the fears and anxieties associated with railway travel in a concentrated form, evoking the dread of darkness, speeding into the unknown, burial alive,

¹¹¹ Gissing, *In the Year of Jubilee*, part 5, chap. 2, p. 309.

powerlessness and, more subtly, sexual violation and biological degeneration.¹¹² The image of a train entering a tunnel is now well-established as an image of sexual intimacy; indeed, particularly in the hands of film-makers, it has become something of a modern cliché.¹¹³ It owes this twentieth-century importance largely to the psychoanalytic theories of Sigmund Freud, but awareness of the sexual significance of railway excavations and especially tunnels long predates the era of Freud and modern psychoanalysis. In Elizabeth Barrett Browning's *Aurora Leigh* (1857), the heroine describes a train passing through the Alps to Italy in densely wrought, sexually-charged language which blends the biological, the mythological and the geological:

. . . shot through tunnels, like a lightning-wedge
By great Thor-hammer driven through the rock,
Which, quivering through the intestine blackness, splits,
And lets it in at once: the train swept in
Athrob with effort, trembling with resolve,
The fierce denouncing whistle wailing on
And dying off smothered in the shuddering dark . . .¹¹⁴

The language of this description is expressive of the story of violation, abandonment, and social and sexual transgression which Barrett Browning tells in *Aurora Leigh*. The irresistible power of the train, its ability to master and penetrate the very earth itself, the suggestion that the mountains both fear and welcome the penetration; the passage is a dramatic encapsulation of the interplay of fear and desire which governed so many Victorian responses to the railway. Within the narrow confines of the tunnel, the neuroses of the railway were focussed and channelled into their most powerful forms. It was in the tunnel that the fears of

¹¹² A powerful literary expression of these themes is Emile Zola's *La Bête humaine* (1894). Peter Gay notes that Zola was haunted by a fear of being buried alive in a tunnel; Peter Gay, *The Bourgeois Experience: Victoria to Freud. Vol. 2: The Tender Passion* (New York: Oxford University Press, 1986), p. 327.

¹¹³ I owe this point to a discussion with Eric Caplan of the University of Chicago. See Eric Caplan, 'Trains, brains, and sprains: Railway Spine and the origins of psychoneuroses', *Bulletin of the History of Medicine*, vol. 69, no. 3 (Fall 1995), p. 387.

¹¹⁴ Elizabeth Barrett Browning, *Aurora Leigh*, ed. Kerry McSweeney (1857; Oxford: Oxford University Press, 1993) book VII, ll. 430-6, p. 235. I am grateful to Marjorie Stone, of Dalhousie University, for drawing my attention to this reference.

assault which haunted the Victorian railway traveller were most potent, and it was with the horror of an accident in a tunnel that Victorian fears of railway travel found their most powerful expression.

In the case of the Channel Tunnel, tunnel phobia influenced not only individual rail travellers, but impacted on questions of national security. The controversy over the construction of a railway tunnel linking Britain with the continent does not reflect simply a long-established insular tradition of invasion scares; it addresses a specifically Victorian and Edwardian perception of the tunnel as an agent of violation, transgression, penetration, pollution.¹¹⁵ The visionary scheme put forward in the 1880s by a leading railway manager, Sir Edward Watkin, chairman of the Manchester, Sheffield and Lincolnshire and the South Eastern railways, envisioned the construction of a great main line which would link Scotland, England and the continent via a tunnel beneath the Channel.¹¹⁶ For those who believed in railways as creators of peace and international harmony, the proposed tunnel was a blessing; Charles Bradlaugh MP supported the project in 1887 by claiming that 'Commerce is an eloquent peace preacher; the frequent and more complete intermingling of unarmed peoples begets distaste of war; national prejudices die away under frequent contact'.¹¹⁷ For others, it threatened 'to unisland England and join her soil to the Continent while Europe is seething with unrest and complexities and perplexities',¹¹⁸ opening her previously inviolate frontiers to corruption, invasion and conquest.

In a more generalized sense, the railway was never more threatening than when confronted in its subterranean realm. Charles Dickens's short story *The Signalman*, published in 1866 as part of the 'Mugby Junction' special Christmas issue of *All The Year Round*, dramatizes such a confrontation. The setting is a stretch of railway line which passes through a deep, narrow, rock-walled cutting before vanishing into a tunnel. The signalman of the title oversees the railway traffic passing through this lonely location from his cabin, situated near the tunnel-

¹¹⁵ For more on the context of the Channel Tunnel controversy, see Daniel Pick, *War Machine: the Rationalisation of Slaughter in the Modern Age* (New Haven, Conn. & London: Yale University Press, 1993), pp. 118, 121-35.

¹¹⁶ On the history of the Channel Tunnel project, see Michael R. Bonavia, *The Channel Tunnel Story* (Newton Abbot: David & Charles, 1987).

¹¹⁷ Quoted in Pick, *War Machine*, p. 123.

¹¹⁸ Quoted in *ibid*, pp. 121-2.

mouth.¹¹⁹ Dickens's description of the place vividly conveys its isolation and bleakness:

His post was as solitary and dismal a place as ever I saw. On either side, a dripping-wet wall of jagged stone, excluding all view but a strip of sky; the perspective one way, only a crooked prolongation of this great dungeon; the shorter perspective in the other direction, terminating in a gloomy red light, and the gloomier entrance to a black tunnel, in whose massive architecture there was a barbarous, depressing, and forbidding air. So little sunlight ever found its way to this spot, that it had an earthy deadly smell; and so much cold wind rushed through it, that it struck chill to me, as if I had left the natural world.¹²⁰

The narrator describes himself as 'a man who had been shut up within narrow limits all his life, and who, being at last set free, had a newly-awakened interest in these great works'.¹²¹ It is an irony that he has chosen an exploration of the railways as a means to exercise his new-found freedom, only to find himself in a railway-made environment which does not liberate but oppresses and confines. At the beginning of the story, he looks down upon the railway from his vantage-point above the cutting, and experiences the passing of a train as a great eruption from below which threatens to engulf him and drag him down into this railway underworld: 'Just then, there came a vague vibration in the earth and air, quickly changing to a violent pulsation, and an oncoming rush that caused me to start back, as though it had force to draw me down'.¹²²

At first, he can see no way down into the cutting, until the signalman indicates a narrow, precipitous, zigzagging path cut into the rock wall. As the narrator makes his way down, he leaves the upper world of sunlight and fresh air for a subterranean realm created for and dominated by the railway, its tracks and

¹¹⁹ See Michael A. Vanns, *Signalling in the Age of Steam* (Shepperton: Ian Allan, 1995), p. 14, for an illustration from circa 1860 of a signal cabin (at Clayton Tunnel, Sussex) in a location strikingly similar to that described by Dickens.

¹²⁰ Charles Dickens, *No. 1 Branch Line: The Signalman*, in *The Nine Christmas Numbers of All The Year Round* (London: Chapman & Hall, 1870), p. 21.

¹²¹ *Ibid.*

¹²² *Ibid.*, p. 20

earthworks excluding all views of any world other than its own. Sunk far below ground level, between sheer rock walls, the deep, narrow cutting, with its earthy, chill air, is reminiscent of a grave. Dickens describes the cutting as a trench, a chasm, a dungeon; the implication is that there is no escape from it, and for the unfortunate signalman that proves indeed to be the case. The only exit, seemingly, is *downwards*, into the earth through the darkness of the tunnel-mouth, the 'barbarous' architecture of which suggests not modern civilization but the ancient terrors of the underworld.

This association of the railway with the underworld reflects a long-established tradition of seeing in the landscapes of industry an eruption of infernal subterranean regions onto the surface of the earth.¹²³ As Rosalind Williams notes, British travel literature of the eighteenth and early nineteenth centuries 'overflows with descriptions by middle-class people who had visited mining areas and were stunned by the black pits, the blighted land-scape, the smoke and steam, the strange noises of the machinery, the flaring lights of furnaces, and the dark, demonic human figures'.¹²⁴ The characteristics of railway earthworks and architecture – cyclopean masonry, giant arches, gaping tunnels, looming embankments, vast gloomy vaulted spaces – the fact that the railway was so often an underworld, of excavations, vaults and tunnels, the sulphurous, fiery, smoke-filled world which steam trains created, made the connection of the railway with the underworld almost a cliché of the nineteenth-century imagination. 'An element of poetic horror surrounds the railway by night that is Dantesque', wrote Edward Bradbury in the *Magazine of Art* in 1880. Industrial areas which appeared 'blighted and depressing' in the daylight were transformed by night, becoming

grand in their glare and gloom, sublimely spectacular at nightfall. The inky rivers of coal and iron become invested with classic fancies. They are Acheronic streams. The ugly slagheaps become fiery volcanoes. Look out of the carriage window now, as the midnight mail, with a shock and a rattle and a roar, urges through the heart of the Black Country . . . The night air sobs

¹²³ See Rosalind Williams, *Notes on the Underground: An Essay on Technology, Society, and the Imagination* (Cambridge, Mass.: MIT Press, 1990), pp. 65-9.

¹²⁴ *Ibid.*, p. 66.

with the wail and moan of beaten metal. The screech might be a cry of pain wrung from great spirits. Is this really a railway carriage in which we are seated, or a cushioned compartment in Charon's boat? Answer me, is it the London and North-Western line, or the awful Styx bearing us away on its black bosom to Pluto's kingdom?¹²⁵

Furthermore, the railway's subterranean landscapes were experienced by all who journeyed by train. Those who lived and worked in the industrial underworlds described by earlier writers were industrial workers — miners, quarrymen, ironworkers. They were often described as if they were almost a race apart: foundrymen as 'daemons at work by the light of their own fires',¹²⁶ miners as 'a race fallen from the common rank of men, and doomed, as in a kind of purgatory, to wear away their lives in these dismal shades'.¹²⁷ In contrast, the railway — in this respect as in others — brought experiences which had previously been the preserve of industrial workers into the daily lives of middle and upper class people who were normally shielded from industrial processes; people such as the country clergyman Francis Kilvert, who was struck by a landscape through which his train passed in Cornwall: 'The bowels of the world ripped open, turned inside out in the search for metal ore, the land defiled and cumbered with heaps and wastes of slag and rubbish, and the waters poisoned with tin and copper washings'.¹²⁸ The railway traveller, unprepared for the experience of travelling through a man-made hell, could find the experience a stressful one, as this comment from the medical journal *The Lancet* in 1862 suggests:

Persons travelling at night through the iron and coal counties, where all around lies in the lurid glare of kilns, forges and furnaces, and the figures of workmen are seen distorted and moving to and fro (presenting a picture of what one may suppose

¹²⁵ Edward Bradbury, 'Pictures in trains', *Magazine of Art*, vol. 3 (1880), pp. 110-11.

¹²⁶ Thomas Gray, describing the forges at Sizergh in Cumberland, 1769; quoted in Jennings, *Pandaemonium*, p. 64.

¹²⁷ Richard Ayton, describing the William Pitt mine, Kent, in 1813; quoted in Williams, *Notes on the Underground*, p. 66.

¹²⁸ Francis Kilvert, *Kilvert's Diary 1870-1879: Selections from the Diary of the Rev. Francis Kilvert*, ed. William Plomer (Harmondsworth: Penguin, 1977), p. 60. The entry is for 21 July 1870.

aptly to resemble the ancient domains of Pluto and the infernal regions), — persons travelling in such districts may undergo a shock to the nervous system which it will require weeks to remedy.¹²⁹

Even outside tunnels and away from the scenes of industry, the passage of the railway train often revealed to its passengers landscapes of social ‘underworlds’ which they might otherwise never have seen for themselves. The railway journey crossed the divisions between the spheres inhabited by different social classes, opening up a cross-section of society, like an excavation cutting through varied geological strata. Dombey’s journey reveals a layered structure of habitations and activities as it offers ‘glimpses of cottage-homes, of houses, mansions, rich estates, of husbandry and handicraft, of people, of old roads and paths’.¹³⁰ George Gissing, in *The Nether World* (1889) invites his readers to share in a vision of poverty, misery and squalor the extent and comprehensiveness of which can only be obtained from the windows of a train, as he describes a journey ‘Over the pest-stricken regions of East London . . . across miles of a city of the damned, such as thought never conceived before this age of ours . . . stopping at stations which it crushes the heart to think should be the destination of any mortal’.¹³¹ Charles Dickens has his Mr Dombey travel across another such underworld in his train, a blackened, wretched world of ‘jagged walls and falling houses close at hand, and through the battered roofs and broken windows, wretched rooms are seen, where want and fever hide themselves in many wretched shapes’.¹³² This is the dark side of the panorama of progress offered by the railway journey; such visions of squalor and decay constitute the sombre inverse of such spectacles of industrial power as that seen by George Borrow from the window of his train as he journeyed through the west midlands.

¹²⁹ *The Lancet*, 1 March 1862, p. 236.

¹³⁰ Dickens, *Dombey and Son*, chap. 20, p. 354.

¹³¹ George Gissing, *The Nether World* (1889; Oxford: Oxford University Press, 1992), p. 164.

¹³² Dickens, *Dombey and Son*, chap. 20, p. 355.

Modernity, machines and mentalities

The nineteenth-century railway acquired a subtext of metaphorical and implied meanings, becoming emblematic of the condition of modern humanity, subject to the remorseless efficiency of an increasingly mechanized civilization and the violent unpredictability of seemingly irrational and uncontrollable machines. On one level, the growth and elaboration of the railway system during the nineteenth century was an indicator of progress, of an increase in the complexity of the social and economic organism in accordance with the doctrines of evolution; but at the same time it also represented a restriction of human freedom in that it subjected human behaviour to a high degree of regulation and control, and increased the risk to which people were exposed — for the more complex and highly evolved an organism becomes the more fragile its organisation is, and the more dangerous are the consequences of a breakdown in that organisation.

Networks of progress

In the railway network, the locomotive and the train those discourses which used a biological language to describe the attributes of machinery and mechanical systems found a very potent application. The railway, like the roads and canals before it, lent itself easily to the biological imagery of blood vessels, nerves, and circulatory systems; an imagery lent new significance from the middle of the century by the doctrines of evolution. The fact that the railway was clearly at a higher level of integration than the older transport systems, and the vital role of the electric telegraph in railway operation, served to encourage the application of organic models to the railway. The German writer Max Maria von Weber compared the railway itself to a living body when he commented in the 1870s that,

as the muscle of a human body without a nerve flashing through it would be a mere lifeless hunk of flesh, so would the flying muscles that Watt's and Stephenson's inventions have lent to humanity be only half as capable of winging their way, if they

were not animated by the guiding thought imperiously flashing through the nerves of the telegraph wires.¹³³

The railway could be seen as the clearest symbol of the nation's evolutionary progress, facilitating communication between the different parts of the organism and enabling it to work more efficiently as a unified whole. 'How shall we fitly estimate', asked Henry Booth in 1852,

the rapid and everlasting diffusion of information effected by the transportation of news, with practical disquisitions on the prominent topics of the day, radiating every morning from the metropolis, the great centre of intelligence, the living heart whose pulsations animate and invigorate our provincial districts, through the length and breadth of the land!¹³⁴

The evolutionary analogy tends to become more explicit as the century passes. For E. Foxwell, writing in the 1880s, the railway — and especially the express train — is an unmixed blessing, the clearest sign that progress is at work in the world. The railway is the highest development of communication and transportation, its defining characteristics — speed, directness, energy, intensity — brought to their finest pitch of development in the express train. The invention, expansion and elaboration of the railway system in Great Britain was exemplified for Foxwell in the '400 expresses [which] run across England every day . . . mile after mile by day or night for a hundred miles on end, in summer and winter alike, through fog or storm, at a speed barely less than that at which nerve-tremors throb in our own bodies'.¹³⁵ Reaching naturally for organic metaphors, Foxwell described how the diffuse and separate intelligences and abilities of the population, the different and formerly distinct areas of the country and centres of activity, were brought into unity by the railway and subjected to a higher, national, organically unified purpose.

¹³³ Max Maria von Weber, *Vom rollenden Flügelrade* (1882); quoted in Wolfgang Schivelbusch, *The Railway Journey* (Oxford, 1979; pbk edn, Leamington Spa, 1986), p. 30.

¹³⁴ Booth, *Case of the Railways Considered*, p. 7.

¹³⁵ E. E. Foxwell, *English Express Trains: Two Papers* (London: Edward Stanford, 1884), p. 3.

It is the invigoration put into men's energy by the quick conversion of intention into deed, which is the most valuable effect of expresses . . . an express takes Purpose white-hot at its origin, whisks it off into warm contact with other living centres, and lights up Action across an area of opportunities. Such swift speed makes one organic whole of the practical ideas scattered here and there, so that the local vigour of the country pervades the whole mass in through currents, which return to revivify the centres of their birth; industrial life becomes intensified as bodily functions are by the establishment of cerebro-spinal nerve tracks among the local 'sympathetic' ganglia; there is more and more an orchestral effect in life.¹³⁶

Doctors writing on the health consequences of railway travel also placed their consideration of the medical aspects of railways into the wider context of the significance of railways in civilization, and the relationship of the railway to questions of progress and social evolution. James Ogden Fletcher, in his *Railways in their Medical Aspects*, published in 1867, approached the perceived medical dangers of railway travel in the context of the railway's place in society as a whole. He therefore began by asking, 'Is this mode of conveyance a necessity or a luxury?' and 'Did it contribute to or arise from increased civilisation?'¹³⁷ For Fletcher, who as a surgeon employed by the Manchester, Sheffield and Lincolnshire and the Great Northern companies owed his living to the railways, they were both a necessity for modern civilization and a sign that civilization was progressing. The development of the railways had been a necessity, for 'it is sufficient to say that when commerce is checked and civilisation retarded for want of anything, that thing at once becomes a necessity, and there can be no doubt that the state of transit during the last two centuries was a serious impediment to the progress of civilisation and knowledge'. It was inevitable that Great Britain, the most advanced nation in the world, would play the role of pioneer of railway development, driven by its 'increased commercial prosperity and the development of its

¹³⁶ Foxwell, *English Express Trains*, p. 5.

¹³⁷ James Ogden Fletcher, *Railways in their Medical Aspects* (London: J.E. Cornish, 1867), p. 1.

abundant natural riches'.¹³⁸ Thus, for Fletcher, as for Foxwell, there was nothing unnatural or threatening in the railway; it was an inevitable and necessary product of economic and commercial progress, a sign that improvement and advancement was taking its course.

Mechanization and the dark side of progress

Yet this interpretation of the railway's development as the embodiment of progress carried the implication of a darker side to the railway. Could the rapid growth and elaboration of complex technological systems of communication which the railway represented lead to a loss of human liberty, a steady reduction in man's control over his own destiny? Samuel Butler's *Erewhon*, published in 1872, implied that this was indeed the case. The very forces which Foxwell and Fletcher see as the signs of a flourishing, progressive, expanding market economy — invention, innovation, improvement — are, Butler suggests in his account of the Erewhonian 'Book of the Machines', signs that humanity is no more than the tool of irrational forces beyond all human control, forces which find their expression in the rise to dominance of the machine:

. . . this is the art of the machines — they serve that they may rule. They bear no malice towards man for destroying a whole race of them provided he creates a better instead; on the contrary, they reward him liberally for having hastened their development . . . They have preyed upon man's grovelling preference for his material over his spiritual interests, and have betrayed him into supplying that element of struggle and warfare without which no race can advance. The lower animals progress because they struggle with one another; the weaker die, the stronger breed and transmit their strength. The machines being of themselves unable to struggle, have got man to do their struggling for them . . .¹³⁹

¹³⁸ Fletcher, *Railways in their Medical Aspects*, pp. 2, 5.

¹³⁹ Samuel Butler, *Erewhon* (1872; Harmondsworth: Penguin, 1985), p. 207.

In this analysis, Butler adopts the corporeal imagery we have noted above, but interprets the significance of the new technological circulatory systems of the nineteenth century in a provocative and disturbing way:

Who shall say that a man does see or hear? He is such a hive and swarm of parasites that it is doubtful whether his body is not more theirs than his, and whether he is anything but another kind of ant-heap after all. May not man himself become a sort of parasite upon the machines? . . . When we look down from a high place upon crowded thoroughfares, is it possible not to think of corpuscles of blood travelling through veins and nourishing the heart of the town? No mention shall be made of sewers, nor of the hidden nerves which serve to communicate sensations from one part of the town's body to another; nor of the yawning jaws of the railway stations, whereby circulation is carried directly into the heart, — which receive the venous lines, and disgorge the arterial, with an eternal pulse of people.¹⁴⁰

At one level, Butler is describing the process whereby in an industrial society human beings are forced to behave with a machine-like regularity and predictability, and thus sacrifice a degree of liberty for the benefits which mechanization brings. But his argument goes further, and is more subtle, than this. He sees an insidious process at work whereby the human builders and controllers of technology are, through their own desire to improve and make more powerful their machines, gradually subjected to them, ultimately becoming their servants. In effect, human beings become themselves mere components in a vast mechanism. This theorization has direct relevance to the railway and the way in which it was perceived. Butler's choice of the railway to illustrate his argument is not a random one; the locomotive and the railway offer the clearest illustration of the process he describes:

At first sight it would indeed appear that a vapour-engine cannot help going when set upon a line of rails with the steam up and

¹⁴⁰ Butler, *Erewhon*, pp. 205-6.

the machinery in full play; whereas the man whose business it is to drive it can help doing so at any moment that he pleases; so that the first has no spontaneity, and is not possessed of any sort of free will, while the second has and is.

This is true up to a certain point; the driver can stop the engine at any moment that he pleases, but he can only please to do so at certain points which have been fixed for him by others, or in the case of unexpected obstructions which force him to please to do so. His pleasure is not spontaneous; there is an unseen choir of influences around him, which makes it impossible for him to act in any other way than one.¹⁴¹

Human beings are trapped, Butler warns, in a system constructed around the needs of the machines; a system which, while ultimately of human devising and under human control, no longer recognises any human priorities and compels humans to become its servants and comply with its demands, in order to sustain its own existence.

These sentiments are strikingly echoed in the claims of railway labour during this period that the conditions of their employment made them little more than machines. 'Fairly worked, there are few operatives as intelligent and trustworthy as railway officials' stated *The Lancet* in 1862, at a time when a number of serious accidents had brought the hours worked by railway employees to the forefront of public concern, 'But they are men, not machines'.¹⁴² In 1874, 'A Signalman', writing anonymously in a pamphlet published under the title *A Voice from the Signal-box*, claimed that the railway signalman 'is treated like a "machine," and, so long as his "machinery" does not fail, he may stop in this responsible and trying position until his hair turns grey'.¹⁴³ Charles Dickens's signalman, posted for long hours on his lonely stretch of line, 'at all times liable to be called by his electric bell',¹⁴⁴ offers a similar picture, while across the English Channel the mechanical

¹⁴¹ Butler, *Erewhon*, p. 218.

¹⁴² 'The influence of railway travelling on public health', *The Lancet*, 4 January 1862, p. 17.

¹⁴³ 'A Signalman', *A Voice from the Signal-box; or, Railway Accidents and their Causes* (London: Longmans, Green & Co., 1874), p. 22.

¹⁴⁴ Dickens, *The Signalman*, p.21.

tedium of the railwayman Misard's work in Zola's *La Bête humaine* contributes to his mental and physical degeneration:

Each time the electric bell rang signalling the arrival of a train, sound the hooter; then, once the train was past and the section blocked, press one button to alert the next section-post and press another to give the line clear to the preceding section-post: these were simple, automatic movements [*des mouvements simplement mécaniques*] which had become like bodily functions in his vegetable existence.¹⁴⁵

The clearest instances of human beings becoming incorporated into the vast mechanism of the railway as pieces of machinery themselves are found among the railway employees of the nineteenth century; but the passengers, too, who abandoned their individuality to become part of the 'eternal pulse of people' along the arteries of railway, were required to govern their comings and goings according to the dictates of the railway timetable, to conform with numerous rules and regulations, and to surrender their safety to other hands.

The poet John Davidson's account of the commuter crowds at London Bridge draws on a combination of images, relating the circulatory processes of the world — rivers, deltas, seas — to the circulation of blood in the body, when he describes London Bridge's 'wide delta of platforms, whence / Discharges into London's sea, immense / And turbulent, a brimming human flood, / A river inexhaustible of blood'.¹⁴⁶ Railway crowds could easily be seen as constituting a regulated 'flow' through the system of tracks, trains and stations; the imagery of arteries and veins, of wires and nerves, of flows, pulses, circulation, was naturally applied to the railway from an early stage. Butler's reference to railway passengers as 'corpuscles of blood' drew on a specifically urban and industrial interpretation of the crowd, the mass. Individuals were mere molecules, atoms, particles in the dehumanized mass; the behaviour of that mass was manageable — through a controlled

¹⁴⁵ Emile Zola, *La Bête humaine*, trans. Roger Pearson (1890; Oxford: Oxford University Press, 1996), p. 312.

¹⁴⁶ *Poems of John Davidson*, vol. 2, pp. 434-5.

circulatory system such as the railway, or the grands boulevards of post-Haussmann Paris — yet unpredictable.

Carlyle's comments on the railway reflect this concept, and reveal his preoccupation with the condition of flux, change, and hurry associated with it. He saw that the condition of modern life was one of constant circulation; people, money, words, ideas, even entire towns, are in constant ebb and flow like molecules, acted upon — attracted, repelled, made to spin, coagulate, fly apart — by forces (economic, thermodynamic, technological, biological) vaster by far than they. 'Railways have set all the towns of Britain a-dancing', he wrote in 1858:

Reading is coming up to London, Basingstoke is going down to Gosport or Southampton, Dumfries to Liverpool and Glasgow . . . Their business has gone elsewhere; and they — cannot stay behind their business! They are set a-dancing, as I said; confusedly waltzing, in a state of progressive dissolution, towards the four winds; and know not where the end of the death-dance will be for them, in which point of space they will be allowed to rebuild themselves.¹⁴⁷

Whereas the optimistic Foxwell saw the railway system controlling, focusing and directing concentrated beams of energy made up of the collective purpose of its passengers — 'when the driving wheels begin to turn, and the white steam pours out, it is the departure of a human ray of light and heat to energise some distant spot'¹⁴⁸ — Carlyle saw the energies associated with the railway as dissipative, bringing about the dissolution of the constitutive parts of civilization in a frantic, unmanageable whirl of uncontrolled motion.

The railway and the neuroses of modernity

During the 1920s Britain witnessed something of a vogue for socio-psychological studies of the modern world and its ills. The experience and continuing influence of the Great War and the political, economic and cultural uncertainty which characterized the period contributed to a climate in which writers of widely

¹⁴⁷ Thomas Carlyle, 'Hudson's statue', (1850), in *Collected Works*, vol. 13, p. 266.

¹⁴⁸ Foxwell, *English Express Trains*, p. 8.

differing backgrounds and qualifications felt moved to offer diagnoses of and, sometimes, cures for, the nation's and the world's disorders. Two works written by the historian and social theorist Caroline E. Playne, *The Neuroses of the Nations* (1925) and *The Pre-War Mind in Britain* (1928) were prominent examples of the genre. Both books were essentially concerned with the Great War, its causes and its nature as a conflict. Playne's interest lay, not in politics or in European and imperial military and strategic affairs, but in collective mentalities. Her perspective was a degenerationist one;¹⁴⁹ she held that particular characteristics of late nineteenth-century western civilization had contributed to a collective mentality among the peoples of Britain, France and Germany (and, she clearly implies, other western industrial and urban countries) which amounted to a collective neurosis. The existence of this neurosis made the war of 1914-18 inevitable. Playne contended that:

not only were the national group-minds unhinged by the immensity of the excitement after the War had broken out, but that the different national groups suffered from a mass-neurosis for some decades before group-dementia held them in its grip as the War developed. And further, that the Great War, its universal upheaval and drawn-out strife, were not induced but continued, as a consequence of the moral and mental derangement of the mass-mind among the different nations.¹⁵⁰

This 'moral and mental derangement' was characterized by 'nervous excitement, nervous depression, general irritation, resulting in anger and passion';¹⁵¹ it was a consequence of the rapid speeding-up of the pace of life since the last quarter of the nineteenth century, and the increased quantity of nervous and mental stimulation and irritation to which people were subject as a consequence. The nerves of the modern man, writes Playne, 'receive sense stimulations showered on them, shot at them in continual torrents, whilst his grandfather's nervous system had to deal with sense stimulations arriving in what, by comparison, may be likened to a slow-

¹⁴⁹ See Pick, *War Machine*, pp. 198-200, for a discussion of Playne's writings.

¹⁵⁰ Caroline E. Playne, *The Neuroses of the Nations* (London: George Allen & Unwin, 1925), p. 21.

¹⁵¹ *Ibid*, p. 18.

flowing stream.¹⁵² As a result of the constant flow of ideas, images and stimulations with which modern communications technology bombarded the modern citizen, 'a state of general nervous overwrought tension characterized the mentality of the public at large'¹⁵³ from the later nineteenth century to 1914. The fundamental reason for this lay in the dominance which machinery achieved over human life during that period, the period in which 'mechanicalization [sic] took the lead, and set the pace of men's lives'.¹⁵⁴ The effect of this increased mechanization, transforming life into 'a mechanical push',¹⁵⁵ was to create collective mentalities which were, in effect, mentally disordered, so that the nervous disorders — such as shell shock — which appeared to be the consequence of the war were in fact symptoms of the deeper malaise which had brought the war about:

It has been said that, if the War had lasted long enough, in the end, every fighting man would have reached that part of nervous breakdown known as shell-shock. It is not too much to say that all symptoms go to prove that human society in the countries, where civilization centres, was well on the road to nervous breakdown before it 'staggered and stumbled' into the War.¹⁵⁶

Playne argues the same case in *The Pre-War Mind in Britain*, published three years later. As in the earlier book, the significance of the Great War as the end, rather than the beginning, of a period of psychological and neuro-pathological exhaustion and degeneration is emphasized: 'the strain of keeping up with the drive of purely mechanical processes and the all-round speeding-up of life's work went on increasing throughout the nineteenth century, especially towards its close'.¹⁵⁷ The role of the 'application of mechanical appliances to the means of locomotion', is stressed:

¹⁵² Playne, *Neuroses of the Nations*, p. 5.

¹⁵³ Ibid, p. 20.

¹⁵⁴ Ibid, p. 36.

¹⁵⁵ Ibid, p. 41.

¹⁵⁶ Ibid, p. 42.

¹⁵⁷ Caroline E. Playne, *The Pre-War Mind in Britain: an Historical Review* (London: George Allen & Unwin, 1928), p. 30.

Before our period [i.e., before circa 1890], trains had been running on railways for years and had very much quickened the pace of events. After them came bicycles and finally motor-cars, in turn adding to the quickness of movement, the multiplication of engagements, the general fullness of life. Distant and lonely places became suddenly accessible and in towns people were flung in masses through the streets or through underground tunnels in engine-driven vehicles.¹⁵⁸

In no area of life was the speeding-up of existence, the crowding of more events, experiences, stimulations into a short period of time, clearer than in the area of transport and communication; and the railway, with its dominant position in the transport systems of nineteenth-century Europe and its influence on the development of other communications systems — the telegraph, the postal service, newspapers, popular literature — played a central role.

This analysis connects the railway as the agent of mass society, as symbol of technological modernity, and as degenerative influence on the human mind and body. It is argued that the railway has contributed to the social and psychological disintegration of western society, by allowing the 'demon of neurasthenia' to break free and drive the collective consciousness of the west into a frenzied, unstable state. Playne's account of this collective neurasthenia reflects the 'crowd hysteria' theorized in the nineteenth century by Gustave Le Bon.¹⁵⁹ Too many books, too many newspapers, too many social activities, too many crowds, too much travel, too much hurry; the age of the railway has seen society wrenched away from its roots and left to the mercy of whatever economic, social, biological and technological forces have been released by the rush into modernity. It is within this context that the neuroses of the railway must be understood.

¹⁵⁸ Playne, *Pre-war Mind*, p. 30.

¹⁵⁹ On Le Bon and the significance of the crowd in conceptions of degeneration, see Pick, *Faces of Degeneration*, pp. 90-3, 95; Susannah Barrows, *Distorting Mirrors: Visions of the Crowd in Late Nineteenth-Century France* (New Haven, Conn.: Yale University Press).

THE RAILWAY JOURNEY

The journey and society

By the 1860s the great 'locomotivity'¹ of the British people, the national passion for rail travel, was provoking much comment, both within Britain and abroad. 'We are all railway travellers',² observed the *Saturday Review* in 1868, while in 1887 James Jeans asserted that the number of passenger journeys on British railways was 'in excess of that of all the rest of Europe put together'.³ Modern studies have tended to substantiate the claims of contemporaries that Victorian Britons had a uniquely intensive experience of railway travel.⁴ A very substantial portion of Victorian society travelled by train, and even those who did not lived in a society in which railways were a dominant influence and an unavoidable presence. Thus, it was through the journey that the railway as a disruptive, alarming, threatening agency was most widely and directly experienced by the Victorians. Few people suffered the horrors of direct involvement in railway accidents, or were the victims of criminal assault on a train, or even witnessed such events, but every traveller could draw on the collective experience of the railway journey. Every railway passenger had heard and read about accidents and assaults on trains, and had experienced unexplained halts and delays, the discomfort of poorly-sprung carriages, the darkness and foul air of tunnels, the noise and confusion of stations. Every railway passenger had internalized the mental structures of anxiety which were the collective heritage of Victorian travellers, and

¹ *Annual Register*, 1861, chronicle, p. 160.

² *Saturday Review*, 29 August 1868, p. 281.

³ J. S. Jeans, *Railway Problems: an Inquiry into the Economic Conditions of Railway Working in Different Countries* (London: Longmans, Green & Co., 1887), p. xxviii.

⁴ See B. R. Mitchell, *European Historical Statistics 1750-1975* (1962; 2nd edn., London: Macmillan, 1981), pp. 30-4, 611-12, 629-34; for comments on contemporary and modern statistics, and on the work of Jeans, see Jack Simmons, *The Victorian Railway* (London: Thames & Hudson, 1991), pp. 342-3.

which were augmented and renewed with every year's new tally of collisions, derailments and other mishaps. The railway journey was not merely an event or a process; it was a shared cultural location through which the ill-defined but potent anxieties associated with the advent of mechanized mass transportation were focussed, collected and transmitted. It constituted the paradigmatic experience of the railway age, serving as a link between the public, externalized, shared fears and anxieties provoked by the railway and the private, internal trauma of the individual railway accident victim.

Mobs, masses and mobility

Railways were the first mass transit system. By means of the train, more people than ever before could travel, and in greater numbers. The crowds of people at railway stations, the passengers who filled the trains, constituted an entire society on the move: one observer commented in 1855 on 'the railway engine dragging in its train, what seems at times like a street in motion, with its numerous apartments and various classes of a living population'.⁵ As H. G. Wells observed in 1902,

When the historian of the future speaks of the past century as a Democratic century, he will have in mind, more than anything else, the unprecedented fact that we seem to do everything in heaps — we read in epidemics; clothed ourselves, all over the world, in identical fashions; built and furnished our houses in stereo designs; and travelled — that naturally most individual proceeding — in bales.⁶

Railway trains, like the society they served, were divided into classes, distinguished by the price of the ticket and the level of comfort afforded to the traveller. However, the significance of this class distinction was strictly limited. It did not alter the fact that the railways were open to all who could afford to ride, and that all passengers of whatever class travelled at the same speed and reached their

⁵ John Blakely, *The Theology of Inventions: or, Manifestations of Deity in the Works of Art* (Glasgow: William Collins, 1855), p. 134.

⁶ H. G. Wells, *Anticipations of the Reaction of Mechanical and Scientific Progress upon Human Life and Thought* (London: Chapman & Hall, 1902), p. 16 (footnote).

destinations at the same time. Furthermore, despite the efforts of railway companies to provide entirely separate facilities for the different passenger classes, it was in practice impossible to keep them apart entirely and people of all sorts and conditions inevitably met and mixed, particularly at stations. Finally, for many critics of the railway the system of passenger classes was an irrelevance; the fact that members of almost all classes of society had the opportunity and the ability to travel as never before was a negative factor in itself. To put it simply, with the coming of the railway the mob had become mobile.

It was widely accepted that the railways were having a 'democratizing', 'levelling' effect on society. Critics and supporters of the railways alike would have agreed with James Jeans's statement of 1887 that 'Railways are the great levellers of the world'.⁷ 'Theories of democracy were useless prior to railways', wrote E. Foxwell in 1884:

For fifty years . . . people of every sort and variety have come across each other, and have been intimately mixed up in the affairs of life. This constant rubbing against one another has taught them to be more kindly disposed to all sorts and conditions . . . and while it has in consequence created a wish to level everyone up to those best possibilities of which his human composition renders him capable, the incessant contact of ideas has bred feasible plans for the wiser treatment of that stuff of which high and low are only variations. This is Democracy, and this is the work of railways.⁸

'Mixing', 'rubbing against one another', 'levelling up': these were the very processes at work in society which many viewed with anxiety and alarm. Foxwell celebrated the phenomenon of wider social interaction, greater tolerance, the breaking down of class barriers, the liberation of people from the bonds of custom and deference; others saw the very foundations of civilization being eroded by the influence of the railway. Members of the aristocracy felt this danger particularly keenly. In 1842 an anonymous pamphleteer observed that 'Railways are decidedly

⁷ Jeans, *Railway Problems*, p. xvii.

⁸ E. Foxwell, *English Express Trains: Two Papers* (London: Edward Stanford, 1884), p. 37.

unpopular with the aristocracy', and suggested that one reason for this lay in the fact that 'the mode of carriage is not sufficiently exclusive and that the same speed conveys the poorest and greatest man to his destination'.⁹ Indeed, upper-class travellers, accustomed to the freedom and status of travel in their own, private horse-drawn vehicles, did have reason to feel particular discomfort and resentment at the restrictions imposed by rail travel. A certain nostalgia for pre-railway age travel also undoubtedly contributed to the resentment many felt at the loss of independence involved in journeying by train.¹⁰ Making a journey in one's own horse-drawn vehicle was very often uncomfortable, inconvenient and unpredictable; but it was private, exclusive, and under one's own control, and one chose one's own company. The new form of transport was open to all, and the discerning traveller could no longer rely on the possession and use of a status-confirming means of transport alone to exclude the lower orders. In Benjamin Disraeli's novel *Sybil* (1845), Lord De Mowbray declares that the railway's 'dangerous tendency to equality' is part of 'the levelling spirit of the age' against which the nobility must 'make a stand'. Lady Marney, agreeing with him, recounts the experience of her friend Lady Vanilla, who found herself sharing a compartment with two arrested pickpockets, chained together: "A countess and a felon! So much for public conveyances," said Lord Mowbray'.¹¹

Such concerns related to a complex of fears about technological modernity itself, and its association with an urbanized, socially and culturally degenerate mass civilization. The poet John Davidson articulated this concern through his elitist character Sir John Simplex, in 'The Testament of Sir John Simplex concerning Automobilmism' (1907). Simplex complains that railway travel 'Unites one with a vengeance to the Mob':

Bankers and brokers, merchants, mendicants,
Booked in the same train, like a swarm of ants . . .
In the guard's van my sacred luggage knocks

⁹ Anon., *Railways: their Uses and Management* (London: Pelham Richardson, 1842), p. 63.

¹⁰ For more on aristocratic reactions to railway travel, illustrated mainly by examples drawn from Germany, see Wolfgang Sachs, *For Love of the Automobile* (1984; Eng. Trans. Berkeley & Los Angeles, Calif.: University of California Press, 1992), pp. 92-7.

¹¹ Benjamin Disraeli, *Sybil, or The Two Nations* (1845; Oxford: Oxford University Press, 1981), book II, chap. 11, pp. 101-2.

Against the tourist's traps, the bagman's box;
And people with inferior aims to mine
Partake the rapid transit of the line.¹²

Simplex/Davidson hails the advent of the motor car, which offers the speed and comfort of the train, but also offers the ideal of independence, liberty and status in travel which existed in the days of horse-drawn carriages:

But convalescence with the car begins
And petrol expiates our railway sins.
Before we know we shall with joy behold
A world as sane as any world of old;
From labour and electoral problems free,
A world the fibre of whose health shall be,
No will to the Mob, but mastering all,
A will to the Individual . . .¹³

This fear of the enforced social mixing extended throughout the upper and middle classes; it was not a purely aristocratic phenomenon. For the middle classes, identified with the bourgeois values of order, decency, and self-restraint, the urban masses were increasingly perceived as disorderly, indecent, unrestrained, and much of Victorian middle-class culture can be understood in terms of structures of exclusion designed to keep the perceived threat of the masses at bay. The phenomena which constituted middle-class civilization and expressed the ideal of progress which was central to middle-class identity embodied the ideal of free movement, of unimpeded physical, commercial, cultural and intellectual circulation. Yet, paradoxically, the very openness of such systems of circulation and exchange — the great city, the free-trade economy, free education, modern streets, the railway — made them vulnerable to infiltration from the unimproved, regressive elements of mass society, variously conceived as a cultural, social, or

¹² *The Poems of John Davidson*, ed. Andrew Turnbull (2 vols., Edinburgh & London: Scottish Academic Press, 1973), vol. 2, p. 375.

¹³ *Ibid.*, pp. 373-4.

biological threat.¹⁴ The railway, the most striking and public exemplar of the concept of free movement and circulation, was at the heart of this paradox.

Against this background, the railway can be viewed not only as a system of circulation and exchange, but as an arena of contested social spaces: the station, the platform, the railway carriage. The railway compartment in particular played a significant role in this discourse. The medical periodical *The Lancet* drew on the anxiety and unease associated with the compartment when it commented in 1887 on the dangers of the lower classes, associated with disease and infection, breaking into the supposedly secure world of the first- or second-class compartment:

The forcible intrusion of persons often in the dirtiest condition among the occupants of first and second class carriages, who have purchased the comparative comfort in which they choose to travel, is a matter of serious public inconvenience. The company of these intruders is not only objectionable on aesthetic grounds, but it is equally undesirable on sanitary principles . . . the possible transference of infection and other *contagium vivum* of parasitic nature is no mere shadow of imagination when one's travelling companions have come from the slums of the great city.¹⁵

While ostensibly concerned solely with issues of public health, this passage is fraught with many other layers of meaning. The status of first- and second-class passengers, and the right of those who have more money to occupy a great share of space and secure more comfortable facilities, is represented as a matter of public good rather than private privilege. The 'intruders' complained of are represented as a threat to health, not merely as unsightly and unpleasant objects; but the validity of objections to them 'on aesthetic grounds' is implicitly admitted. In short, it is assumed that intruders from outside the sequestered comfort of the first- or second-class compartment will use violence ('forcible intrusion') to gain admittance, will be insanitary and dirty, of offensive appearance, and quite possibly

¹⁴ For a suggestive discussion of this issue in the context of the movement for urban sanitary reform and improvement in the 1830s, see Mary Poovey, *Making a Social Body: British Cultural Formation, 1830-1864* (Chicago, Ill.: University of Chicago Press, 1995), pp. 57-60.

¹⁵ *The Lancet*, 24 September 1887, p. 625.

highly infectious. The reference to '*contagium vivum* of parasitic nature', it is clear, does not refer only to the diseases these intruders may be carrying; it refers to the intruders themselves.

The representatives of the railway-travelling middle classes who articulated these concerns were haunted by the spectre of the mass, the mob, the crowd. John Davidson spoke for many when he portrayed the train as the symbol of a society which embodied the triumph of the crowd; and from the beginning, trains, stations, and the environs of railways were indeed scenes of the massing and movement of crowds (see figure 16).¹⁶ The potential for disorder and violence inherent in all large bodies of people made the station in particular a place of uneasy and fragile balance between order and chaos, in which a veneer of regulation and control overlaid a disturbing potential for turbulence and disorder. Wilkie Collins provided a brief but vivid sketch of York station in his 1862 novel *No Name*:

That entire incapability of devising administrative measures for the management of large crowds, which is one of the national characteristics of Englishmen in authority, is nowhere more strikingly exemplified than at York. Three different lines of railway assemble three passenger mobs, from morning to night, under one roof; and leave them to raise a travellers' riot, with all the assistance which the bewildered servants of the company can render to increase the confusion . . . dozens of different people were trying to attain dozens of different objects, in dozens of different directions, all starting from a common point, and all equally deprived of the means of information.¹⁷

¹⁶ The poor planning and lack of organization which characterized many Victorian railway stations could result in disaster when crowd control broke down. In 1892 six people were crushed to death and many more were injured when hundreds of passengers surged down a stairway onto the platforms at Hampstead Heath station, north London. See Wendy Neal, *With Disastrous Consequences: London Disasters 1830-1917* (Enfield Lock: Hisarlik, 1992), pp. 226-8.

¹⁷ Wilkie Collins, *No Name* (1862; Oxford: Oxford University Press, 1986), p. 187. The description is based on the York station of the 1840s, which was notoriously disorganized; *The Times* of 17 September 1847 called it 'ill-planned, worse managed, and far too small for the traffic.' It was rebuilt in the 1870s.

Collins's description is humorous, but nevertheless conveys the threat of violence and disorder which he perceived in the crowd. The terms he uses — 'mobs', 'riot' — are not neutral or dispassionate. They draw on perceptions of the crowd as frightening, unmanageable, threatening, and reflect an image of the station as an arena of inadequately contained disorder and turmoil.

One of the ways in which the threat of such crowds could be met and engaged with was through a process of observation and classification.¹⁸ Through the study of certain significant details of appearance and behaviour, an approach could be made towards anatomizing and understanding the crowd and containing its dangers. This is the discourse which underlies William Powell Frith's famous painting of 1863, *The Railway Station*, which depicts passengers boarding a Great Western Railway train at Paddington (see figure 17). The crowd is representative of the cross-section of society which was to be found at a railway station. There are soldiers, sailors and tradesmen, city workers and rural folk, the young and the old, the rich, poor and middling, the respectable, the criminal, the coarse and the genteel; all identifiable through details of clothing, appearance, physiognomy and behaviour.¹⁹ In setting his case-study of the crowd in a railway station, Frith was drawing on contemporary recognition that modern modes of transport had brought about fascinating and revealing mixtures of classes, characters and types;²⁰ a phenomenon of which the railway station crowd was the foremost instance. In Mary Elizabeth Braddon's novel *Henry Dunbar: the Story of an Outcast*, published two years after Frith's picture was painted, Joseph Wilmot, 'an idle, purposeless man', uses the station as a source of free entertainment: 'here in this crowded terminus there was life and bustle and variety enough in all conscience; and all to be seen for nothing: so he strolled backwards and forwards upon the platform, watching the busy porters, the eager passengers rushing to and fro'.²¹ For Edward

¹⁸ For more on the crowd in the context of nineteenth-century theorizations of social, cultural and biological degeneration, see Daniel Pick, *Faces of Degeneration: a European Disorder, c. 1848-1918* (Cambridge: Cambridge University Press, 1989), pp. 90-6, 105, 150.

¹⁹ See Mary Cowling, *The Artist as Anthropologist: the Representation of Type and Character in Victorian Art* (Cambridge: Cambridge University Press, 1989).

²⁰ The same attitude is revealed in the flourishing sub-genre of Victorian 'omnibus art', showing scenes inside crowded omnibuses: William Maw Egley's *Omnibus Life in London* (1859) is a notable example. See Julian Treuherz, *Victorian Painting* (London: Thames & Hudson, 1993), pp. 109-10.

²¹ Mary Elizabeth Braddon [published anonymously], *Henry Dunbar: the Story of an Outcast* (3 vols., London: John Maxwell & Co., 1864), vol. I, pp. 50-1.

Bradbury, writing in *The Magazine of Art* in 1880, the railway station provided endless education, amusement and inspiration:

The most aching tragedies and the most amusing comedies are to be beheld on busy railway platforms. At little way-side stations are to be read delicious pastorals, charming idylls, lyrics of the line . . . There is . . . a library of lyrics and sonnets, ballads and *vers de société*, to be read between departure and arrival termini . . . what, I ask, is a busy railway station but a picture, with its arrivals and departures, its sorry partings and glad meetings? Here Momus and Melpomene rub shoulders, and comedy and tragedy are played out against each other, while the bell rings, and the guard blows his whistle, and the urgent engine responds in an obedient shriek of eager steam.²²

Bradbury invites his readers to view the station as a theatrical stage, and as an animated work of art. In both cases, the viewer is free to impose narratives on the situations and events played out on the platform, and read characters and histories into the individuals who come and go in the station.

Frith's picture incorporates a number of such narratives: a wedding party, the arrest of a criminal, the departure of children for school, new army recruits with their sergeant, a lady attempting to smuggle her dog aboard the train. Other stories are implied in the picture, and can be read in details of clothing, expression, attitude: the genteel family fallen on hard times, the villainous degenerate destined for a life of crime. The viewers of Frith's picture are invited to become *flâneurs*, observers of urban life, the life of the endlessly circulating crowd. Frith's station is both an entertaining spectacle and a scientific sampling of the society it served. The railway as a machine is hardly present in this picture; the locomotive is distant and static, tracks, signals and the other apparatus of the railway system are marginalized or absent, the row of wooden carriages forms a stationary background to the activity on the platform, as a row of houses might provide the backdrop for the activities of a bustling street. But the railway as a presence in

²² Edward Bradbury, 'Pictures in trains', *Magazine of Art*, vol. 3 (1880), p. 109.

society — not a static presence but an active, transforming agent of movement, of mixing and dynamic social interaction of every kind — is powerfully conveyed.

The station was a focus of human activity, energizing the society around it with speed, motion, change and novelty. E. E. Foxwell saw the energies of the railway station as a sign that progress was at work in the world:

Everybody is in love with motion, all living souls are under its spell . . . standing on the platform of our great inland stations we watch a salutary stir in the ebb and flow of restless men; we see men under the treatment of Motion, and know there is a chance for them.²³

Among the many agreeable accompaniments of railway travel, claimed the *Railway Traveller's Handy Book* in 1862, were 'the bustle of the station, the incidents of the platform and waiting-room', which 'tend to arouse the faculties, and to impart to them a freshness which they lose in silent and persistent labour'.²⁴ This perception of the tumult and bustle of the station as an energizing, invigorating force is reflected in the comments of Walter Hartwright, setting off from Euston to begin his adventures in Wilkie Collins's *The Woman in White*, and relieved to be 'in movement again towards new interests and a new life. Even the bustle and confusion at the railway terminus, so wearisome and bewildering at other times, roused me and did me good'.²⁵ Yet for many it was the 'wearisome and bewildering' aspect of the station which struck them most forcefully. William Morris was repelled by the bustle and confusion of a great railway station, as he made clear in a letter to his daughter May in 1879: 'As for Willesden Station; don't try it: it is a mere trap for the unwary; everything is arranged so that you shall miss your trains there . . . if you try the place, you may get back to Naworth, or you may get to Aberdeen, or Truro, or Northampton, or Norwich or Boulogne but to Hammersmith you will never get, unless you walk there'.²⁶

²³ Foxwell, *English Express Trains*, pp. 15-16.

²⁴ *The Railway Traveller's Handy Book* (London: Lockwood & Co., 1862), p. 6.

²⁵ Wilkie Collins, *The Woman in White* (1860; Oxford: Oxford University Press, 1973), p. 23.

²⁶ *The Collected Letters of William Morris*, ed. Norman Kelvin (3 vols., Princeton, N.J.: Princeton University Press, 1984-7), vol. 1, p. 521.

The railway station provided a concentration of many of the aspects of modern life which were widely believed to be injurious to health: anxiety, pressure, worry, noise, bustle, crowds, constant movement. A physician writing in the *Association Medical Journal* (the forerunner of the *British Medical Journal*) in 1856 recounted how a friend who was a regular commuter on one of the lines into London 'fell down dead on the platform of a railway station; his life being the forfeit paid for the exertion which he had made to reach the starting train'; although he was careful to point out that the individual in question suffered from 'an affection of the heart'.²⁷ One of the physicians contributing to *The Lancet*'s 1862 inquiry into railway travel commented that years of observing travellers from his home near a large station convinced him that 'the frequent excitement, and constant hurry and anxiety which he witnessed on the part of passengers arriving' were 'a mischievous circumstance. In certain unhealthy conditions of the heart it has many times proved fatal'.²⁸ Medical commentators agreed that people with already weakened constitutions were especially vulnerable to the effects of hurry and anxiety, but that all travellers were at risk in the mentally and bodily exhausting environment of the railway²⁹ and that the station was a particularly dangerous location. It was at the station that the railway system connected with the rest of the social and economic infrastructure of society; it was from the station that the invisible but inexorable demands of the railway extended across society; and it was upon entering the station that the traveller felt the imposition of railway time and railway regulation. The railway station stands as a symbol of the often traumatic Victorian encounter between technological modernity and the human constitution.

Crime and the railways

One of the tableaux which W. P. Frith incorporated into *The Railway Station* depicts the arrest of a criminal, apprehended by two police officers in the act of

²⁷ 'Railway travelling and its effects on health', *Association Medical Journal*, vol. 4, no. clx (n.s.), 26 January 1856, p. 72. This was a reprint of an article originally published in the *Quarterly Journal of Public Health* for December 1855.

²⁸ *The Lancet*, 11 January 1862, p. 51.

²⁹ See, for example, the monograph by Alfred Haviland, *Hurried to Death: Especially Addressed to Railway Travellers* (London: Renshaw and Mitchell, 1868). I am grateful to Dr Nicholas Daly of Trinity College, Dublin, for bringing this reference to my attention.

stepping onto the train. This reassuring statement of the powers of law and order would have been appreciated by a public who had become used to associating railways and crime. When in 1858 two young children were murdered in Hammersmith, west London, the coroner observed that 'If there had been a railway in the parish, I should not have been so much surprised.'³⁰ In 1846 there appeared a collection of satirical 'railway eclogues' which included observations on the phenomenon of railway crime:

A plague on railroads! — they're a vile device,
For propagation of all kinds of vice.
By them the plunderer drives a thriving trade;
He robs a luggage-van — his fortune's made.
Presto, he's vanished by another train;
You'll ne'er see him — you may his like, again.³¹

Trains provided new opportunities for the rapid and unimpeded movement on the part of criminals, as well as a new arena for their activities in the confines of the carriage, among the contents of luggage vans and goods wagons, and at the station which, with its transient population, its mixing of all sorts and conditions of people, its constant bustle and confusion, was a magnet for thieves, pickpockets, prostitutes, misfits, idlers and ne'er-do-wells. The Victorian railway network was vast, and stations, sidings and other facilities were often impossible to secure, despite the efforts of the railways' own police services. Authors were quick to exploit the potential of railway crime, and railways made frequent appearances in Victorian crime stories; train chases in particular, in which the escaping criminal was pursued across the network, became a common feature of sensational literature in the latter half of the nineteenth century.³²

The dangers of one particular aspect of railway travel, the compartment, were thrown into a lurid light by a number of highly-publicized assaults and murders

³⁰ P. D. Whitting (ed.), *A History of Hammersmith* (London: Hammersmith Local History Group, 1965); quoted in Simmons, *Victorian Railway*, p. 370.

³¹ Anon. [Basil Montagu], *Railroad Eclogues* (London: William Pickering, 1846), p. 24.

³² For example: Mary Elizabeth Braddon, *Lady Audley's Secret* (1862), *Henry Dunbar: the Story of an Outcast* (1864); Robert Louis Stevenson, *The Wrong Box* (1892), Arthur Conan Doyle, *The Final Problem* (1894); Richard Marsh, *The Beetle* (1897).

which took place on trains in the 1860s. The murder of Chief Justice Poinot on a train between Mulhouse and Paris in December 1860 caused concern throughout Europe,³³ and a number of similar occurrences in Germany were also widely reported.³⁴ The resulting climate of anxiety provoked an English journal to comment in 1863 that ‘murder, or violence worse than murder, may go on to the accompaniment of a train flying along at sixty miles an hour. When it stops in due course, and not until then, the ticket collector coming up may find a second-class carriage converted into a “shambles”. We are not romancing’.³⁵ This new anxiety provoked a certain amount of black humour. The cartoon ‘Scene in a Tunnel. How to Clear a Carriage for a Cigar’ which appeared in *Punch* in January 1864 is one example: a passenger encourages his fellow traveller to move to another compartment by casually remarking on the merits of his large folding knife (see figure 18). But in July 1864 the public’s fears received ghastly confirmation with the murder of Thomas Briggs, brutally assaulted in broad daylight on a stopping train in the London suburbs.³⁶ The facts of the case were shocking: aboard a busy train, in the brief interval between two closely-spaced stations, Briggs was stabbed, robbed, and thrown out onto the tracks to die. The crime was not discovered until a passenger got into the first-class compartment formerly occupied by the victim and noticed blood on the seats and floor. ‘It is the glory of an age of scientific progress to have invented a perfectly new and unique description of social torture’, observed the *Saturday Review* in the wake of this shocking murder:

The English railway-carriage — more especially, the English first-class railway-carriage — may be defined as an apparatus of unexampled efficiency for isolating a human being from the companionship and protection of his fellow-creatures, and exposing him a helpless prey to murderous outrage.³⁷

³³ See Wolfgang Schivelbusch, *The Railway Journey: the Industrialization of Time and Space in the Nineteenth Century* (1977; pbk. edn., Leamington Spa: Berg, 1986), pp. 80-8. The Poinot murder also provided part of the inspiration for Emile Zola’s *La Bête humaine* (1890).

³⁴ On the German cases see David Blackburn & Geoff Eley, *The Peculiarities of German History* (Oxford: Oxford University Press, 1984), pp. 214-5.

³⁵ *The Globe*, 1863; quoted in Schivelbusch, *Railway Journey*, p. 79.

³⁶ See Jonathan Goodman (ed.), *Railway Murders* (London: Allison & Busby, 1984), pp. 11-44.

³⁷ *Saturday Review*, 16 July 1864, p. 72.

The Briggs case led to what the *Saturday Review* called a 'frenzy of the public mind about the dangers of railway travelling'.³⁸ In fact, murders were almost unknown on British railways: the next case of a railway passenger being murdered on a moving train did not occur until 1881, and there were only five such murders between 1864 and 1914;³⁹ but the anxiety created by the idea of such crimes was out of all proportion to the reality. More than thirty years after the Briggs murder, the furore provoked by the publication in 1897 of John Oxenham's short crime story *A Mystery of the Underground* illustrates the power such anxiety continued to wield in the public mind. The story was published as a serial in the popular magazine *To-Day*, beginning on 27 February 1897; it described, through apparently authentic extracts from London newspapers, how the London underground railway system was being terrorised by a serial killer who struck at the same time every Tuesday, week after week, shooting innocent passengers dead in their seats. The magazine's circulation surged, and alarm spread among underground travellers; railway officials claimed that passenger numbers actually dropped on Tuesday evenings, and representatives of the companies which ran the underground system wrote a formal letter of protest to the magazine, leading the magazine's editor to consider dropping the story.⁴⁰

One of the most important reasons for the scale and longevity of the impact which the Briggs case had was the peculiarly middle-class sense of security which was outraged by the crime. Writing one year after the Briggs murder, Matthew Arnold expressed this class dimension when he remarked on the profound effect which the crime had had on him and his fellow travellers on the Woodford branch of the Great Eastern Railway:

³⁸ *Saturday Review*, 23 July 1864, p. 106.

³⁹ The cases concerned were the Briggs murder itself, and the murders of Frederick Isaac Gold in Balcombe Tunnel, Sussex, in 1881; of Mary Sophia Murray, near the same location, in 1905; of John Innes Nisbet, between Newcastle and Alnmouth, in 1910; and of Willie Starchfield, a child of five, near Broad Street Station, London, in 1914. All five cases received sensational press coverage. See Goodman, *Railway Murders*, for accounts of all these cases.

⁴⁰ An account of these events can be found in the anthology *Murder on the Railways*, edited by Peter Haining (London: Orion Books, 1996), pp. 337-9, which includes the story itself and three similar stories: Baroness Orczy, *The Mysterious Death on the Underground Railway* (1901); Victor L. Whitechurch, *The Murder on the Okehampton Line* (c. 1903); and Thomas W. Hanshew, *The Riddle of the 5.28* (1910).

Every one knows that the murderer, Müller, perpetrated his detestable act on the North London Railway, close by. The English middle class, of which I am myself a feeble unit, travel on the Woodford branch in large numbers. Well, the demoralisation of our class . . . caused by the Bow tragedy, was something bewildering.⁴¹

There is more to this 'demoralization' than the sense of vulnerability to crime which is one of the constant themes of middle-class Victorian life. The railway had a very particular significance to the middle classes, as one of the commercial and technological achievements which made possible the comfort and security of their lives. It was woven into the texture of middle class civilization, carrying families to holidays, men (and, increasingly, women) to and from work, bringing newspapers, luxuries and essentials, innumerable home comforts. The railway-travelling middle classes, represented so confidently in Frith's *Railway Station* by the figures of the painter and his family who occupy the centre of the canvas,⁴² felt profoundly the assault on Mr Briggs as an assault on their whole class. The nexus of the anxiety provoked by the murder was located in its transgression of the structures of security, privacy and protection which had developed around the middle-class railway passenger since the 1830s, and which were physically embodied in the phenomenon of the compartment.⁴³

As the Briggs case revealed, the compartment offered a highly ambiguous form of security. It was beset by the paradox that for the passenger it was as much prison as it was protection. The helpless traveller could find him- or herself confined with someone 'from an infectious sick bed, or . . . unconsciously himself the seat of an incubating fever',⁴⁴ or with a violent criminal, a lunatic, a garrotter, or a rapist. The dream repeatedly experienced by one of Freud's patients, in which 'a lunatic was being conveyed in a compartment on an Italian line, but through carelessness a traveller was allowed in with him', and which ended with the lunatic

⁴¹ Matthew Arnold, *Essays in Criticism* (1865); from *The Complete Prose Works of Matthew Arnold* (11 vols., Ann Arbor, Mich.: University of Michigan Press, 1960-77), vol. 3, pp. 288-9. Bow was the station at which evidence of the assault was discovered.

⁴² See Cowling, *Artist as Anthropologist*, pp. 360-1, for a discussion of the significance of the Friths' presence in the painting.

⁴³ For more on the compartment, see below, chapter 2, 'Passengers as Prisoners'.

⁴⁴ *The Lancet*, 25 October 1884, p. 745.

killing the other traveller, echoed a widespread fear.⁴⁵ The anxiety associated with enclosure in the compartment was intensified when combined with the fears provoked by the tunnel. Tunnels were, under any circumstances, frightening for the nervous railway traveller; the danger that they might give the assailant with whom one was closeted in one's compartment the opportunity to strike gave them particular horror. *The Railway Traveller's Handy Book* sought to offer practical advice:

Male passengers have sometimes been assaulted and robbed, and females insulted, in passing through tunnels, and this has most frequently been the case when there have been only two occupants in the carriage. In going through a tunnel, therefore, it is always as well to have the hands and arms ready disposed for defence, so that in the event of an attack, the assailant may be instantly beaten back or restrained.⁴⁶

Considerable effort was expended on devising mechanical means whereby the occupants of a compartment could communicate with the outside world. *The Handy Book's* suggestion was 'to tie a coloured handkerchief on to the end of a stick, and hold it out as far beyond the carriage as possible'⁴⁷ — although what use this would be in a tunnel, and how one could do it while holding the hands and arms ready disposed for defence, was not explained. There was very little support, however, for the idea of moving away from the compartment altogether towards the American model of open carriages; the shared space of the open car might suit the 'democratic' American temperament, but was felt to offend against the important European right to privacy and quiet. The British middle classes, like their French and German counterparts, remained reluctant to abandon their structures of enclosure and exclusion.

⁴⁵ Sigmund Freud, *The Standard Edition of the Complete Psychological Works*, vol. 15: *Introductory Lectures on Psycho-Analysis (Parts I and II)* (London: Hogarth Press and Institute of Psycho-analysis, 1955), p. 197.

⁴⁶ *Handy Book*, pp. 93-4.

⁴⁷ *Ibid.*, p. 101.

Gendered spaces

Before the Victorian age very few women were able to travel when and where they wished, unconstrained by social disapproval and restraints imposed by others; and for upper-class women to travel alone in a public conveyance was almost unknown. The railway changed this. As early as 1844, the *Quarterly Review* observed approvingly that railways had brought about 'the emancipation of the fair sex, and particularly of the middle and higher classes, from the prohibition from travelling in public carriages, which with the majority was a prohibition from travelling at all'.⁴⁸ The emergence of opportunities for relatively free travel for women led to a reshaping of social relations and public spaces, and the development of new areas of cultural and sexual negotiation and friction. In the case of the railway, the character of the public spaces occupied by travellers, and in particular the compartment, became the focus for new anxieties.

The British railway compartment, as we have seen, was a very particular kind of space; whereas the openness of the American railroad car provided the security of visibility,⁴⁹ the compartment enclosed its occupants in a self-contained environment, shielded from public scrutiny. Following some cases of alleged sexual assault in railway compartments in the 1840s, some railway companies provided 'ladies only' compartments on certain trains,⁵⁰ but, as Jack Simmons notes, 'The dangers from which they tried to protect their women passengers were subtly advertised by each "Ladies Only" label on the window of a compartment'.⁵¹ Cases of sexual assault in railway carriages continued in a steady flow throughout the nineteenth century; they were never common, but as with other aspects of railway anxiety it is the public perception of the danger that is more significant than the reality. Such cases as did occur were widely reported, in full and often salacious detail, encouraging the development of a climate of alarm over the safety of the railway compartment; in the words of the *Saturday Review*, 'Everybody feels that

⁴⁸ *Quarterly Review*, vol. 74, p. 250.

⁴⁹ For a discussion of American women travellers, see Patricia Cline Cohen, 'Safety and danger: women on American public transport, 1750-1850', in Susan Reverby & Dorothy Helly (eds.), *Gendered Domains: Public and Private Spheres in Historical Perspective* (Ithaca, N.Y.: Cornell University Press, 1992), and the same author's 'Women at large: travel in antebellum America', *History Today*, vol. 44, no. 12 (December 1994), pp. 44-50. There is a lack of similar work on the experience of British women travellers.

⁵⁰ Simmons, *Victorian Railway*, p. 334.

⁵¹ *Ibid.*

no man's life and no woman's honour is safe inside a railway carriage'.⁵² As well as providing a secluded arena for male sexual fantasy, and sometimes for actual sexual assault, the compartment confronted men and women with each other, in a luxurious, rhythmically moving environment. E. M. Forster encapsulated the sensuality and the erotic promise of the railway compartment in *Howard's End* (1910): "Male and female created He them"; the journey to Shrewsbury confirmed this questionable statement, and the long glass saloon, that moved so easily and felt so comfortable, became a forcing-house for the idea of sex'.⁵³

Augustus Egg's painting *Travelling Companions*, of 1862 (see figure 19) is similarly expressive of the sensual atmosphere of the cushioned and curtained first-class compartment, redolent of erotic possibilities. The pose of the sleeping woman, her head thrown back and her mouth slightly open, is strongly reminiscent of the languid female slumberers to be found in the art of Edward Burne-Jones, Albert Moore and Lord Leighton. Her dress, undone at the breast, her loose hair and ungloved hands, all serve as signifiers of sexual availability. It has been suggested that the painting does not show two women at all, but two aspects — idle and industrious, good and bad — of the same woman;⁵⁴ it may also be read as representing the same woman at two different times, telescoping time to suggest to the male onlooker that during a railway journey the most respectable-looking woman is susceptible to erotic possibilities. The compartment, an enclosed and as it were timeless space, moving through the world but detached from it, encouraged confidences and advances, both wanted and unwanted. The prescribed time of the journey and the confined space of the compartment could both provide arenas for the exercise of male sexual fantasies.

It was also suggested that railway travel created conditions in which female passengers of an 'imaginative' or 'hysterical' tendency might be led to invent, consciously or unconsciously, stories of assault, leading to the unjust impugning, even blackmail, of innocent men. In 1864 *The Saturday Review* commented on a recent case of 'this special evil which railway travelling has aggravated':

⁵² *Saturday Review*, 23 July 1864, p. 106.

⁵³ E. M. Forster, *Howard's End* (1910; repr. Harmondsworth: Penguin, 1983), p. 209.

⁵⁴ Andrew Graham-Dixon, *A History of British Art* (London: BBC Books, 1996), pp. 167-8. See also Michael Cohen, *Sisters: Relation and Rescue in Nineteenth-Century British Novels and Paintings* (Toronto & London: Associated University Presses, 1995), p. 23.

There is a danger to which the unprotected male passenger is liable which does not affect his life, but which compromises interests that are even dearer than life. We mean the liability which every man incurs of being charged with indecent assault . . . Poor Mr. Briggs found in a first-class carriage, and in a train stopping every five minutes, no security for his life. A respectable young man, Rutherford, found the crowded benches of a third-class van on the North Kent line no security against a charge preferred by a 'modest and respectable young woman,' as we are assured, who was stimulated into semi-insanity by the terrors of a tunnel and the newspaper reports of assaults which have been made, under similar circumstances, on female chastity.⁵⁵

The experience of Sir William Hardman on a train in south London two years later would seem to indicate that it was not only women who were susceptible to over-stimulation in the prevailing climate of alarm. Hardman was greatly disturbed by the behaviour of a woman who got into his compartment and changed her seat a number of times: 'three seats in as many minutes! I began to speculate as to where she would sit next — perhaps on my knee, and then would charge me with sexual assault'. She got out at Clapham Junction, but Hardman's ordeal was not over, for she re-boarded the train, this time getting into the next compartment:

Perhaps she was relating to her new companion how she had just been grossly insulted by a lewd gent in the place she had just left . . . These unfounded charges of indecent assault have been very common of late, and I have determined to object in future to the entry of any unprotected female into a carriage where I may be alone.⁵⁶

⁵⁵ *Saturday Review*, 23 July 1864, p. 106. It is noteworthy that Mr Rutherford's respectability is taken for granted by the *Review*; the unnamed young woman's respectability is placed between questioning quotation marks.

⁵⁶ Sir William Hardman, *The Hardman Papers*, ed. S. M. Ellis (London: Constable, 1930); quoted in Jack Simmons (ed.), *Railways: An Anthology* (London: Collins, 1991), pp. 101-2.

In 1866 *Punch* supported the provision of 'distinct carriages for unattended females', but their concern was not primarily with the safety of women travellers but rather with 'the dangers of extortion to which male passengers are exposed'.⁵⁷

The risks run by women railway travellers in the nineteenth century were real enough; yet the issue which concerned much of the periodical press and many individual male travellers was the danger presented by women making false accusations of assault against innocent, respectable men. Perhaps this was in part a reaction to the successful claiming by women of the new freedom to travel which the railway brought, and their consequent presence in the public spaces of the railway. It can thus be seen in the context of the railway's role as an agent of social mixing, and as a disrupter of established codes of conduct. As the American scholar Patricia Cline Cohen has observed, the 'possibility of movement, both rapid and far from home, untied people from obligations, restrictions and expectations'.⁵⁸ The etiquette of travel remained uncertain and fluid in Victorian Britain, the established structures of social differentiation and division inadequate to the new circumstances of mass industrialized transportation.

The journey and the passenger

'To make a journey': the phrase suggests that the traveller possesses a degree of creative autonomy, and can shape the journey according to his or her particular requirements. One of the chief complaints against the train from its earliest days was that the railway traveller was denied the freedom to 'make' a journey, and was transformed from an autonomous and creative agent into a passive commodity being transported within a rigid system of routes and stations. Railway journeys were laid out in advance, times of departure and arrival pre-ordained, routes pre-planned, with travellers collectively serving as the raw material for what was in effect an industrial system, the end-product of which was mass transportation.⁵⁹

⁵⁷ *Punch*, vol. 51 (1866), p. 70.

⁵⁸ Cohen, 'Women at large', p. 50.

⁵⁹ For more on this point, see Schivelbusch, *Railway Journey*, pp. 38-9.

In 1883 James Nasmyth, chairman of the Metropolitan Railway, presided at a meeting of the railway's shareholders at which he performed an interesting demonstration:

At a recent meeting of the Metropolitan Railway Company I exhibited one million of letters, in order to show the number of passengers (thirty-seven millions) that had been conveyed during the previous twelve months. This number was so vast that my method only helped the meeting to understand what had been done in the way of conveyance. Mr. Macdonald, of *The Times*, supplied me with one million type impressions, contained in sixty average columns of *The Times* newspaper.⁶⁰

Nasmyth's attempt to illustrate in concrete terms the abstract statistical concept of the 37 million journeys made on the Metropolitan Railway during the year 1882-3 clearly conveys both the unprecedented scale of railway activities and the difficulties sometimes experienced by contemporaries in grasping such a large and complex reality; but it also gives expression to the transformation of railway passengers into numbers to be counted, flows to be controlled, commodities to be transported. The individuality of the railway traveller became subsumed into the flow of 'passenger traffic'; people became atoms, pulsing, coalescing and dispersing across the railway network. Nasmyth's demonstration embodied in graphic form the new conceptualization of the crowd in the age of mass transit, in which millions of individuals were transformed into stereotyped representations. It is within this context that Ruskin's complaint of 1856, that he did not consider going by railway as travelling at all but merely as "being sent" to a place, and very little different from becoming a parcel',⁶¹ should be understood.

⁶⁰ James Nasmyth, *An Autobiography*, ed. Samuel Smiles (1883); quoted in Humphrey Jennings, *Pandaemonium: The Coming of the Machine as seen by Contemporary Observers*, ed. Mary-Lou Jennings & Charles Madge (London: André Deutsch, 1975), p. 348.

⁶¹ John Ruskin, *Modern Painters* (1856), part IV, chap. XVII; in *Works*, vol. 5, p. 370.

Passengers as parcels: the industrialization of travel

One of the most important aspects of the industrialization of travel brought about by the railway was the high degree of regulation and control experienced by the passenger. At every stage of the journey, the traveller was confronted by the regulated, systematic, mechanical nature of the railway, in the apparatus of tickets, luggage labels, timetables, clocks, bells, uniformed officials, in the numbering of carriages, compartments, seats, tickets and platforms. To a degree unprecedented in civilian life, railway passengers were subjected to bureaucratic procedures, counted, regulated, ticketed and controlled. This phenomenon was dictated by the nature of the railway, which did not permit free and unregulated access by people driving their own vehicles and following their own itineraries as on any other highway, but had to be a closed system to which all access was controlled, and within which all movement was regulated. As a writer observed in 1846, 'The wheels, rails, and carriages are only parts of one great machine, on the proper adjustment of which, one to the other, entirely depends the perfect action of the whole'.⁶² The passengers were as much a component of the great railway machine as the tracks and trains, and just as all the movements of the mechanical components had to be controlled if the machine was to operate effectively, so the behaviour of the human traveller had to be regulated with mechanical efficiency.

The Railway Traveller's Handy Book conveys both the extent of that regulation and the powerful effect it had on the minds of contemporary railway passengers, in its advice to the traveller who wishes to avoid unnecessary stress and confusion:

About five minutes before a train starts a bell is rung as a signal to passengers to prepare for starting. Persons unaccustomed to travel by railway connect the ringing of the bell with the instant departure of the train, and it is most amusing to watch the novices running helter-skelter along the platform, tumbling over everything and everybody in their eagerness to catch the train which they believe is about to go without them. At the same time the seasoned traveller, who understands the intention of the

⁶² C. H. Greenhow, *An Exposition of the Dangers and Deficiencies of the Present Mode of Railway Construction, with Suggestions for its Improvement* (London: John Weale, 1846), p. 4.

bell, stands by the carriage door coolly surveying the panic-stricken multitude . . .⁶³

A contributor to the *Association Medical Journal* in 1854 similarly suggests the extent to which passengers felt pressurised by the railway's regulated, timetabled operations. The chief medical evils of railway travel, he writes, result from 'the excitement, anxiety, and nervous shock consequent on the frequent efforts to catch the last express; to be in time for the fearfully punctual train . . . Cases of sudden death, produced by the hurry and eagerness often required to reach the train on time, are on record'.⁶⁴

The implication is that the railway pressurizes, exhausts, dehumanises, with what the *Handy Book* calls its 'straight-laced punctuality'⁶⁵ and its rigid concern with rules and regulations. 'The station, with its timetables, tickets, uniformed staff, and ubiquitous clocks, is an inherent supporter and encourager of discipline and order',⁶⁶ comment Jeffrey Richards and John MacKenzie in their *Social History of the Railway Station*, while the railway historian Jack Simmons observes that the railways 'enforced a new observance of punctuality. Through them the clock came to guide — even to rule — lives as it never had before'.⁶⁷ No more potent symbol could be found for the enforcing, regulating aspect of the railway than the prominence of the clock in station architecture,⁶⁸ and the establishment of 'railway time' as a unified national standard in Britain, the United States and other countries. The railway brought the tyranny of the clock and the timetable into people's lives, governing their every action: 'I went to bed at night conscious that I must rise at a given and somewhat early hour, or miss my train. I am sure that this does not render sleep more sound and refreshing', complained the eminent doctor Forbes Winslow in *The Lancet*; 'In the same way breakfast is eaten with this

⁶³ *Handy Book*, pp. 70-1.

⁶⁴ 'Railway travelling and its effects on health', *Association Medical Journal*, vol. 4 (New Series), 1 December 1854, p. 1079.

⁶⁵ *Handy Book*, p. 29.

⁶⁶ Jeffrey Richards & John MacKenzie, *The Railway Station: A Social History* (Oxford: Oxford University Press, 1986), p. 14.

⁶⁷ Simmons, *Victorian Railway*, p. 347.

⁶⁸ The first such clock in Britain was at Bricklayer's Arms in south-east London, opened in 1844. For examples, see Carroll L. V. Meeks, *The Railroad Station: An Architectural History* (New Haven, Conn., 1956), Christiane Scelles, *Gares: Ateliers du voyage 1837-1937* (Paris: R.E.M.P.ART., 1993).

necessity of being on time still in one's mind.'⁶⁹ This sense of being constantly under the pressure of the timetable contributed to the anxiety associated with railway travel. The experience of the central character of Mary Elizabeth Braddon's *Henry Dunbar* (1864), tormented by the fear that he will miss his connection, must have been all too familiar to many of her readers: 'The delay attendant upon every fresh stoppage worried him, as if each pause had been the weary interval of an hour. He sat with his watch in his hand; for every now and then he was seized with a sudden terror that the train had fallen out of its regular pace, and was crawling slowly along the rails'.⁷⁰ Just as the factory clock converted the industrial worker from a human being into a regulated piece of mechanism, so the station clock represented the process whereby the individual people who used the railway were subsumed into a flow which could be turned on and off according to the timetable. The tide of commuters hurrying through the station in John Davidson's poem 'London Bridge' (1909) 'Sweeps unobservant save of time — for thrift / Or dread disposes clockwards every glance'.⁷¹

The timetables which had to be consulted in advance of most journeys can be seen as sets of programmed instructions which travellers had to follow in order to pass through the railway system. The timetable, in its modern sense, arrived with the railway — the word itself is a railway coinage, first used by the London and Birmingham Railway in 1838⁷² — the direct expression of the railway's demand for precision and regulation. The complexity of railway timetables produced much incomprehension and confusion, as this comment on the most famous and successful of the national timetables, *Bradshaw's Railway Guide*, indicates:

When you get into the maze of this huge monthly magazine that scorns fiction and is congested with facts, armed with intricate tables of place-names, dots, figures, warning hands, dark lines, notes, references, indications of trains 'up' and trains 'down', trains that run on 'week days', trains that run on 'Wednesdays only', and trains that run on 'Saturdays only' and when after striving in vain for half an hour to ascertain really what time you

⁶⁹ 'The influence of railway travelling on public health', *The Lancet*, 11 January 1862, pp. 50-1.

⁷⁰ Braddon, *Henry Dunbar*, vol. 2, p. 233.

⁷¹ *Poems of John Davidson*, vol. 2, p. 435.

⁷² Simmons, *Victorian Railway*, p. 183. See also *OED*, 'timetable'.

will arrive at your destination, you alight; with your head in a fog and your eyes aching, on the encouraging words in italic 'see above' or 'vice versa' you feel inclined to fling 'Bradshaw' out of the window.⁷³

Consulting the railway timetable to plan the journey, no less than making the railway journey in reality, involved a sometimes traumatic process of adjustment to the demands of industrialized transportation; this passage confirms that the former, as well as the latter, could leave the Victorian traveller with aching head and disturbed vision.

The railway station

As has already been suggested, the railway station was an important manifestation of the railway's imposition of discipline and order (see figure 20), its subjection of the traveller to the demands of its highly regulated operations. Stations were important presences in communities large and small, frequently performing a wide range of functions in addition to their specifically railway role,⁷⁴ but they were essentially in the mould of contemporary manufacturing and industrial enterprises such as mines, mills and factories. Stations were 'machines for handling passengers and receiving money',⁷⁵ designed and operated to perform a particular role within the railway system. The station contained a complex of rooms, offices and other areas,⁷⁶ each serving a specific function, and was planned around a network of routes and paths to accommodate the flows of people, luggage, goods, money and information which passed through it.⁷⁷ Its form was dictated by the demands of the rail-borne traffic which (along with the telegraph and later the telephone systems of which it was also a part) connected it to other stations and the rest of the

⁷³ John Pendleton, *Our Railways: their Origin, Development, Incident and Romance* (2 vols., London: Cassell, 1896), vol. 2, pp. 153-4; quoted in Richards & MacKenzie, *Railway Station*, p. 97.

⁷⁴ See Scelles, *Gares*, pp. 15-20, for a discussion of the multifaceted nature of the railway station, and of the concepts of flux and circulation which underlay station planning, which draws on French examples but is relevant to the British experience.

⁷⁵ Simmons, *Victorian Railway*, p. 259.

⁷⁶ For an account of the offices associated with railway stations, see Richards & MacKenzie, *Railway Station*, pp. 285-313.

⁷⁷ See Meeks, *Railroad Station*, p. 30, for diagrammatic representations of passenger flows through various types of station. See also Scelles, *Gares*, pp. 15-16.

system. In short, the railway station was both a machine in itself and also took its place as one component within the larger mechanism of the railway network.

The Victorian railway station was by any standards a significant public building, and was seen by contemporaries as uniquely representative of the modern age; as Dionysius Lardner observed of the 'vast buildings and their dependencies' which constituted the great railway stations, 'Nothing in the history of the past affords any parallel to such a spectacle'.⁷⁸ The *Architect* observed that 'As our whole railway system is essentially a characteristic of nineteenth century life, and one which has had no precedent or foreshadow in any previous age of the world, so the constructive and artistic work which it has called into existence must be regarded as forming an area unique in the history of science and art'.⁷⁹ The influential *Building News* argued that the railway station was the most significant embodiment of contemporary architectural endeavour, declaring in 1875: 'Railway termini and hotels are to the nineteenth what monasteries and cathedrals were to the thirteenth century. They are truly the only representative kind of building we possess'.⁸⁰

As we have seen, the keynote of nineteenth-century attitudes to the railway was ambivalence. The architecture of the railway station was a testimony to this ambivalence. To discuss railway station architecture solely in terms of its supposed symbolization of the 'exuberance, grandeur, self-confidence, and self-esteem' of some ill-defined and highly generalized 'spirit of the nineteenth century'⁸¹ is vague and misleading. Exuberance and grandeur certainly characterized many Victorian stations, and the companies that built them were not generally lacking in self-confidence and self-esteem, but the social and cultural context within which these monuments of the railway age arose was more complex than such superficial analyses will allow. The railway station is as much a testament to uncertainty, anxiety and doubt as it is to confidence and grandeur.

At the most basic level, nineteenth-century approaches to the railway station were characterized by uncertainty and doubt. It was felt that the designers of the stations which were springing up in their hundreds across the country, and

⁷⁸ Dionysius Lardner, *Railway Economy: A Treatise on the New Art of Transport, its Management, Prospects, and Relations* (London: Taylor, Walton, & Maberly, 1850), pp. 119-20.

⁷⁹ *Architect*, vol. 10 (1873), p. 54.

⁸⁰ *Building News*, vol. 29 (1875), p. 133.

⁸¹ Richards & MacKenzie, *Railway Station*, p. 20.

especially those of the great city terminals, had generally failed to rise to the challenge which this entirely new form of building required; most of them, judged the *Building News*, were 'the works of engineers without artistic merit except of the lowest order.'⁸² There was doubt as to how the design of these temples of modernity should be approached: were they properly the province of the engineer alone, or of the architect? What styles of architecture were appropriate to them? The view of the *Building News* was that the most successful station architecture expressed the building's purpose rather than seeking to disguise it. Too often the efforts of architects and engineers revealed only 'our thorough inability to meet the requirements of a new class of structure', clothing station buildings with 'glaring anachronisms' and 'tasteless travesty' such as 'Greek temples of the prostyle order, or Italian palazzi-looking buildings'. The one London station singled out for praise was the Great Northern's terminus at King's Cross, designed by Lewis Cubitt and built in 1851-2: 'a glance at the boldly-arched facade is enough to convince anyone of its purpose — it is expressive, if not beautiful.'⁸³

The *Building News* was not arguing for a purely functional approach to station design; in 1868 it had praised Broad Street station, the terminus of the North London Railway, which had been built in an ornate French renaissance style, for the 'extreme lightness' of its interior and the 'considerable taste' of its exterior, which it described as 'superior to that of any other London station.'⁸⁴ Rather, it was urging the adoption of tasteful and appropriate architecture and ornament which did not detract from the efficient working of the station. Others went much further, arguing that the railway station was an essentially mechanical phenomenon, and that its form should reflect this fact; its design was thus a matter for engineers rather than architects. For John Ruskin, the essential character of the railway rendered the station intrinsically unsuitable for any form of ornament or decoration:

Another of the strange and evil tendencies of the present day is the decoration of the railroad station. Now, if there be any place in the world in which people are deprived of that portion of

⁸² *Building News*, vol. 29 (1875), p. 133.

⁸³ *Ibid.*

⁸⁴ *Ibid.*, vol. 15 (1868), p. 714.

temper and discretion which is necessary to the contemplation of beauty, it is there. It is the very temple of discomfort, and the only charity that the builder can extend to us is to show us, plainly as may be, how soonest to escape from it . . . There never was more flagrant nor impertinent folly than the smallest portion of ornament in anything concerned with railroads or near them.⁸⁵

Ruskin's position is that train travel is a spiritually degenerative process. The condition of constant movement and hurry which characterizes the railway journey deprives the traveller of any aesthetic sensibility: 'For the time he has parted with the nobler characteristics of his humanity for the sake of planetary power of locomotion. Do not ask him to admire anything. You might as well ask the wind. Carry him safely, dismiss him soon: he will thank you for nothing else'.⁸⁶ To use ornament on railway structures is both to degrade ornament itself — 'All attempts to please him in any other way are mere mockery, and insults to the thing by which you endeavour to do so'⁸⁷ — and is inappropriate, for such structures are not architectural but functional. Ruskin specifically excluded the functional and the utilitarian from architecture, which he defined as 'that art which, taking up and admitting, as conditions of its working, the necessities and common uses of the building, impresses on the form certain characters venerable or beautiful, but otherwise unnecessary'.⁸⁸ Ruskin's conviction was that architecture is a spiritual and moral as well as a physical construct,⁸⁹ and railways are associated at best with an indifference to, and at worst with the destruction of, spiritual and moral values. Ornament is unnecessary; railways are the very embodiment of the necessary, and they and everything concerned with them should be treated as the functional, mechanical, amoral things they are. For Ruskin, architectural functionalism is appropriate to the railway station. It is a machine, and should be allowed to look like one: 'Railroad architecture has, or

⁸⁵ John Ruskin, *The Lamp of Beauty*, in *Works*, vol. 8, pp. 159-60.

⁸⁶ *Ibid.*, p. 159.

⁸⁷ *Ibid.*

⁸⁸ *Ibid.*, p. 28.

⁸⁹ There is an excellent discussion of this point in Mark Swenarton, *Artisans and Architects: the Ruskinian Tradition in Architectural Thought* (Basingstoke: Macmillan, 1989), pp. 15-16.

would have, a dignity of its own if it were only left to its work. You would not put rings on the fingers of a smith at his anvil'.⁹⁰

Most of Ruskin's contemporaries were not driven by his concern with morality and honesty in architecture, and their attitudes to the railway station as mechanism display more ambiguity. Their ambivalence found expression in the often dramatic discontinuity to be seen in many nineteenth-century stations between the vast iron and glass trainsheds — marvels of engineering, and ultra-modern in their day — and the hotels and station buildings interposed between them and the road, presenting a more acceptable public face of brick and stone in italianate, gothic or classical style. Many stations, commented the *Building News* in 1875, 'lack unity of parts and thoroughness. The Charing-cross hotel becomes a mere palatial mask to the vast shed behind it, and Cannon-street and other stations are similar combinations of structural design. There is a glaring discord directly we pass through the hotel and booking-offices'. In the case of the then newly completed St Pancras, 'We have two essentially separable architectural portions — the hotel and the station — the one a mask to the other'.⁹¹ Buildings such as the Midland Railway's gothic hotel at St Pancras and the London & North Western's doric prostyle (or 'doric arch') at Euston can be seen as architectural expressions of the subconscious desire to disguise the mechanical and industrial, just as the padding and ornament within the railway carriage protected its inmates from the realities of industrial transportation. The same process can be seen in smaller rural and village stations, in which the adoption of local vernacular architectural styles (what the twentieth-century architectural historian Carroll Meeks has called 'a kind of protective coloration'⁹²) served to neutralize the potential threat represented by the presence of the railway by absorbing it visually into the established local order⁹³ — an architectural strategy which can be seen as equivalent to the literary and pictorial 'railway pastoral'.⁹⁴

⁹⁰ Ruskin, *Works*, vol. 8, p. 160. For more on Ruskin's views on ornament, see Michael W. Brooks, *John Ruskin and Victorian Architecture* (London: Thames & Hudson, 1989), pp. 89ff.

⁹¹ *Building News*, vol. 29 (1875), p. 133.

⁹² Meeks, *Railroad Station*, p. 42.

⁹³ See Jack Simmons's account of vernacular station styles in *The Railways of Britain* (1961; 4th edn., London: Macmillan, 1986), pp. 128-9.

⁹⁴ On the 'railway pastoral', see above, chapter 1, 'The Railway Poetic/pastoral/apocalyptic'.

Passengers as prisoners: enclosure and isolation

We have already encountered the widespread perception that railway travel transformed passengers into parcels and articles of freight. This process was clearest in the case of those who travelled in the lowest of the railway passenger classes. Until the passing of Gladstone's Railway Regulation Act of 1844, which required that third class passengers be conveyed in vehicles fitted with seats and protected from the weather, such travellers were commonly conveyed in open goods trucks, many of them without seating or covering of any kind. Even after 1844, railways offering 'fourth class' transport at rates below the 1d. per mile prescribed in the Act could carry their unfortunate passengers in freight wagons; in 1845 the Sheffield, Ashton & Manchester Railway placed an order for cattle trucks and specified that they be 'fitted with spring buffers and drawbars, to answer occasionally for passengers'.⁹⁵ One did not have to be a traveller in the lowest classes, however, to feel that one was treated as a commodity; the transformation from autonomous individual into passive subject of an industrial process was experienced by all classes of traveller, and was as clear for the first- or second-class passenger, travelling in upholstered and well-appointed comfort in enclosed carriages as it was for the third-class passenger in more spartan (but less constricted) accommodation. The provision of seat cushions, padded doors, lace and gilt trimmings, mirrors, framed pictures and all the accoutrements of a comfortable drawing room could only disguise, not obliterate, the mechanical, industrial nature of the process.⁹⁶

In the early days of the railway, attempts had been made to combine the freedom of travel in a private road vehicle with the speed and facility of rail travel by permitting aristocratic and wealthy travellers to make their railway journeys in their own vehicles. The road carriage, sometimes with its wheels removed,

⁹⁵ George Dow, *Great Central* (3 vols., London: Locomotive Publishing Co., 1959), vol. 1, p. 159. These trucks were the first railway vehicles to be designed for the specific purpose of carrying cattle.

⁹⁶ For examples of the lavish furnishing of many Victorian railway carriages, see C. Hamilton Ellis, *Railway Carriages in the British Isles from 1830 to 1914* (London: George Allen & Unwin, 1965). For an analysis of nineteenth-century efforts to disguise mechanical and industrial devices and processes with padding and decoration, see John Gloag, *Victorian Comfort: A Social History of Design from 1830-1900* (Newton Abbot: David & Charles, 1973) — although Gloag overstates the Victorians' aversion to the mechanical and functional. For a more balanced view see Asa Briggs, *Victorian Things* (London: Batsford, 1988), esp. chap. 2 'The Great Victorian Collection.'

would be secured to a flat wagon attached to the train (see figure 22);⁹⁷ the horses would be conveyed in a van in the same train, and on arrival horses and carriage would be reunited and the journey would be continued by road, without the necessity for the passengers ever to leave their own vehicle. This was a short-lived experiment, however; apart from the resulting delay and complication during the marshalling of trains at stations, it was also inherently unsafe.⁹⁸ By the end of the 1840s the practice had been abandoned on British railways, and all passengers travelled in self-contained railway vehicles of some description.

The practice of conveying passengers in their own road vehicles mounted on railway wagons can be seen as a transitional stage both in the technological development of the railway carriage and in the adjustment of peoples' attitudes to the demands of the new mode of transport. The abandonment of the practice did not mark the end of this transitional mode, however; until the 1850s even purpose-built railway carriages long remained little more than road carriage bodies mounted on railway underframes. Even with the appearance by the 1890s of bogie carriages, corridor connections, heating, and on-board lavatories,⁹⁹ the British railway carriage remained indebted to its horse-drawn forebears in the crucial matter of the provision of compartments. The compartment, intended to minimise the shock and discomfort of rail transportation for the bourgeois or aristocratic traveller by reproducing the privacy, status and comfort of horse-drawn travel, tended in fact to have exactly the opposite effect. Rather than bestowing upon the new means of travel the spirit and character of the old, the compartment emphasized the gulf between the two. Many travellers may have found it reassuring; but for others it simply made the restricted, enclosed, mechanical nature of rail travel all the more apparent. To take just one example, while journeying by road offered the pleasures of an ever-changing scene and the chance of conversation with people met upon the road, the railway compartment merely trapped the traveller in boredom and monotony, with nothing to look at but the faces of those sitting opposite. In 1838 a letter appeared in the *Railway Times*,

⁹⁷ Ellis, *Railway Carriages*, pp. 44-9; Frank Ferneyhough, *Liverpool and Manchester Railway 1830-1980* (London: Robert Hale, 1980), p. 109; Simmons, *Railways of Britain*, pp. 174-6.

⁹⁸ See L. T. C. Rolt, *Red for Danger: A History of Railway Accidents and Railway Safety* (1955; 3rd edn., Newton Abbot: David & Charles, 1976), p. 30.

⁹⁹ For these innovations and other aspects of railway carriage development, see Ellis, *Railway Carriages*; Simmons, *Railways of Britain*, pp. 176-83; Simmons, *Victorian Railway*, pp. 84-6.

signed 'An Enemy to Imprisonment for Debt and in Travelling' which suggested that the seating in some compartments be placed back to back, enabling the passenger to 'see all the country within view of both sides of the road; and, surely, this would be pleasanter than a three or four hours' study of physiognomy at a stretch, for want of any other occupation'.¹⁰⁰

The railway compartment offered a very ambiguous form of security. It enclosed, protected, shielded; it provided a self-contained, cushioned environment, disguising the industrial nature of the process of which the traveller was a part. But it could also be seen as a trap, a confined space from which there was no escape, from other people or from oneself. If we look again at Augustus Egg's *Travelling Companions* we can see a striking illustration of this ambiguity (see figure 19). The picture shows the inside of a first-class railway compartment. The train is passing through a beautiful Mediterranean landscape; through the windows a sunlit panorama of a white-walled town on a curving bay can be seen. The tassel of the blind above the central window, gently swinging, betrays the motion of the train. Inside the compartment two young women sit facing each other. Their identical blue-grey silk crinoline dresses dominate the picture, covering seats and floor and rising almost to the bottom edges of the windows. The two halves of the picture seem to be mirror-images of each other: the clothes and faces of the women are identical. Close observation reveals, however, that the occupations of the two women, and their postures, are different. The woman on the right is reading; her head is bent over the book she holds in her gloved hands, and she has pulled the curtain across behind her to exclude the sunlight which would otherwise fall directly onto her face. Her companion is asleep, her head thrown back against the cushion, her mouth slightly open, her hands, lightly clasped together in her lap; she does not wear gloves. There are other differences of detail between the two figures. The woman who is reading has a posy of flowers on the seat beside her, while her companion has a basket of fruit; the reader's hair is worn up, neatly dressed behind her head, while the sleeper's hair is loose, falling over her shoulder and down her back; their identical hats are in slightly different positions.

The picture conveys a strong sense of introspection and self-containment. The two travellers seem to require nothing beyond their enclosed, comfortable world; they have food for the body (the fruit) and stimulation for the mind (the book),

¹⁰⁰ *The Railway Times*, vol. 1 (1838), p. 46; quoted in Schivelbusch, *Railway Journey*, p. 76.

they have rest (sleep) and industry (reading), they have even brought a sample of the beauty of the natural world into the compartment with them (the flowers). What comes from the outside world (the sunlight) can be managed and diverted according to their own requirements (the drawn curtain). Most strikingly, the occupants of the carriage seem to have no interest in the landscape beyond the window. One sleeps, the other reads, neither pays any attention to the bright sunlit panorama outside. The central window, which is let into the compartment door and can be opened, is firmly shut. 'The distant landscape seems a pleasure garden of freedom', writes the art historian Michael Cohen, 'but it also looks more like a picture on the wall of their compartment than a real place they can step into. And it is not approaching but going by'.¹⁰¹

Here we have the isolation of the railway compartment, and of railway travel generally, exemplified. The landscape through which the train moves is 'a picture on the wall', and like a picture on a wall it is a commodification of experience, a place or event transformed into product to be used or ignored as the consumer desires. Ralph Waldo Emerson commented on the same phenomenon in 1843, observing that the towns through which his train passed on its journey from Philadelphia to New York 'make no distinct impression. They are like pictures on a wall. The more, that you can read all the way in the car a French novel'.¹⁰² In an article published in the *Magazine of Art* in 1880, the essayist Edward Bradbury drew the attention of railway travellers to 'the "hurrygraphs" of scenery that come and go like the sliding scales of a magic lantern':

The average traveller allows these choice vignettes to pass unheeded. He — 'good, easy man!' — seats himself in his favourite corner of the carriage, pulls his rug over his knees, his Times out of his pocket, his pipe out of its case, and settles down into the foreign telegrams and the share market, or falls into a tobacco trance. The windows — framing picture after picture — are only referred to for purposes of ventilation . . .¹⁰³

¹⁰¹ Cohen, *Sisters*, p. 15.

¹⁰² Ralph Waldo Emerson, *Journals*, 7 February 1843; quoted in Schivelbusch, *Railway Journey*, p. 52.

¹⁰³ Bradbury, 'Pictures in trains', pp. 109-10.

These perceptions of the external scene as forming 'pictures on a wall' or a series of magic lantern slides reflect two important aspects of railway travelling which were widely noted by contemporaries. The first relates to the nature of the view obtained from a moving railway train. As Bradbury's intriguing phrase 'hurrygraphs' indicates, it is the effect of the speed of the train which gives the passing scene as viewed from the railway carriage its particular character. Because nearer objects pass too quickly to be perceived as anything other than flashes of colour, the traveller's gaze is drawn to more distant objects, which move more slowly. Jules Verne commented on this phenomenon in 1869, when the narrator of his *Twenty Thousand Leagues Under the Seas* observed that from the window of the speeding submarine Nautilus he 'saw of the Mediterranean's depths merely what the traveller on an express glimpses of countryside passing before his eyes: far-off horizons, and not the close-ups which pass by in a flash'.¹⁰⁴ The effect of this phenomenon was to confuse the traveller's senses of distance and movement, and flatten out the prospect visible from the window. The second point relates to the relationship between the viewer and the view. The passenger, dissociated from the passing prospect by this disturbed perception and physically separated by the walls and windows of the carriage itself, becomes not an active participant in the surrounding landscape, but a passive consumer of it, and very often — as Emerson suggests — ends up ignoring it, just as an uninteresting picture on the wall is ignored. This phenomenon came to be almost an expected part of railway travel, particularly with the advent of railway tourism from the 1850s. As James Buzard notes in his history of tourism:

The detached perspective and imprecise panoramic vision ascribed to passengers of the new means of transport became vital ingredients of the 'tourist's frame of mind'. So too did passengers' boredom, augmented by the blurred landscape and assuaged less by looking out of the window than by ignoring that passing panorama in favour of some diverting reading matter.¹⁰⁵

¹⁰⁴ Jules Verne, *Twenty Thousand Leagues Under the Seas*, trans. William Butcher (1869; Oxford: Oxford University Press, 1998), part II, chap. VII, p. 236.

¹⁰⁵ James Buzard, *The Beaten Track* (Oxford: Oxford University Press, 1993), p. 36.

As an instance of the industrial commodification of experience, the view from the railway carriage window is in the same category of nineteenth-century socio-cultural phenomena as the department store window display, photography, and, at the end of the century, cinema. The cultural critic Raymond Williams, in his discussion of the relationship between the observer and the city in nineteenth- and twentieth-century literature, identifies the 'fragmentary experience' of perceiving a constantly moving, constantly varied scene as one of the key forms of modern imagery. He goes on to claim that 'the perceptual experience itself does not necessarily imply any particular mood, let alone an ideology',¹⁰⁶ and in the case of a figure moving through the modern city — in Virginia Woolf's *Orlando* or James Joyce's *Ulysses*, to cite Williams's examples — this is to an extent true; a variety of moods and meanings can be read into the experience of urban movement. Similarly, the experience of railway travel can be used to convey exhilaration or despair, according to the author's purposes. Robert Louis Stevenson's poem 'From a Railway Carriage' conveys the former: 'Faster than fairies, faster than witches, / Bridges and houses, hedges and ditches';¹⁰⁷ while Dombey's journey to Birmingham in Dickens's *Dombey and Son* expresses the latter,¹⁰⁸ although making a similar use of the rhythms and fragmented glimpses of railway travel. But in the case of the railway, which Williams does not address, the isolation of the traveller from the scene outside the carriage introduces an extra level of meaning: much more than the journey through a city street, an environment with which the observer can freely interact, the railway journey is characterized by alienation and passivity.

In this sense the sensory experience of the railway journey is a direct forerunner of the sensory experience of cinema; the railway journey literally 'trained' audiences in the cinematic gaze. It is significant that railways played a prominent role in early cinematic productions. The arrival of a train at a station, trains passing at speed, the view from inside a train, produced visual effects which fascinated pioneering cinematographers, as a list of film titles from the 1890s indicates:

¹⁰⁶ Raymond Williams, *The Country and the City* (London: Chatto & Windus, 1973), pp. 240-2.

¹⁰⁷ From *A Child's Garden of Verses* (1885); reprinted in L. Kennedy (ed.), *A Book of Railway Journeys* (London: Collins, 1980), p. 9.

¹⁰⁸ Charles Dickens, *Dombey and Son* (1848; Harmondsworth: Penguin, 1971), chap. 20, pp. 354-5.

Arrival of a Train at La Ciotat (1895)
Arrival of the London Express at Brighton (1896)
GNR Trains at Wood Green (1896)
Train Entering East Berlin Station (1896)
Train on a Level Crossing at Joinville-le-Point (1896)

A series called 'Phantom Rides' offered views from the cabs of moving trains: *Railway Ride over the Tay Bridge* (1897), *Down Exeter Incline* (1896) and *View from an Engine Front* (1900) are notable surviving examples of what was a very popular genre with filmmakers and their audiences.¹⁰⁹ The close relationship between the passing view from a train and the experience of cinema is perhaps demonstrated most directly in films which feature scenes set within moving railway carriages, in which the world going by outside the window is simulated by a moving film within the film.

The connections between railway travel and cinema are a particularly striking illustration of the way in which, with the coming of the railways, the journey itself becomes both process and commodity; in the words of the cultural historian Anne Friedberg, 'Transportation . . . alters the commodity, but it also becomes a commodity itself — the train ticket'.¹¹⁰ This phenomenon is a prerequisite for the rise of tourism. With the railways, for the first time in human history the journey enters the arena of the market place and becomes itself a product for which desires must be created and satisfied. The phenomena of mass tourism, holidays and excursions, marketed by advertising and publicity, were creations of the railway age and expressed powerfully the commodification of the railway traveller and the railway journey.

¹⁰⁹ These examples are drawn from John Huntley, *Railways on the Screen* (Shepperton: Ian Allan, 1993), p. iv. See also Simmons, *Victorian Railway*, pp. 151-2, and Nicholas Faith, *The World the Railways Made* (London: The Bodley Head, 1990), pp. 253-4.

¹¹⁰ Anne Friedberg, *Window Shopping: Cinema and the Postmodern* (Berkeley & Los Angeles, Calif., & Oxford: University of California Press, 1993), p. 56. Friedberg follows Walter Benjamin in seeing in the department store, the boulevard, the shopping arcade and the railway journey 'a fitting paradigm for all modernity' (ibid., p. 49), but — like Benjamin — fails to stress the imposed passivity of the observer which distinguishes the railway journey from the other forms of experience cited. Schivelbusch similarly elides this important distinction, despite his stress elsewhere on the passivity of the railway passenger: Schivelbusch, *Railway Journey*, pp. 188-97.

Railway readings

The travelling companions in Egg's painting are representative of their type in that they have resorted to sleeping and reading. The desire of many railway travellers to sleep demanded only tolerably comfortable accommodation and a smooth ride (both of which, admittedly, were very often lacking); but the need of many railway passengers for entertainment of some kind during their journey encouraged the growth of a huge market in railway reading matter. Bookstalls became a standard feature of railway station platforms at an early date, beginning with the London and Blackwall Railway in 1841,¹¹¹ and the provision of reading matter for railway passengers rapidly expanded to become a hugely important part of the publishing trade, playing an important part in the rise of several leading publishing houses — Longmans and Routledge are notable examples — and laying the foundations for the expansion of important retail and distribution firms such as W. H. Smith and John Menzies.

It was among bourgeois travellers that railway reading became an almost universal activity, as Schivelbusch observes.¹¹² This did not mean, however, that the reading matter they favoured was educational, elevated or improving; Schivelbusch's assertion that 'in contrast to the supply of trashy mass literature in the regular bookstores, the railway bookstalls . . . carried highly respectable non-fiction, fiction, travel guides, etc'.¹¹³ is misleading. 'Respectable' titles were available: Matthew Arnold found (with some astonishment) his *Empedocles on Etna* on sale at a Derby station bookstall in 1854,¹¹⁴ and Francis Kilvert purchased a translation of Goethe's *Faust* at Worcester Foregate Street in 1870;¹¹⁵ but much of the literature offered by railway bookstalls was popular and lowbrow (see figure 23), as is largely the case at late twentieth-century airport bookshops. In 1862 the *Saturday Review* commented that railway travellers might have been expected to select improving matter to wile away the tedious hours of travelling, choosing to purchase 'the very best books — the finest poetry, the most thoughtful essay, or

¹¹¹ Simmons, *Victorian Railway*, p. 245.

¹¹² Schivelbusch, *Railway Journey*, p. 66.

¹¹³ Ibid.

¹¹⁴ Simmons, *Victorian Railway*, p. 247.

¹¹⁵ Francis Kilvert, *Kilvert's Diary 1870-1879: Selections from the Diary of the Rev. Francis Kilvert*, ed. William Plomer (Harmondsworth: Penguin, 1977), p. 103. The diary entry is for 3 December 1870.

the deepest and most closely packed philosophy . . . so that, instead of keeping the eyes or the attention constantly on the strain, he might occasionally throw himself back and commit to memory or meditate on what he read'.¹¹⁶ Here, the appeal of reading is related to the particular sensory experience of the railway journey. Trying to see objects as they hurtled by, or make sense of the blurred landscape, only exhausts the nerves and worries the senses; thus reading is suggested, not so much to keep boredom at bay, as an antidote to the nervous over-stimulation of railway travel. However, the *Review* went on to note that passengers had not on the whole favoured 'improving' or 'elevated' reading-matter; instead, railway reading had come to be characterized by 'the most imaginative class of romances bound in covers indicating the exciting character of their contents'.¹¹⁷

In 1867, *Massey's Railway Satirist* (itself a publication intended specifically to provide entertainment for railway travellers on tedious journeys) satirized the type of sensational literature to which the *Review* referred in an advertisement for '*Viscountess Vain's Vengeance*: New Sensation Novel. Contains — 6 Bigamies, 5 Elopements, 4 Murders, 3 Suicides, 2 Poisonings, and 1 Delightful Wedding'.¹¹⁸ The target of Massey's mockery here is the type of sensation-novel typified by Mary Elizabeth Braddon's *Lady Audley's Secret*, which had appeared in 1862 and included not only bigamy, murder and child-desertion but also a climactic pursuit by railway and steamer.¹¹⁹ Despite attempts to improve the standards of railway reading matter, through such series as 'Routledge's Railway Library', 'Bentley's Railroad Library' and 'Murray's Railway Reading', all of which included versions of the classics, history, poetry and philosophy in their lists,¹²⁰ sensational novels and simple light entertainment remained popular. Particularly successful were booklets containing an assortment of brief paragraphs dealing with a wide variety of topics, intended for browsing and intermittent reading. A good example of such digests is *Railway Readings*, published by the Oxford firm of J. Vincent in 1847. Among the topics covered by the booklet's brief snippets — none of which exceeds

¹¹⁶ 'Railway literature and the *demi monde*', *Saturday Review*, vol. 14, no. 372 (13 Dec. 1862), p. 719.

¹¹⁷ *Ibid.*

¹¹⁸ William John Massey, *Massey's Railway Satirist* (London: George Phipps, 1867), p. 20. I am indebted to Stephen Rawles of Glasgow University Library for this reference.

¹¹⁹ Mary Elizabeth Braddon, *Lady Audley's Secret* (1862; Oxford: Oxford University Press, 1987), chap. VI, pp. 382-3.

¹²⁰ See Simmons, *Victorian Railway*, pp. 246-7.

300 words — are ‘Alligators, on the habits of’, ‘Charles V, curious anecdote of’, and ‘Sheep, strange use of in Brazil’.¹²¹ *Massey’s Railway Satirist* is itself another example of the genre, taking the form of a compendium of spoof advertisements. Such books seem curiously well-adapted to the characteristics we have noted as being typical of railway journeys; they are fragmented, dealing in glimpses and brief, fleeting impressions, rather than sustained narratives.

The association of railway reading with sensational fiction and digests of jokes and trivia was seen by some as confirming the relationship between railways and low culture. The term ‘railway novel’ rapidly became a synonym for vulgar and sensational reading matter. In 1851 *The Times* investigated station bookstalls and found that ‘with few exceptions unmitigated rubbish encumbered the bookshelves of almost every bookstall we visited’.¹²² In 1857 one critic observed that ‘the railroad has been the means of at least doubling the number of books printed and published . . . the habit of reading on railways has created new classes of readers, and spread the taste for reading’, but qualified his approval of the phenomenon: ‘Looking at this fact in a moral light, its aspect is not so pleasant as it might be, inasmuch as no small amount of literary rubbish travels by rail, and a considerable quantity besides which might be designated as something very much worse’.¹²³ When the publisher John Murray launched ‘Murray’s Railway Reading’ series in 1851 he did so specifically ‘to counteract and supersede the trivial, and often immoral, publications at present destroying the taste, and corrupting the morals of Railway Readers, more especially of the young’.¹²⁴ Murray’s list, like the rival ‘Longman’s Travellers’ Library’ which was launched at the same time, contained no novels at all;¹²⁵ more popular and long-lived was ‘Routledge’s Railway Library’, which concentrated on cheap reprints of novels, and featured, alongside the works of Jane Austen and Alexandre Dumas *père*, popular novels by Bulwer-Lytton and Braddon, and titles such as *Zingra the Gypsy* and *Violet the Danseuse*.¹²⁶ The success

¹²¹ *Railway Readings* (Oxford: J. Vincent, 1847), pp. 87, 113, 138.

¹²² Samuel Phillips, ‘The literature of the rail’, from *Essays from The Times*, series I (London: John Murray, 1855), p. 311.

¹²³ Charles Manby Smith, *The Little World of London: or, Pictures in Little of London Life* (London: no pub., 1857), p. 96.

¹²⁴ From Murray’s 1851 prospectus; quoted in Richards & MacKenzie, *Railway Station*, p. 300.

¹²⁵ Simmons, *Victorian Railway*, p. 246.

¹²⁶ From a list of titles printed inside the cover of *The Millionaire of Mincing Lane* by Dudley Costello (London: Routledge & Co., 1858). A note advertises a free catalogue of the Railway Library series, listing some 500 volumes.

of the Routledge list, and of the 'Parlour Library' of Simms & Macintyre on which it was based, seemed to confirm the opinion of critics that railway reading was sensational or frivolous where it could have been educational and improving. *The Times* complained of the 'Parlour Library' that 'every addition to the stock was positively made on the assumption that persons of the better class who constitute the larger proportion of railway readers lose their accustomed taste the moment they enter the station'.¹²⁷

Despite such complaints, the association between the railway and cultural vulgarity exemplified by 'railway reading' did not disappear as the century passed but became, if anything, even stronger. In 1880 Matthew Arnold was complaining of 'the tawdry novels which flare in the book-shelves of our railway stations, and which seem designed, as so much else that is produced for the use of our middle class seems designed, for people with a low standard of life'.¹²⁸ With the continuing spread of literacy during the last quarter of the century, popular newspapers and journals such as *Tit-Bits* (1881), *Pearson's Weekly* (1890), the *Daily Mail* (1896) and the *Daily Express* (1900) joined the cheap novels and compilations of trivia which remained the mainstay of the railway reader. H. G. Wells saw in this one of the aspects of the train which made it 'a perfect symbol of our times . . . uncomfortably full in the third class — a few people standing — and everybody reading the current number of the *Daily Mail*, *Pearson's Weekly*, *Answers*, *Tit Bits*, or whatever the Greatest Novel of the Century happened to be going'.¹²⁹ This association of the railway with cheap reading matter combined with the image of the railway excursion, the riotous vulgarity of the advertising on display at railway stations, to reinforce the association of the railway with cultural degeneration.

The journey and the body

The perceived degenerative threat of the railway journey was not limited to its cultural, social, moral and aesthetic influence on the external world; it was also widely believed to consist in more insidious influences, and particularly in the

¹²⁷ Quoted in Richards & MacKenzie, *Railway Station*, p. 300.

¹²⁸ Matthew Arnold, 'Copyright' (1880); from *Complete Prose Works*, vol. 11, pp. 114-35.

¹²⁹ Wells, *Anticipations*, p. 16 (footnote).

ways in which the deleterious environmental and sensory influences associated with railway travel acted upon the human mind and body from within. Just as the railway undermined the social and cultural differentiations and hierarchies upon which the stability of Victorian and Edwardian society rested, so, it was supposed, it attacked the delicate balance of biological energies and functions which sustained the workings of the human body.

Health and the railway traveller

It was widely accepted that the greater freedom of travel created by the coming of the railways had brought great benefits to health, particularly for the urban labouring population, who were able to escape the crowding and foul air of the cities and travel to the seaside and the country with more freedom and in greater numbers than ever before. Some went further, asserting that railways were beneficial to public health not only because they brought people to healthful locations, but through the influences which worked upon them during the journey itself. Under the heading 'Health Seekers', the *Railway Traveller's Handy Book* declared that 'being whirled through space at the rate of thirty or forty miles an hour is most pleasurable in its effects. To the over-wrought brain, or the over-strained mental faculties, to the toiler who has sunk into a state of exhaustion, this rapid locomotion acts as an agreeable fillip'.¹³⁰ E. E. Foxwell agreed, writing in 1884 that 'Many a modern brain, aching from inward collision, receives an unrivalled tonic from the pleasant broadside of life that plays upon our rapid course with such a kind profusion' as the train 'Whirl[s] with a magnificent ease through a panorama of life so generously presented'.¹³¹

Such opinions tended to be in the minority, however. The general view was that travelling was a tiring activity whatever the means employed, and that railway travel produced particular discomfort. By the mid-nineteenth century it was widely believed that there was a particular, novel form of railway travel exhaustion, different in nature from the tiredness associated with other forms of travel. Sheridan Le Fanu describes it in *Uncle Silas* (1864): 'Fatigued with the peculiar fatigue of railway travelling, dusty, a little chilly, with eyes aching and

¹³⁰ *Handy Book*, p. 6.

¹³¹ Foxwell, *English Express Trains*, p. 9.

wearied'.¹³² Travellers throughout the Victorian age complained constantly about the poor riding qualities, noisiness, uncomfortable seating, inadequate lighting, and ineffective heating and ventilation of railway carriages. 'Railways are excellent things, and I wonder how the world got on without them', declared a character in Mortimer Collins's novel of 1870, *The Vivian Romance*:

but twenty or thirty miles on the best line in England thrills every nerve in my body, and makes my brain throb, and causes me to feel so grim, that I abhor myself. Then the hideous smell of the engine, the dust and ashes that attack your eyes and nostrils, the fustiness of the carriages, the maniacal scream of the steam-whistle, the grinding and groaning noises of the whole machine — are not these abominations?¹³³

The environment of the railway carriage, as we have seen, offered the ambiguous security of enclosure and protection. The carriage was enclosed, shielded from the elements, padded and furnished inside, but the industrial nature of the railway travel process was vividly conveyed to the passenger by the noise, smoke and steam of the locomotive, the sound of the whistle, the jolts and vibrations which were conveyed through the structure of the carriage. Travel in road vehicles shared some of these qualities: the ride was frequently uncomfortable, and the interior was often too hot or cold; but the noisy, smelly presence of the steam locomotive, the rapidity of railway travel, and the fact that the passenger could not break his or her journey, step out of the carriage for a while, or in other ways interact with the landscape through which the train passed, made the conditions of the train journey novel and disturbing. 'Railway fatigue' was not only new and distinctive; it was also worrying, seeming to hint at some deep insidious damage being done by the railway to the human constitution.

The vibration and shaking to which railway travellers were subjected formed an early focus of concern for those seeking to investigate the consequences of railway travel for human health. The French doctor E. A. Duchesne, who

¹³² Sheridan Le Fanu, *Uncle Silas* (1864; Oxford: Oxford University Press, 1981), chap. LX, p. 390.

¹³³ Mortimer Collins, *The Vivian Romance* (3 vols., London: Richard Bentley, 1870), vol. 1, p. 186.

published his *Des chemins de fer et leur influence sur la santé des mécaniciens et des chauffeurs* in 1857,¹³⁴ suggested that a *maladie des mécaniciens* could be identified among railway workers, particularly those who worked on locomotive footplates, exposed to extremes of heat and cold. He described this 'engineer's malady' as including pseudo-rheumatic pains and 'generalized, continuous and persistent pains, accompanied by a feeling of weakness and numbness',¹³⁵ caused by the peculiar vibrations and jolts experienced on the engines. These aspects of travelling on the footplate were confirmed and commented on by journalists and others who had occasion to make a journey by railway in the company of the locomotive crew. Thus Frederick Williams, describing a ride he had taken on the footplate of the London to Dover night mail train, remarked that his thoughts were 'shaken into hopeless jumble by the incessant *vibrato* which my anatomy was undergoing', and complained that he suffered from 'extremes of temperature, a bleak wind . . . freezing me to my waist, while the heat from the furnace bakes my legs'.¹³⁶

The effects of vibration were not limited to locomotive crews; the same influences acted upon passengers in the train. The mid-nineteenth-century railway carriage shook, rattled and jolted to an alarming degree, a fact commented upon by many travellers. Dante Gabriel Rossetti recounted in verse 'the sore torment of the route;— / Toothache, and headache, and the ache of wind' which he had suffered on his railway trip from London to Brussels in 1849; 'This cursed pitching is too bad', he complained, 'my teeth / jingle together in it'.¹³⁷ When the medical journal *The Lancet* came to examine the effects on health of railway travelling in 1862, much attention was paid to the jolts and vibrations experienced in the course of a journey. 'The frequency, rapidity and peculiar abruptness of the motion of the railway carriage keep . . . a constant strain on the muscles', observed *The Lancet*,

¹³⁴ E. A. Duchesne, *Des chemins de fer et leur influence sur la santé des mécaniciens et des chauffeurs* (Paris, 1857). This work does not appear to have been translated into English, but seems to have been well enough known in Britain for *The Lancet* to refer to it without detailed elaboration in 1862; see 'The Influence of Railway Travelling on Public Health', *The Lancet*, 18 January 1862, p. 80.

¹³⁵ Duchesne, *Des chemins de fer*, p. 183.

¹³⁶ F. S. Williams, *Our Iron Roads: their History, Construction, and Administration* (1852; 7th edn., 2 vols., London: Derby, Bemrose & Sons, 1885), vol. 2, pp. 356-7.

¹³⁷ 'A Trip to Paris and Belgium. II. Boulogne to Amiens and Paris', in *The Works of Dante Gabriel Rossetti*, ed. William M. Rossetti (revised and enlarged edn., London: Ellis, 1911), p. 178.

'and to this must be ascribed a part of that sense of bodily fatigue, almost amounting to soreness, which is felt after a long journey'.¹³⁸

The nature and consequences of the 'incessant *vibrato*' associated with the railway journey were questions which would assume great importance in subsequent medical investigations of railway travel. It was not that the ride on a train was bumpy in the same way as the ride in a stage-coach or on a horse-drawn wagon; on the contrary, it was far smoother, giving rise to the idea that rail travel was akin to 'flying', unaffected by the ruts, potholes and rough surfaces of the common roads. The point was that railway travel subjected the traveller to a new kind of vibration consisting of a rapid and continuous succession of minor jolts and jars. Duchesne was clear that the symptoms of his *maladie des mécaniciens* were largely due to this vibration: 'Without exception, all the firemen and drivers complain about the vibration of the machine, the regular but perpetual movements that it transmits to the entire body and the lower extremities in particular'.¹³⁹ This vibration was so fatiguing, Duchesne went on to relate, that drivers contrived what means they could to cushion themselves against it, ranging from the placing of a doormat under the feet to the installation of 'an elastic stool on which they can sit down from time to time'.¹⁴⁰ The seats and upholstery in first and second class carriages were partly a response to this vibration, intended to protect the passenger mechanically, through the provision of springs and cushions, and to distance him or her psychologically from the industrial nature of the process by making the railway compartment as far as possible an extension of the domestic environment. *The Lancet* stressed that this constant 'vibration and oscillation' affected not only the muscles but also the brain, the spinal cord and the nervous system as a whole, and the results of such 'commotion of the brain or spinal system of nerves' could be of the utmost seriousness: 'Cerebral or spinal concussions, in their higher degree, annihilate the functions of those organs. In the milder forms they lead up to a disease which, remaining for a long time latent, may still end in paralysis'.¹⁴¹

The Lancet was not alone in perceiving in the vibrations felt by railway passengers an insidious degenerative threat of nervous and cerebro-spinal disease. It was generally accepted that prolonged exposure to constant shaking and jolting

¹³⁸ *The Lancet*, 11 January 1862, p. 51.

¹³⁹ Duchesne, *Des chemins de fer*, p. 146.

¹⁴⁰ *Ibid.*

¹⁴¹ *The Lancet*, 11 January 1862, p. 51.

could have serious effects on the nervous system. Such effects were not limited to the railway; another transport innovation, the bicycle, provoked similar medical concerns:

Compounding the injuries from active exertion of the nervous system were the insults it received directly from the wheel . . . When patients began to complain of 'seediness' following bicycle rides, the nervous nature of the symptoms — headache, sleeplessness, lassitude the following day, depression — suggested repeated concussion of the nervous system as the cause.¹⁴²

Medical interest in the 'diseases of cycling' in the 1880s followed the same pattern as did concern over the medical effects of railways in the 1860s. Initial emphasis on the acute injuries produced by accidents was replaced as the novelty of the invention faded with emphasis on less tangible, chronic disorders, particularly effects on the nerves. There was even a ten-part 'Report on Cycling in Health and Disease' in the *British Medical Journal* in 1880, echoing *The Lancet's* report into 'The influence of railway travelling on public health' of 1862.¹⁴³

The more regular and intensive an individual's experiences of railway travel, the more liable he or she was to suffer ill effects. Commuters were seen as a particularly vulnerable group. Railway commuting had begun in earnest in the 1850s, soon becoming an established feature of working life for many people, but the possible health effects of daily, sometimes lengthy, railway journeys undertaken in addition to the normal pressures of work remained a cause for concern. The *Lancet's* comments on this issue struck a chord of recognition beyond the confines of the medical profession. *The Spectator*, reviewing *The Lancet's* reprint of its report in pamphlet form in July 1862, saw season-ticket holders as more vulnerable than other travellers to the 'injurious and peculiar evils arising from railway travelling': '[these] travellers are a distinct class; many of them are constantly in motion; it is to these that accrue the evil effects'.¹⁴⁴ *The Cornhill Magazine* similarly warned that for rail commuters 'the muscular and nervous

¹⁴² James C. Whorton, 'The hygiene of the wheel: an episode in Victorian sanitary science', *Bulletin of the History of Medicine*, vol. 52 (1978), pp. 75-6.

¹⁴³ *Ibid.*, pp. 69-70.

¹⁴⁴ 'Perils of the train', *The Spectator*, 12 July 1862, p. 779.

strain, daily repeated twice, will generally exert a baneful influence; and if there be already organic disease, that influence may be very serious'.¹⁴⁵ *The Lancet* cited 'the large number of instances in which season ticket holders have been compelled to desist from the practice of long daily journeys' because of the tiredness and strain which their journeys, on top of the usual fatigues of the urban working day, entailed. 'There is strong evidence, indeed', *The Lancet* continued, 'in favour of the opinion that the privilege of country residence may be dearly bought at the cost of long daily journeys by rail'. In support of this claim, they reproduced the testimony of 'one of the leading physicians of the metropolis' on 'the rapid ageing of season-ticket holders':

Travelling a few years since on the Brighton line very frequently, I became familiar with the faces of a number of the regular passengers on that line. Recently I had again occasion to travel several times on the same line . . . I have never seen any set of men so rapidly aged as these seem to me to have been in the course of those few years.¹⁴⁶

Another observer commented in 1868 that 'It has been over and over again observed that season-ticket holders, especially on the Brighton line, age very rapidly'.¹⁴⁷

The claim of one medical authority in 1868 that the demands of railway travelling, particularly 'all this striving to do certain distances in certain given times' had 'engendered an irritability in our organs'¹⁴⁸ underlines the contemporary perception that the railway was attacking the very substance of the body itself, and that the whole cerebral, spinal and nervous structure of the body was implicated in railway fatigue. This view is emphasized by the attention paid by contemporaries to the exhaustion of the organs of sense which paralleled this muscular exhaustion; in the words of *The Lancet*:

¹⁴⁵ 'Effects of railways on health', *Cornhill*, vol. VI (July-December 1862), pp. 487-8.

¹⁴⁶ *The Lancet*, 18 January 1862, pp. 79-80.

¹⁴⁷ Haviland, *Hurried to Death*, p. 22.

¹⁴⁸ *Ibid.*

The influence of railway travelling upon the brain cannot, however, be measured solely by estimating the character and extent of the concussions to which it is subjected. The brain is not only affected by the mind, but also through the avenues of the eye and ear; and by the excitement of the respiratory and circulatory systems.¹⁴⁹

As we have seen, the rapidity of railway travel placed new demands on the eyes and brain, taxing them to a far greater degree than slow, pre-industrial road travel. 'The rapidity and variety of the impressions necessarily fatigue both the eye and the brain', observed *The Lancet*:

The constantly varying distance at which the objects are placed involves an incessant shifting of the adaptive apparatus by which they are focused upon the retina; and the mental effort by which the brain takes cognizance of them is scarcely productive of cerebral wear because it is unconscious; for no fact in physiology is more clearly established than that excessive functional activity always implies destruction of material and organic change of substance.¹⁵⁰

The key term here is 'excessive functional activity'. The visual stimuli associated with railway travel transformed the demands placed upon the eyes and brain, above all by greatly increasing the sheer quantity of stimulation with which they had to deal; and this increased level of activity, it was suggested, threatened to inflict physical damage on the organic substance of the body.

The pathological disruption produced by the effects of railway travel on the eyes must be placed in the context of the adjustment required of the nineteenth-century traveller by the particular conditions of railway travel. The demands placed on the visual apparatus of the passenger by the speed of movement on the rails represent an aspect of the pressures placed on the human mind and body to adapt to the demands of industrialized travel. *The Lancet's* strictures on the dangers

¹⁴⁹ *The Lancet*, 11 January 1862, p. 51.

¹⁵⁰ *Ibid*, pp. 51-2.

of over-taxing the eyes can be read as a warning of the pathological consequences of employing the pre-industrial gaze in the industrialized context of the railway journey: strained muscles and nerves, exhausted eyes, aching brain. Travellers on the road had no difficulty observing the passing scene, deciding what they would look at and what they would ignore, able to examine particular aspects of the scene in as much detail as they wished. Ruskin advised travellers 'to be content with as little change as possible':

If the attention is awake, and the feelings in proper train, a turn of a country road with a cottage beside it, which we have not seen before, is as much as we need for refreshment; if we hurry past it, and take two cottages at a time, it is already too much; hence to any person who has all his senses about him, a quiet walk along not more than ten or twelve miles of road a day, is the most amusing of all travelling; and all travelling becomes dull in exact proportion to its rapidity.¹⁵¹

Ruskin here makes three points about the interaction between the traveller and the landscape. First, it is as much a psychological matter of the state of mind of the observer as a physical one of the conditions of observation; the observer must have his or her 'feelings in proper train' — a feat impossible, Ruskin believed, for a harassed and hurried railway traveller. Second, the landscape must be allowed to unfold at its own pace; the traveller must accept what it offers and not 'hurry past it', seeking more stimulation for its own sake. Third, and related to the first two, rapidity itself is incompatible both with looking and with travelling.

Not everyone reacted to the new types of vision made possible by rail travel with hostility; some adjusted readily, and welcomed the new ways of seeing. Matthew E. Ward, an American traveller, wrote in 1853 that the English landscape was best appreciated 'when dashing on after a locomotive at forty miles an hour':

Nothing by the way requires study, or demands meditation, and though objects immediately at hand seem tearing wildly by, yet the distant fields and scattered trees, are not so bent on eluding

¹⁵¹ Ruskin, *Works*, vol. 5, p. 370.

observation, but dwell long enough in the eye to leave their undying impression. Every thing is so . . . destitute of prominent objects to detain the eye, or distract the attention from the charming whole, that I love to dream through these placid beauties whilst sailing in the air, quick, as if astride a tornado.¹⁵²

The contrast between Ruskin and Ward in their responses to the view from the carriage window is clear. The enjoyment of the landscape which Ward experiences is dependent upon his adjustment to a new type of vision; the very adjustment which Ruskin, conscious of the aesthetic and moral consequences of the industrialization of vision, resists. Ward does not attempt to watch everything, does not seek to dwell upon individual incidents and objects, but embraces the 'charming whole', the whole speeding vista with his vision and becomes, not the active, discriminating, psychologically engaged Ruskinian observer, but the passive consumer of a spectacle provided ready-animated and complete outside his carriage window.

In addition to the strain it inflicted on the eyes, the railway journey was believed to exert a baneful influence through the other senses as well. The hearing, argued *The Lancet*, was strained by 'The rattle and noise which accompany the progress of the train' which cause 'an incessant vibration on the tympanum'.¹⁵³ Poorly-heated and draughty carriages exposed the passenger to the effects of cold, which 'will surely and steadily chill the parts of the body exposed, and will as surely excite disease in those predisposed to it . . . the speed of the railway intensifies the cold'.¹⁵⁴ In other cases, the lack of proper ventilation made for unhealthy heat and stuffiness. The journeys William Morris made between Calais and Ghent in 1874 were made unbearable, he complained, by the heat: 'I must say I had no idea what heat was before, it was like being in a Turkish bath'.¹⁵⁵ The London underground he termed 'that vapour-bath of hurried and discontented

¹⁵² Matthew E. Ward, *English Items: or, Microcosmic Views of England and Englishmen* (New York, 1853), pp. 71-2. Quoted in Schivelbusch, *Railway Journey*, p. 60.

¹⁵³ *The Lancet*, 11 January 1862, p. 52.

¹⁵⁴ *Ibid.*, p. 50.

¹⁵⁵ Letter from Morris to Aglaia Ionides Coronio, 24 July 1874; in Kelvin (ed.), *Collected Letters*, vol. 1, p. 225.

humanity'.¹⁵⁶ All these factors combined to produce a unique level of physical and mental fatigue in the railway passenger:

Assailed through the avenues of the eye and ear, and subject to concussions due to vertical movement and lateral oscillation communicated through the trunk, and actually transmitted through the bony walls of the head when it rests against the back of the carriage, the brain is apt to suffer certain physiological changes. Amongst the well-known effects are — occasional dizziness, headache, sickness, and mental fatigue.¹⁵⁷

These symptoms represent an ameliorated form of Duchesne's *maladie des mécaniciens*. Railway passengers were protected from the extremes of heat and cold experienced on the footplate — although the inadequacies of heating and the persistence of draughts did cause them to develop colds, catarrhs, chills and similar ailments¹⁵⁸ — but they were exposed to the same vibrations, jolts and shakes. Like the drivers and firemen, they were part of the process of industrialized transportation, and were exposed to the wear and tear associated with that process.

¹⁵⁶ William Morris, *News from Nowhere* (1890-1), in Clive Wilmer (ed.), *William Morris: News from Nowhere and Other Writings* (Harmondsworth: Penguin, 1993), chap. I, p. 43.

¹⁵⁷ *The Lancet*, 11 January 1862, p. 50.

¹⁵⁸ *Ibid.*, pp. 48-9; 8 March 1862, p. 259.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

1. Railway time: a station clock from c.1850.

National Railway Museum, York. Reproduced from Dether (ed.), *All Stations*, p. 69.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

2. Railway time: the clock at Edinburgh Waverley station booking hall, installed in the 1890s, proclaims its allegiance to 'Greenwich Time'.

RCAHM Scotland. Reproduced from Simmons, *Railways of Britain*, p. 238.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

3. The railway pastoral: the Great North of England Railway crossing the oblique bridge over the Tees at Croft, near Darlington. Lithograph by G. Hawkins, c.1840.

British Museum. Reproduced from Darby, *Early Railway Prints*, p. 39.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

4. The railway pastoral: the Great Western Railway west of Bath. Lithograph by L. Haighe, 1840.

British Museum. Reproduced from Darby, *Early Railway Prints*, p. 41.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

5. J. M. W. Turner, *Rain Steam and Speed – the Great Western Railway* (1844)

National Gallery, London.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

6. Diagram showing the composition of *Rain Steam and Speed*.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

7. The chaos of railway construction: the London & Birmingham Railway cuts through Camden, north London. Lithograph by John Bourne, 1836.

National Railway Museum, York. Reproduced from Simmons, *Victorian Railway*, pl. I.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

8. Building the Great Central Railway: tunnel construction north of Marylebone, 1898.

Reproduced from Rolt, *Making of a Railway*, p. 73.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

9. Reshaping the urban fabric: building the line between London Bridge and Charing Cross stations through Southwark in the 1860s.

National Railway Museum, York. Reproduced from Simmons, *Victorian Railway*, pl. 50.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

10. The railway re-orders and divides the landscape. Crimble Valley Viaduct, near Harrogate. Lithograph by Gibson & Co., 1847.

British Museum. Reproduced from Darby, *Early Railway Prints*, p. 56.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

11. The railway underworld: cutting on the Dublin & Kingstown Railway.
Aquatint by A. Nichol and J. Harris, 1834.

British Museum. Reproduced from Darby, *Early Railway Prints*, p. 18.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

12. The western portal of Box Tunnel, near Bath, Great Western Railway.
Lithograph by John Bourne, 1844.

Science Museum, London. Reproduced from Vaughan, *Great Western Architecture*, p. 313.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

13. The railway sublime: No. 1 Tunnel, Bristol, west portal. From a working drawing by I. K. Brunel, 1838.

Railtrack. Reproduced from Vaughan, *Great Western Architecture*, p. 319.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

14. The battlemented east portal of Twerton Tunnel, Devon. From a working drawing by I. K. Brunel, 1838.

Railtrack. Reproduced from Vaughan, *Great Western Architecture*, p. 319.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

15. The Egyptian-style west portal of Summit Tunnel, built 1837-41 to take the Manchester & Leeds Railway under the Pennines.
Lithograph by A. F. Tait, 1845.

Ironbridge Gorge Museum Trust. Reproduced from Simmons, *Railways of Britain*, p. 165.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

16. Crowds on the move: commuters at Liverpool Street station, London, 1910.
R. C. Riley Collection. Reproduced from Simmons, *Railways of Britain*, p. 181.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

William Powell Frith, *The Railway Station* (1863).

Royal Holloway and Bedford New College, University of London.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

18. 'Scene in a tunnel. How to clear a carriage for a cigar.' The anxieties of the railway compartment: cartoon from *Punch*, 1864.

National Railway Museum, York.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

19. Augustus Leopold Egg, *Travelling Companions* (1862).

Birmingham Museums and Art Galleries.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

20. Order and hierarchy at the station: London, Brighton & South Coast
Railway staff at Clapham Junction, 1880s.

National Railway Museum, York. Reproduced from Faulkner, *Clapham Junction*, p. 11.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

21. Upholding order: police and armed soldiers protect strike-breaking staff
operating Pouparts' Junction signal box, Clapham Junction, during the national
railway strike of 1911.

National Railway Museum. Reproduced from Faulkner, *Clapham Junction*, p. 74.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

22. The transition from private carriage to railway carriage, late 1830s: a landau, top left, complete with passengers, being carried on a railway flat wagon on the London & Greenwich Railway. Anonymous lithograph, c.1838.

Science Museum, London. Reproduced from Darby, *Early Railway Prints*, p. 23.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

23. The railway bookstall: W. H. Smith's stall at Crystal Palace (High Level) station, photographed in 1907. Among the articles for sale are postcards, reproductions of popular paintings, caricatures, newspapers, a large selection of magazines, books from the 'W. H. Smith & Sons Library', combs, and ready-made bow ties.

R. C. Riley Collection. Reproduced from Simmons, *Victorian Railway*, pl. 59.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

24. Advertisement for the Railway Passengers' Assurance Company, c.1864.

National Railway Museum, York. Reproduced from Briggs, *From Iron Bridge to Crystal Palace*, p. 103.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

25. The Abergele disaster, 1868: the scene a few hours after the accident, as depicted in the *Illustrated London News*.

National Railway Museum, York.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

26. Aftermath of the head-on collision between two passenger trains at Norwich Thorpe, 1874, from the *Illustrated London News*.

National Railway Museum, York.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

27. Wigan, 1873: the station seconds after being devastated by the impact of a runaway train, as reconstructed by the *Illustrated London News*.

National Railway Museum, York.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

28. Collision at Kentish Town on the North London Railway, September 1861.
The artist has conflated the moment of impact (the goods train locomotive, which has just crossed the bridge, rearing up centre right) and its immediate aftermath (the passenger train careering down the embankment, foreground) into a single highly dramatic image.

Ironbridge Gorge Museum Trust. Reproduced from Briggs, *Iron Bridge to Crystal Palace*, p. 102.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

29. Railway heraldry: images of stability and continuity. The Furness Railway, as with many Victorian railway companies, modelled its emblem after the pattern of medieval seals, basing its device on the seal of the Cistercian abbey of Furness. The Duke of Devonshire, who was a leading local landowner, took a close interest in the railway's affairs, and the company adopted his family motto, *Cavendo tutus*.

National Railway Museum, York.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

10. Reassurance: London & North Western Railway poster, 1911.
Artist: Norman Wilkinson.

National Railway Museum, York. Reproduced from Simmons *Victorian Railway*, pl. 55.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

31. Where mechanical and human power interacted. The tumult of the express locomotive footplate, depicted in an engraving entitled 'Seventy Miles an Hour', c.1870.

Ironbridge Gorge Museum Trust. Reproduced from Briggs, *Iron Bridge to Crystal Palace*, p. 128.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

32. Railway complexity: an array of signalling equipment at Cannon Street station, London, c.1860.

Reproduced from Williams, *Our Iron Roads*, vol. 2, p. 284.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

33. The state as a runaway train: Disraelian politics conceived as a locomotive speeding into danger, 1868. Engraving by Matthew Somerville Morgan, from the magazine *Tomahawk*.

National Portrait Gallery, London.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

34. 'A railway undertaking': an intending passenger is confronted by a railway carriage transformed into a surgery, and a pallbearer offering his services.

Cartoon from *Punch*, 1852.

National Railway Museum, York.

The image originally presented here cannot be made freely available via ORA because of copyright restrictions.

35. Safety dress for railway travellers. Cartoon from *Punch*, 1864.

National Railway Museum, York.

THE RAILWAY ACCIDENT

Railway safety and railway slaughter

Generally speaking, Victorian railways were safe and reliable. Taking into consideration the high speeds at which British passenger trains operated (from the mid-1840s, express trains in the United Kingdom, which regularly ran at speeds of around 40 miles per hour, were the fastest trains in the world;¹ and even ordinary passenger trains were commonly timetabled to run at between 20 and 30 miles per hour), the ever-increasing volume of traffic and frequency of trains, and the vast numbers of passengers carried, the safety record of Britain's railway system during the nineteenth century was an admirable one. During the first half of the period 1850-1909, the number of fatal railway accidents per year averaged 6.9; during the second half, that yearly average had fallen to 4.0. The general trend of every significant measurement of railway performance is similarly towards steadily improving levels of railway safety over the period of this study.²

Contemporaries were very ready to acknowledge the exceptional safety of the railways, and statistics which proved them to be safe were regular features of books, articles and newspaper accounts of their performance. A favoured conceit is that 'it is safer to travel by railway than to stop at home', given that a railway passenger is free 'from any danger of tumbling down stairs and breaking his neck, or of slipping over a piece of orange peel and dislocating his spine, or of being blown up in a coal pit, or of being torn by machinery, or of being burnt in bed'.³ *The Lancet* went so far as to claim, at the beginning of its inquiry into 'The Influence of Railway Travelling on Public Health', that 'Railway travelling is more

¹ Jack Simmons, 'The origins and early development of the express train', in *The Express Train and Other Railway Studies* (Nairn: Thomas & Lochar, 1995), pp. 23-7.

² See Appendix for the statistical evidence of improving railway safety.

³ F. S. Williams, *Our Iron Roads* (1852; 7th edn., 2 vols., London: Derby, Bemrose & Sons, 1885), vol. 2, p. 437.

free from actual danger to life and limb than any other mode of conveyance'.⁴ The journal reproduced Board of Trade figures to show that during the year 1860 there were sixty-eight railway accidents in Great Britain in which 515 people were injured and 37 lost their lives, and went on to point out that in London alone:

there were 70 persons killed and 910 injured by coach and carriage accidents in 1859. In Paris, the numbers in 1860 were 30 killed and 579 injured. The average number of deaths in coal-mines in this country is 1000 per annum . . . Here is proof sufficient of the comparative safety of railways compared with other modes of travelling and with other conditions of life in which the individual does not rely on himself for security.⁵

All the evidence suggests that, generally speaking, the Victorian public liked railways, and that members of almost all classes of society used them extensively, happy to exploit the opportunities and experiences which they offered. Railway companies, criticized for risking accidents through the high speed of their expresses, the intensiveness of their timetables and the number and size of their excursion trains could justifiably claim that they were responding to the demands of public opinion, which consistently pressured the companies into running more and faster trains, extensive holiday services and frequent commuter trains. The public increasingly depended on the railways as the nineteenth century wore on: for the daily arrival of fresh food and milk, for rapid mail delivery and the prompt arrival of their newspapers, for the opportunity to go on holiday to distant places, for the freedom to live in the country and commute to work in town, for the convenience of ordering goods by mail and having them quickly and efficiently delivered. Only the railways could do this; people very rapidly came to expect the railways to be at their service, and, by and large, the railways fulfilled that expectation. By 1850 Victorian society had become a society running on rails.⁶

Yet the railways' dominance of Victorian travel and transport nurtured, rather than extinguished, the slow but steady percolation of fear and anxiety through the

⁴ *The Lancet*, 4 January 1862, p. 16.

⁵ *Ibid.*

⁶ See Jack Simmons, *The Victorian Railway* (London: Thames & Hudson, 1991), chap. 14, 'Mobility', pp. 309-44.

layers of contemporary consciousness. There may have been little in the way of open reluctance to take to the rails, but unease remained beneath the surface. In 1846 the civil engineer Robert Ritchie considered the question of the statistical proofs of railway safety and their failure to reassure the public. Addressing himself to those who claimed 'that the number of accidents bears no relation to the number of passengers', he asked 'what force can there be in such a comparison?'

The question is not one of per centage or statistics, but is locomotive travelling based upon correct principles for general safety; for, were even the chances of death as only 1 to 1000, why should one be exposed to this contingency, or run this risk, if it can be avoided?⁷

Ritchie's particular concern was to defend steam locomotive operation against those, such as the engineer C. H. Greenhow,⁸ who claimed it was unsafe; the whole purpose of his book was to explain how railways could be operated safely, efficiently and economically using steam power. But, in making his case, he perforce acknowledged the fragile balance between danger and safety which railway operation involved. Ritchie was not an alarmist over railway safety, but he did not feel able to dismiss the anxieties of the public as groundless:

The numerous and fatal accidents which have happened with locomotive engines were supposed to be necessarily attendant on the infancy of the system, and as more experience was acquired in it, it was presumed, they would be got the better of; but their continuance has created well-grounded alarm as to the efficiency of the system itself.⁹

⁷ Robert Ritchie, *Railways, their Rise, Progress, and Construction: with Remarks upon Railway Accidents, and Proposals for their Prevention* (London: Longmans, Brown, Green, & Longmans, 1846), pp. 361-2.

⁸ C. H. Greenhow, *An Exposition of the Dangers and Deficiencies of the Present Mode of Railway Construction, with Suggestions for its Improvement* (London: John Weale, 1846). See also the anonymous pamphlet *Horse-power Applied to Railways at Higher Rates of Speed than Ordinary Draught* (London: John Ollivier, 1844).

⁹ Ritchie, *Railways*, p. 365.

Ritchie's view, as a railway engineer himself, was that absolute safety was not achievable, but that accidents could be prevented by instituting effective operational and mechanical safeguards. But public concern over railway safety was not amenable to such rational approaches. The daily reality of safe, efficient, routine railway operation was one thing; public perception was often quite another. It was not statistical proofs of safety which lodged in the public mind, but awful images of danger, destruction and death. The railway companies themselves recognised that this was the case. When the Railway Passengers' Assurance Company was set up in 1849¹⁰ — in itself a recognition of increasing public concern over railway safety — the railway companies' booking clerks, who sold the insurance to passengers buying travel tickets and received a commission, were instructed by their employers not to invite the taking of insurance directly, fearing that the open discussion of potential disasters on the railway might increase anxiety among travellers.¹¹ In 1850 the Company reported that 'There is still an unwillingness on the part of two or three Railway Boards to sanction the issue of Insurance Tickets on their lines. The plea of alarming passengers has been put forward as the ground of this refusal'.¹²

Public concern was naturally greatest after major catastrophes on the railways, such as the Abergele accident of 1868, the Armagh disaster of 1889, or during periods such as 1870-4 which saw a number of serious accidents in quick succession; but even at other times the constant stream of lesser mishaps, errors and breakdowns formed a continuous, well-reported background to the daily functioning of the railway system. 'We all know what risks we are always running', commented the *Saturday Review* in June 1865, 'and the narrative of hairbreadth escapes such as those of the passengers run into at Keynsham [a reference to a recent non-fatal collision] only confirms the general vague sense of danger'.¹³ 'Every train', asserted Edwin Phillips in the *Fortnightly Review* in 1874, 'from its starting to its destination, goes through a series of the most marvellous hairbreadth escapes; and if the travelling public had an inkling of the pitfalls that beset them,

¹⁰ For the background to the Railway Passengers' Assurance Company, and other railway insurance companies set up during the 1840s, see W. A. Dinsdale, *History of Accident Insurance in Great Britain* (London: Stone & Cox, 1954), pp. 55-9.

¹¹ See Michael Stewart, *The Railway Passengers Assurance Company, with Particular Reference to its Insurance Tickets* (Transport Ticket Society [no place of publication given], 1985), p. 7.

¹² Quoted in Dinsdale, *History of Accident Insurance*, p. 55.

¹³ *Saturday Review*, 17 June 1865, p. 725.

comparatively few would venture from home',¹⁴ while the *Saturday Review* characterized railway operation as a sequence of close shaves with catastrophe, as trains 'fly through junctions where the nodding pointsman has wakened with a start to turn the switches, and past sidings where an ill-coupled train of coal-waggons has lumbered off the line but a second before'.¹⁵ The companies were charged, in the journals and newspapers, in the law-courts and in parliament, with running more trains over their networks than could safely be managed and controlled; employing insufficient staff, and compelling them to work excessive hours; encouraging drivers to race at dangerous speeds by levying fines on them for unpunctuality; failing to invest in necessary maintenance; failing to make use of new safety mechanisms and procedures on the grounds of economy; and generally being more concerned with producing a dividend for their shareholders than with ensuring the safety of their passengers.¹⁶ When the popular novelist John Berwick Harwood published his three-volume novel *Lord Ulswater* in 1865, he was able to combine almost all these charges in the account of a cataclysmic railway accident which ends his story. The doomed train is 'flying, rattling, bounding, in its mad hurry and haste', its driver 'doing his very best to make up for lost time, and to save himself from fines',¹⁷ but the bridge towards which the train is speeding is in a precarious state. It was recorded as 'requiring thorough reparation' by the line's engineer, but no repairs have taken place, the railway company preferring to do nothing and trust to luck:

In the meantime, it was suffered to afford a prize specimen of the glorious uncertainty of railway management. The Secretary was unwilling to add the cost of repairs for the bridge to the already heavy bills for work and improvements: he had been

¹⁴ Edwin Phillips, 'The internal working of railways', *Fortnightly Review*, 15 (1874, new series), p. 375. Phillips, as editor during the 1870s of the *Railway Service Gazette*, the organ of the Amalgamated Society of Railway Servants, was a forthright defender of railway employees' rights and a vigorous critic of railway management.

¹⁵ *Saturday Review*, 27 April 1872, p. 532.

¹⁶ On the public image of the railways from the 1850s to the 1880s, see Jack Simmons's discussion of the anti-railway cartoons by John Tenniel published in *Punch* during this period: Jack Simmons, 'A powerful critic of railways: John Tenniel in *Punch*', in his collection *The Express Train and Other Railway Studies* (Nairn: Thomas & Lochar, 1995).

¹⁷ John Berwick Harwood, *Lord Ulswater* (3 vols., London: Richard Bentley, 1867), vol. 3, p. 273.

manipulating his accounts very carefully and painfully, and he did not wish, nor did the directors wish, to add a feather to the camel-load of expenses under which the sulky shareholders groaned. He had to face the shareholders at a meeting very shortly, and the better the small balance and the infinitesimal dividend showed, the better; so the word was given to patch up the rickety bridge with temporary props and struts of timber; to caution the engine-drivers on the duty of crossing it at a slackened pace, and —

Crash!¹⁸

The bridge, of course, collapses, precipitating the speeding train into the river, and ‘Juggernaut — the Juggernaut of irresponsible officialdom — was served to the full that day, and had his blood-sacrifice to the full’.¹⁹

Against this background, railway safety, particularly from the 1850s to the 1880s, became a topic of universal concern for the press, for public opinion, and for politicians. Although shipwrecks, mining accidents, mishaps on building sites, in factories and on the roads were all far commoner than significant railway accidents, and in each case killed and injured more people every year than did the railways, it was the violence, destruction, terror and slaughter of the railway accident which dominated the headlines, commanded public attention and pervaded the contemporary imagination. For the Victorian public, the statistics proving the safety of the railways, the overwhelmingly common daily experience of safe, reliable rail travel, counted for little in the face of the horror of the railway accident. ‘It is in vain to quote averages’, commented the *Quarterly Review* in 1878,

and to tell us that the proportion of railway passengers killed and mutilated ‘for causes beyond our control’ is one in eleven millions. The grisly terror of a railway accident dulls the force of any argument of that kind. The public mind turns from the computations of the arithmetician to the ghastly multitude of

¹⁸ Harwood, *Lord Ulswater*, pp. 276-7.

¹⁹ Ibid, p. 278. The fall of the bridge also gives Harwood the opportunity to stage a dramatic, climactic confrontation between the hero and villain of his story, who fight to the death amid the turbulent waters of the river and the shattered wreckage of the train.

victims, some sent to instantaneous destruction, others yet living, beside or underneath the dead, moaning inarticulately, or vainly shrieking . . . while the shattered carriages and hissing locomotives swell the hideous pyramid, and fill up the horror of the scene.²⁰

The problem of railway safety, the reader is encouraged to infer, is beyond any remedy — the railways devour and destroy, and nothing can be done. This was not the reality, of course; railway accidents were produced by technical, operational and human failings, all of which were capable of remedy, as the most railway-hostile sections of the media accepted — indeed, they attacked the railway companies precisely because those remedies were not forthcoming. But that this tone of despair is present in such comments from the later nineteenth century is indicative of the terrifying power of the railway accident in the contemporary mind.

Railways, press and public

The uniquely potent horror which the railway accident held for the nineteenth-century public was due not least to a phenomenon as characteristic of modernity as the railway itself: the mass media. Railway accidents have always been news, in a way in which the slow but inexorable stream of casualties on the roads has not; and from the outset, mishaps on nineteenth-century railways, especially if they involved fatalities, were exhaustively and often luridly reported in the press. Graphic pictures of railway accidents were frequently provided in illustrated journals (see figures 25 and 26), and some publications were not above providing imaginative reconstructions of the scene immediately after an accident (see figure 27) or even of the very moment of disaster itself (see figure 28). In 1850 Dionysius Lardner had written of railways that:

of all the means of locomotion which human invention has as yet devised, railway travelling is the safest in an almost infinite degree . . . nevertheless the apprehension of danger in this mode

²⁰ 'Railway accidents', *Quarterly Review*, vol. 145, no. 289 (1878), pp. 170-1.

of travelling entertained by timid persons, and even by some who scarcely merit that appellation, is not inconsiderable [because accidents] are commented on in the journals and public alarm is excited.²¹

Railway accidents had a prominent place in the later nineteenth-century cultural landscape. As well as the detailed coverage given them in newspapers and journals, they featured in novels, plays and sermons. The country clergyman Francis Kilvert notes several occasions in his diary in which recent railway accidents featured in his sermons in the 1870s,²² and it was not uncommon for sermons occasioned by railway accidents to be printed and achieve wide circulation.²³ There were several plays on the London stage which used railway accidents, notably Dion Boucicault's *After Dark*,²⁴ and accidents featured largely in many later nineteenth-century novels.

Not only were railway accidents dramatic, highly public, events, often involving large numbers of people; they also related directly to the daily experience of the newspaper- and journal-reading public, in a way in which other accidents did not. As Henry Booth, writing from the point of view of the professional railway manager, observed rather sadly in 1854:

We are constrained . . . to admit that a fatal catastrophe by railway, is far more calculated to excite sympathy and to arouse feeling than an ordinary stage-coach accident. It is an awful event

²¹ Dionysius Lardner, *Railway Economy: a Treatise on the New Art of Transport, its Management, Prospects, and Relations* (London: Taylor, Walton, & Maberly, 1850), pp. 331-2.

²² For example, 4 November 1874, on the collision on the Great Eastern Railway at Norwich Thorpe, and 8 September 1878, on an accident on the South Eastern Railway at Sittingbourne. See Francis Kilvert, *Kilvert's Diary 1870-1879: Selections from the Diary of the Rev. Francis Kilvert*, ed. William Plomer (Harmondsworth: Penguin, 1977), pp. 285, 359.

²³ For example, T. Talon, *The Tay Bridge Disaster: was it Accident or Judgment? A Sermon Preached in St. Vincent Chapel, Edinburgh, on Sunday, 11th January 1880* (Edinburgh: David Douglas, 1880).

²⁴ I would like to thank Dr Nicholas Daly, of Trinity College Dublin, for sharing his work on Boucicault and other aspects of Victorian 'sensation theatre' with me. Intriguingly, Boucicault was almost certainly the illegitimate son of Dr Dionysius Lardner, the prolific author of 'scientific' works on railways and many other topics. The playwright had another, tragic, connection with the railways; his son was one of the fourteen people killed in the Abbot's Ripton collision on the Great Northern Railway in January 1876. See Richard Fawkes, *Dion Boucicault: A Biography* (London: Quartet, 1979).

when such a catastrophe is witnessed by a hundred spectators — many of them shaken and terrified, and believing that they have narrowly escaped the same fate. Perhaps we ought not to wonder that popular sentiment is thus strongly aroused, and that men who have witnessed the disaster are stirred to indignant declamation on the tragic occurrence, who would have listened comparatively unmoved, to a narrative of 300 lives sacrificed by the wreck of an emigrant ship, or 40 or 50 by a colliery explosion.²⁵

Disasters at sea had always happened, and generally occurred out of public view, in an environment known to be dangerous, travelled only by those who knowingly accepted the risk. Colliery accidents similarly took place in a hidden realm known for its perilous character; only miners suffered, and only mining communities grieved. But railway accidents happened in the landscape of towns, villages, streets, fields and farms in which everybody lived, and affected people from all classes of society, doing ordinary everyday things. Railway accidents brought carnage and destruction on an unprecedented scale into the ordinary business of work and leisure, and everybody felt vulnerable. Writing of the Abergele accident in 1868, the *Saturday Review* commented that it was not the number of victims nor the particular horror of the event which caused it to make such an impression on the public mind, but ‘its nearness to us all’:

A great and sudden explosion in a coal-mine has oftener hurried more souls, and as suddenly, to their final account; a shipwreck presents more sublime, and at the same time more pitiful and terrible, details of suffering . . . [But] Few of us know anything of mines and powder-mills and ships foundering at sea. These things are but as distant tales and impersonal histories to most people. But we are all railway travellers; these trains and

²⁵ Henry Booth, *A Letter to the Right Hon. Lord Campbell, on the 9 & 10 Victoria*, Cap. 93 (London: John Chapman, 1854), pp. 5-6.

collisions, these stations and engines, and all the rest of it, are not only household words, but part of our daily life.²⁶

In a land which had known no significant large-scale conflict for two centuries or so, the sudden creation of great physical destruction and large numbers of dead and living casualties — often terribly mutilated and mangled — in the midst of peaceful, orderly everyday life, was a profound shock. Journalists and others searching for an image to convey the magnitude of a major railway accident often resorted to the imagery of the battlefield, an instance of the widespread militarization of image of the railway in the nineteenth century.²⁷ Thus *The Lancet* remarked in July 1858 that the injuries and deaths resulting from the Chilham accident of the preceding month had been ‘more severe and the results as serious as in many a smart skirmish in war’;²⁸ while in an editorial of 7 September 1861 the same journal commented that ‘the victims of these [railway] accidents number more than those of many a battle’.²⁹ In his *Gryll Grange*, published the previous year, the novelist Thomas Love Peacock had drawn the same parallel:

I see long trains of strange machines on wheels,
With one in front of each, puffing white smoke
From a black hollow column. Fast and far
They speed . . .

But while I look, two of them meet and clash,
And pile their way with ruin. One is rolled
Down a steep bank: one through a broken bridge
Is dashed into a flood. Dead, dying, wounded,
Are there as in a battle-field. Are these
Your modern triumphs? Jove preserve me from them.³⁰

²⁶ ‘The railway calamity’, *Saturday Review*, vol. 26, no. 670, 29 August 1868, p. 281.

²⁷ See below, chapter 3, ‘Working the Railway’.

²⁸ ‘Railway accidents’, *The Lancet*, 10 July 1858, p. 42.

²⁹ ‘The late railway accidents’, *The Lancet*, 7 September 1861, p. 235.

³⁰ Thomas Love Peacock, *Gryll Grange* (1860), in *Headlong Hall and Gryll Grange* (Oxford: Oxford University Press, 1987), p. 270.

When in December 1870 an express and a coal train collided head-on at Brockley Whins on the North Eastern Railway, killing five people and injuring more than fifty, the *Saturday Review* published an editorial which similarly implied a parallel between railway accidents and the disasters of war:

The descriptive powers of journalists are at present concentrated on the battlefields of France, and therefore our own domestic scenes of carnage receive perhaps less attention than would be given them in ordinary times. But the art of man directing the powers of nature has produced no more terrible result than this of an encounter between two railway trains moving in opposite directions upon the same line of rails.³¹

The suggestion was that there existed a clear parallel between the destruction and horror of the battlefield and the death and violence of the railway accident, calling for the same level of public revulsion and the same kind of journalism. The enormous scale and complexity of railway operations provided a further parallel between the working of the railways and the organisation of military campaigns, and, the *Times* suggested in 1884, the human cost of mistakes and failings was similarly high:

At the present time [the height of the holiday season] the rolling stock of all the railways, their permanent ways, points and signals, their servants of every degree, from the station master to the pointsman, are being put through the same ordeal as armies undergo in the field; and, unfortunately, the comparison holds good in every way, for the failures of railway management have always to be summed up in a shocking waste of human life.³²

³¹ 'Recent railway accidents', *Saturday Review*, vol. 30, no. 789, 10 December 1870, p. 748. 1870 was a particularly black year on British railways. At the time this article appeared in the *December Review*, there had been 12 fatal accidents and 74 passenger fatalities since January, and there would be two more terrible accidents, killing a further 21 people, before the end of the year.

³² *The Times*, 12 August 1884, p. 9.

'An unwieldy, unmanageable and wild power': regulating the railways

The perception underlying the *Times's* words is that the state of the railways, like the state of the nation's armed forces, is a matter of necessary public concern; in both cases the matter is simply too important, and the cost of mistakes too high, for it to be left to the unaccountable institutions of private management. Criticism of the 'failures of railway management' had been growing in volume and force since the 1850s: by the mid-1860s the terms 'railway management' and 'railway directors' were almost synonymous with arrogance, complacency and criminal carelessness, and the railways were perceived as an arbitrary and dangerous power which had to be curbed.

In the comic monologue 'Mrs Lirriper's Legacy' from *All the Year Round* (1864), Charles Dickens set out to satirize the shortcomings of real railways through his account of a miniature railway constructed in a lodging-house parlour. Mrs Lirriper, the kindly and garrulous keeper of the house, has a grandson, Jemmy, who is brought up by her and her lodger, Major Jackman. One of the activities which the boy and the Major share is the creation of 'the United Grand Junction Lirriper and Jackman Great Norfolk Parlour Line.' Jemmy and the Major run their miniature line in careful imitation of the full-size railway, with the latter writing monthly reports 'of the state of the Rolling Stock and the Permanent Way and all the rest of it (the whole kept upon the Major's sideboard and dusted with his own hands every morning before varnishing his boots)'.³³ Mrs Lirriper's role in the enterprise is to be 'the Public', purchasing shares in the Line and being fobbed off when she becomes concerned about safety:

... when I says to the Major, 'Major can't you by any means give us a communication with the guard?' the Major says quite huffy, 'No Madam it's not to be done,' and when I says 'Why not?' the Major says, 'That is between us who are in the Railway Interest madam and our friend the Right Honourable Vice-President of the Board of Trade.'³⁴

³³ *Mrs Lirriper's Legacy*, in Charles Dickens, *Selected Shorter Fiction*, ed. Deborah A. Thomas (Harmondsworth: Penguin, 1976), p. 316.

³⁴ *Ibid*, p. 315.

Mrs Lirriper has good reason to question the safety of the line with, as she remarks, the trains 'a getting off the line and falling over the table and injuring the passengers almost equal to the originals it really is quite wonderful', and 'the working signals beautiful and perfect (being in general as wrong as the real)'.³⁵ When the Line was opened it 'ran excursions and had collisions and burst its boilers and all sorts of accidents and offences all most regular correct and pretty'.³⁶

This, then, is the mid-Victorian railway as Dickens would have us see it: beset with derailments, boiler explosions and collisions; dangerous, badly run, inefficient; its safety measures inadequate, its managers complacent and arrogant; within a system of government regulation that colludes with its failings rather than seeking to remedy them. And by the 1860s and 70s this opinion was widely shared. It was generally believed that the numbers of railway accidents were increasing, and that accidents themselves were becoming more disastrous and destructive. The question of the frequency of accidents was bound up with issues of responsibility and competence on the part of the railway companies, which in turn involved the issue of government responsibility for railway safety, and the question of how far the state was justified in becoming directly concerned in railway operation in order to protect the public. Dickens's narrative thus reflects a complex situation in which the event of the accident was reflected in many different facets of contemporary culture, and had wide social, political and cultural ramifications.

From very early in the development of the steam-powered railway, in the 1830s and 40s, railway accidents were seen as existing in a different category from other accidents, and as requiring a novel response. In an age in which accidents were generally seen as private, individual misfortunes demanding a strictly limited range of response from society as a whole,³⁷ accidents on passenger-carrying railways were from the outset recognized as necessitating some form of collective action on the part of the community. It was widely agreed that the new mode of transport was potentially dangerous to a degree that was true of no other, and that effective arrangements would have to be instituted to ensure public safety. This can be seen in the early realisation that it was not, contrary to expectations, possible

³⁵ Dickens, *Mrs Lirriper's Legacy*, p. 315.

³⁶ *Ibid.*, p. 316.

³⁷ For more on this point, see Roger Cooter, 'The moment of the accident: culture, militarism and modernity in late-Victorian Britain', in Roger Cooter & Bill Luckin (eds.), *Accidents in History: Injuries, Fatalities and Social Relations* (Amsterdam: Rodopi, 1997).

to regard a railway line as a common highway onto which anybody could bring their vehicles and make whatever journeys they wished; in the adoption of set places where trains could stop and pick up passengers; and in the development of increasingly complex signalling and communication systems. Passengers and railway workers alike took some time to adjust to the demands of the new technology. Initially, trains were regarded as another kind of road-coach, and an attitude of occasionally fatal carelessness prevailed. People expected trains to give ample warning of their approach, to have the time to stop even when travelling at high speeds, or the freedom to swerve to avoid obstacles. Drivers misjudged braking distances; people wandered across the tracks, and even sat down upon the rails to eat and drink, passengers stood up in open carriages, got out when trains were moving, got out on the wrong side in stations and were run down by trains on adjacent lines.³⁸ The process of adjustment to the new conditions of mechanized transport can be seen as analogous to that associated with the enclosure of land; a formerly liberal condition, regulated by custom and practice, in which there was a constant margin for error, free choice, liberty of movement, was replaced by a tightly-regulated, mechanical system in which rules replaced custom. A similar process was, more gradually, taking place in urban streets, where new systems of segregation, regulation and direction were being developed and imposed under the pressure of increasing traffic.³⁹ On the railways, as on the roads, a tension existed between the *laissez-faire* attitudes which were so deeply ingrained in Victorian society and the systems of rules, and the means for enforcing them, which were increasingly recognised as essential for reasons of safety.⁴⁰

In the case of the railways, the structures of regulation were developed and implemented at various levels. Some of the most important were simply the result of universally accepted custom, such as the rule of the road that on double-track stretches of railway, trains travelled on the left-hand track; others were imposed by individual companies on their own systems and could vary widely from railway to railway. A third category was more controversial, and consisted of those conditions and requirements imposed by government. The development of the

³⁸ All these mishaps, and many more, occurred during the first five years of operation on the Liverpool and Manchester Railway, 1830-35. See Ferneyhough, *Liverpool and Manchester Railway*, pp. 84-6.

³⁹ See James Winter, *London's Teeming Streets, 1830-1914* (London: Routledge, 1993), pp. 34-49.

⁴⁰ See *ibid*, pp. 42-9.

railway system provided a new issue over which the proponents of *laissez-faire* and free enterprise could grapple with what were seen to be the increasing powerful forces in favour of greater state intervention and regulation in every aspect of national life. The legislation which regulated the railways, including a system of detailed accident investigation instituted in the 1840s,⁴¹ was more extensive, and took for granted from the beginning a wider acceptance of governmental responsibility for public safety, than was the case with any other industry or sector of the economy. As Harold Perkin notes, 'the government was *forced* to take an early and continuous interest in railway safety'.⁴² The series of regulation acts imposed on the railways by parliament, beginning with the Regulation of Railways Act 1840,⁴³ was largely motivated by a concern to protect public safety, as a contemporary pamphleteer, reviewing the progress of railway legislation, observed:

It will be remembered that, some years since, in consequence of the frightful number of appalling railway accidents, the legislature was obliged to interfere with the hitherto unlimited and irresponsible power possessed by railway companies, nor will it be forgotten the determined resistance which these bodies, individually and collectively, made to such interference; their opposition, however, was of no avail, and to the Board of Trade was confided the care of the lives and limbs of her majesty's subjects, the companies being bound to conform to its orders; and consequently an accident on a railway is now a matter of rare occurrence.⁴⁴

⁴¹ Railway companies had to make returns of accidents happening on their lines to the Board of Trade from 1840, and the Board investigated those which it judged significant. However, the Board's powers to investigate and compel the companies' co-operation were not made mandatory until 1871; a significant instance of the compromised approach to railway regulation in Victorian Britain.

⁴² Harold Perkin, *The Age of the Railway* (London: Granada, 1970), p. 107. Emphasis added.

⁴³ On this Act see Geoffrey Alderman, *The Railway Interest* (Leicester: Leicester University Press, 1973), p. 45.

⁴⁴ Anon., *Railway Reform; its Expediency and Practicability Considered* (London: Pelham Richardson, 1844), p. 14.

The writer is correct in emphasizing the central role of safety in motivating the railway legislation of the 1840s, but greatly exaggerates the powers of the Board of Trade at this early date. As Jack Simmons observes, what the Board exercised 'was supervision, not control'.⁴⁵ The reality was that the collision between the contemporary commitment to railway free enterprise (for example, the first parliamentary select committee to enquire into the railways, in 1839-40, was concerned not with safety but with the dangers of the development of monopolies in the railway industry⁴⁶) and the desire to contain and regulate the powerful and dangerous energies of the railway, produced a compromised and unsatisfactory system. The state recognized the existence of a collective responsibility for the safety of the travelling public but declined to take any actions which would compel the companies to accept it. As a Board of Trade official complained before the Select Committee on Railways in 1841, 'the Government has the responsibility [for public safety] without any of the powers which ought to accompany it'.⁴⁷ The powers of the Railway Department of the Board of Trade under the 1840 Act were limited to inspecting new lines of railway and warning the company concerned if they believed the line to be unsafe, but only under an amendment of 1842 did they gain the ability to prevent the opening of any line which was believed to be dangerous to the public. When investigating accidents, the Board of Trade could advise railway companies to make changes in their equipment and operating procedures, but could not force them to comply. However, at a time when any extension of government supervision and intervention over private industry was almost universally viewed — both inside and outside government — as undesirable, indeed as unnatural and damaging, this was seen by some as an extensive assumption of responsibility for public safety by the state,⁴⁸ and provoked a great deal of criticism. From the point of view of the railway companies and their shareholders, the assumption by government of the right to interfere in railway management and operation in the name of 'public safety' was all too clear, and was strongly resented.

⁴⁵ Simmons, *Victorian Railway*, p. 80.

⁴⁶ H. J. Dyos and D. H. Aldcroft, *British Transport: An Economic Survey from the Seventeenth Century to the Twentieth* (Leicester: Leicester University Press, 1969), p. 141.

⁴⁷ Report of the Select Committee on Railways, *Parliamentary Papers* 1841, XXV [287], p. 3.

⁴⁸ Jack Simmons points out that there was no appeal through the courts against the Board of Trade's prohibition on a new line being opened. Simmons, *Victorian Railway*, p. 80.

The companies held that they knew best how to run railways, and that the state's role was to leave them to do so unencumbered.⁴⁹ Some argued that if the government was empowered to impose safety measures on the railways, the public would be less safe; in 1853 C. A. Saunders, the secretary and chief superintendent of the Great Western Railway, asserted before a parliamentary select committee that to give the government the power to impose improvements on the railways in the name of public safety would be likely 'to paralyse exertion and endanger the safety of railway travelling, by diminishing the responsibility of railway companies, and that the public opinion will always act on railway boards and managers, in a much more wholesome manner than a Government department can do so'.⁵⁰ An anonymous author complained in a pamphlet of 1845 that the Act of 1840 'was founded on the specious pretext of anxiety for the public welfare', and continued:

It is curious to remark the steps by which the Government persuaded themselves and the Parliament that their control over Railway Companies is required for the safety and advantage of the public. Having assumed that Railways with fizzing steam-engines running thereon are *monstr' horrendum*, an unwieldy, unmanageable and wild power, dangerous to all the community; having, in fact, imbibed all the tremors with which old maids first endured their passage through the tunnels; they rush to the conclusion, that the country cannot survive unless protected by their own sagacity and skill, aided by a band of Government Inspectors.⁵¹

By this means, 'the principle of interference by the Executive in the management of private companies is for the first time admitted, without thought or proper

⁴⁹ On this, see Simmons, *Victorian Railway*, p. 81.

⁵⁰ *Parliamentary Papers*, 1852-53, vol. XXXVIII (Cd. 170), p. 155.

⁵¹ Anon., *Ruminations on Railways. No. II. The Railway Board of Trade* (London: John Weale, 1845), pp. 5, 8.

consideration',⁵² and 'the Government are made the Commanders-in-chief of every Railway Company'⁵³ on the pretext of protecting the safety of the public.

The anonymous author of this pamphlet saw the concerns animating the state's efforts to regulate the railways as being of a piece with the groundless fears of the ignorant public; and indeed there was a connection between the government's policy towards railway accidents and railway safety and the attitudes of the public. Railway accidents caused great concern, and were viewed as being in a different category from other accidents. This was partly because accidents on the railway were recognized as potentially more dangerous than road accidents. When in 1849 a dispute over tolls on a stretch of line near Manchester led to two railway companies attempting to blockade one another's trains — resulting in no fewer than eight trains being stuck fast and all traffic coming to a halt — the *Illustrated London News* was sharply critical of the companies involved, pointing out that 'police regulations will not tolerate that two rival omnibus drivers should block up a street to impede traffic and endanger life by their quarrels, neither should the infinitely more dangerous blockade of a line of railway be allowed to pass unpunished'.⁵⁴ Underlying the response of society and government to the regulation of railways during this period, as with so many other aspects of nineteenth-century reactions to the railway, is the perception of railways as uniquely dangerous, destabilizing and threatening.

Many railway managers felt strongly that it was unfair to distinguish railway accidents from other types of accident, and to single out the railways for special treatment as a result; Henry Booth spoke for many when he expressed the view that in imposing regulation and penalties on the railways, politicians had 'ministered to the popular sentiment of the hour',⁵⁵ rather than accepting that 'there is no absolute immunity from casualties, and, in the very nature of things, can be none',⁵⁶ and that the frequency of railway accidents was 'not inconsistent

⁵² *Ruminations on Railways*, pp. 8-9.

⁵³ *Ibid.*, p. 17.

⁵⁴ *Illustrated London News*, 24 March 1849; quoted in Jack Simmons (ed.), *Railways: An Anthology* (London: Collins, 1991), p. 74.

⁵⁵ Henry Booth, *A Letter to the Right Hon. Lord Campbell, on the 9 & 10 Victoria, Cap. 93. Being an Act for Compensating the Families of Persons Killed by Accidents. — (26 August 1846) Showing the Injustice of the Measure and the Propriety of Immediate Repeal* (London: John Chapman, 1854), p. 6.

⁵⁶ Henry Booth [under pseud. 'A Shareholder'], *The Case of the Railways Considered, Especially with Reference to Railway Accidents, and the Operation of Lord Campbell's Act* (London: W. H. Smith & Son, & Liverpool: Baines & Herbert, 1852), p. 22.

with the doctrine of chances, nor at variance with the returns of the Registrar-General'.⁵⁷ Such complaints were in vain, however; railway accidents continued to be seen as uniquely dramatic and dreadful, and the view that it was the business of the whole community to deal with them, rather than purely the individuals affected, became more and more influential.

The safety of the public

In 1877 Benjamin Disraeli, addressing the House of Commons at a time when concern about railway safety was at its height among public, press and politicians, described railway accidents as 'perhaps our greatest domestic question'.⁵⁸ During the previous ten years there had been a number of particularly appalling and bloody accidents, and widespread concern that the railway companies were careless with public safety. At the beginning of the 1870s the major accidents at Warrington (1867) and Abergele (1868) were still a recent memory, and to the impression of horror created by those catastrophes were rapidly added the effects of a series of further disasters: the first half of the decade saw (among others) the accidents at Newark, 16 killed; Stairfoot, 15 killed; Kirtlebridge, 10 killed; Wigan, 13 killed; Bo'ness Junction, 16 killed. 'A very natural impression prevails amongst the public that railway travelling is very unsafe, owing to the frequency and terrible destructiveness of accidents during the past twelve months', observed Edwin Phillips, editor of *The Railway Service Gazette*, in March 1874, and he went on to predict 'that sooner or later we may confidently expect a series of disasters unparalleled in the history of railways'.⁵⁹ His gloomy prediction was fulfilled. Before the end of the year the accidents at Norwich and Shipton had left 55 people dead; and the bloodshed continued into the second half of the 1870s with a total of 39 dead in collisions at Abbot's Ripton, Radstock and Pontypridd, and the final climactic catastrophe of the fall of the Tay Bridge in December 1879 which killed 73 people. Apart from these large-scale calamities, there was a constant stream of lesser but still significant mishaps, invariably widely reported in the press and

⁵⁷ Booth, *Case of the Railways Considered*, p. 5.

⁵⁸ Quoted in James R. Moore, 'Theodicy and society: the crisis of the intelligentsia', in Richard Helmstadter & B. Lightman (eds.), *Victorian Faith in Crisis* (London, 1990), p. 158. I am grateful to Roger Cooter for drawing my attention to this reference.

⁵⁹ Edwin Phillips, introduction to pamphlet by 'A Signalman', *A Voice from the Signal-box: or, Railway Accidents and their Causes* (London: Longmans, Green & Co., 1874), p. 3.

cumulatively adding to the public impression of the railways as dangerous and destructive. In 1873 the *Saturday Review* published a summary of 'a month's railway accidents':

The season began on the 1st, when there was a collision on the North-Eastern near North Shields, by which several carriages were broken and a number of passengers injured. Early next morning came the terrible Wigan accident — fifteen killed and many maimed and wounded; and on the afternoon of the same day a couple of trains ran into each other at Redhill, on the South-Eastern. Then there were collisions on the 4th and 6th on the Lancashire and Yorkshire, and on the 5th on the Great Western — two killed.⁶⁰

The account continues in this vein for almost a full column of small, close-set type, describing incidents on the 7th, 12th, 15th, 18th, 22nd, 24th and 31st of August and the 2nd and 4th of September, including the shivering of a train of empty carriages 'into "small fragments," which would no doubt have been the fate of the passengers, had there been any'; 'the dreadful collision at Retford, between a fish train and an excursion train, three killed and thirty injured'; and an excursion train 'run into by a goods train . . . a great many passengers being hurt'.⁶¹ The following issue saw the *Review* comment that 'It will be time enough to leave off protesting against the homicidal management of railways when the daily slaughter ceases . . . Last week we reckoned up the catastrophes of the previous month. In August there were three or four a week; in September there is one at least a day'.⁶² Overall, the 1870s, which L. T. C. Rolt has called 'a black decade in railway history',⁶³ saw an average of nearly 41 passenger fatalities in railway accidents per year, which was the highest level reached on British railways during the period 1860-1914;⁶⁴ and while the succeeding decade saw the average fall to 25 the horrific nature of some

⁶⁰ *Saturday Review*, 6 September 1873, p. 301.

⁶¹ *Ibid.*

⁶² *Ibid.*, 13 September 1873, p. 334.

⁶³ L. T. C. Rolt, *Red for Danger: a History of Railway Accidents and Railway Safety* (1955; 3rd edn., Newton Abbot: David & Charles, 1976), p. 61.

⁶⁴ For the full figures for the period 1850-1909, see table 3 in the Appendix.

of the accidents during this period, notably Penistone (1884), Hexthorpe (1887), and, most terrible of all, Armagh (1889), in which eighty were killed, many of the victims being children, ensured that public concern over accidents did not recede.⁶⁵

The orthodoxy which had reigned since the passing of the first piece of legislation regulating railways in 1840, that state interference in all aspects of railway enterprise should be kept to a minimum,⁶⁶ found itself under increasingly effective challenge as the outcry over the 'hecatomb of victims'⁶⁷ claimed by railway accidents continued to mount. Henry Parris identifies 1867 as 'a turning point in relations between railways and the state. For more than two decades before that date there had been no significant increase in the government's powers . . . But from 1868 onwards the tendency towards greater state intervention resumed'.⁶⁸ The Board of Trade, for the first time, intervened directly in railway operation by requiring a system of communication to be instituted between passengers and train crews. This was the Board's own initiative; the select committee in to the railways which had published its report in 1867 had recommended no such action, and indeed had concluded that the railways were best left to manage their own affairs. In taking such action the Board of Trade was acknowledging public concern over the isolation of railway passengers in their compartments, particularly following the Briggs case of 1864; it is thus a clear example of the government responding to precisely the kind of middle-class anxiety associated with railway travel discussed earlier in this study. As it happens, the system of communication recommended by the Board was a failure, and the episode tended to confirm the railway companies in their view that direct government intervention in railway operation was undesirable and damaging. A precedent had been set, however, and henceforward the attitude of the Board towards the companies was more interventionist.

By the 1870s it was generally agreed that the technology to address the main causes of many railway accidents was already in existence;⁶⁹ it was a matter of

⁶⁵ See Appendix, tables 1 and 2, for a summary of railway accidents during this period.

⁶⁶ See Alderman, *Railway Interest*, p. 45.

⁶⁷ 'The railway point of view', *Saturday Review*, 13 September 1873, p. 333.

⁶⁸ Henry Parris, *Government and the Railways in Nineteenth-century Britain* (London: Routledge, & Toronto: University of Toronto Press, 1965), p. 212.

⁶⁹ Fixed signals dated from the mid-1830s; semaphore signals equipped with lights had been introduced in the 1840s; the interlocking of signals with each other and with points was developed and perfected during the 1840s and 50s; the electric telegraph first appeared in 1836, and its

getting the railway companies to use it. As an anonymous 'Railway Servant of fifteen years' experience' asserted in 1873, 'means are at hand whereby all preventible railway accidents might be entirely remedied, if the companies would only apply them'.⁷⁰ Between the 1840s and the late 1860s the Board of Trade had consistently championed the innovations necessary to improve safety on the railways, notably the block system (which prevented one train from entering a section of track still occupied by another), full interlocking of points and signals (which prevented the erroneous and conflicting signalling and routing of trains), and braking systems adequate to the control of faster and heavier trains (which required the connection of every vehicle in the train to a continuous braking system). In the case of the block system, for example, which depended on the electric telegraph to keep signalmen informed as to the relative locations of trains, the first fully-operational versions were in use in the mid-1840s,⁷¹ but it took many years for it to gain general acceptance and to be adopted across Britain's railways. The view of the Railway Companies' Association was that 'Block and Interlocking Systems were both good, but not infallible or necessary in all cases'.⁷² The Board of Trade disagreed, and from circa 1867 became, gradually and reluctantly, more reconciled to using legislation to compel action from the companies, encouraged by the pressure which public opinion was bringing to bear on the railways. The same process occurred with regard to continuous brakes. As Michael Reynolds observed in 1889, the year in which the railway companies were finally compelled by law to implement full absolute block working and instal continuous brakes, 'a large proportion of the positive and accurate working of some railways is due to an influence which more or less uniformly supports the railway officials of the Board of Trade — namely, the Press'.⁷³ The rise in public concern over railway safety during this period thus both created a climate in which the Board of Trade could take more direct action with regard to the railways, and gave the Board a

application to railways spread in the late 1830s and 1840s. See Michael A. Vanns, *Signalling in the Age of Steam* (Shepperton: Ian Allan, 1995); O. S. Nock, *Historic Railway Disasters* (1966; 4th edn., revised by B. K. Cooper, Shepperton: Ian Allan, 1992), pp. 11-13; Rolt, *Red for Danger*, passim.

⁷⁰ Anon., *The Principal Causes of Railway Accidents with Proposed Remedies, by a Railway Servant of Fifteen Years' Experience* (Edinburgh: MacLaren & MacNiven, &c., 1873), p. 16.

⁷¹ Vanns, *Signalling*, pp. 15-16.

⁷² Minutes of a meeting of the Railway Companies' Association, 4 March 1873. Quoted in Alderman, *Railway Interest*, p. 49.

⁷³ Michael Reynolds, *Engine Driving Life: Stirring Adventures and Incidents in the Lives of Locomotive Engine-Drivers* (1881; 2nd edn., London: Crosby, Lockwood & Son, 1889), p. 181.

useful ally in its efforts to encourage, coerce and pressurize the railway companies to fall in with its recommendations.⁷⁴

In essence, the novelty and extent of the dangers with which the railway threatened the travelling public compelled a transformation in contemporary attitudes to the powers of government. Just as a degree of direct state intervention in mines and factories had been (reluctantly) accepted on the grounds of safety, so the extension of the conditions of the industrial factory which railway travel represented required a new level of government regulation and even direct control. The history of nineteenth-century railway regulation is the history of the gradual working-out of the tensions between a *laissez-faire* ideology of unfettered free enterprise and a conviction that the railways were too big, too powerful, too important and too potentially dangerous to be left to their own devices. In particular, the opinion gained ground that the companies simply could not be trusted with the public's safety. It was this dimension, the protection of the (specifically middle- and upper-class) public, which made railway regulation different from other systems of industrial regulation introduced in Britain from the 1830s. There were no middle-class men and women in the mines, no aristocrats or bishops working on the factory floor; but such people were now constantly travelling by train, and risking railway dangers.

Anatomizing the accident

The Victorian railway was a uniquely complex and powerful machine, in which vast energies were held in fragile balance. Like all mechanisms, it contained within itself the potential for breakdown, malfunction and crisis. The more complicated and powerful machines became, the more disastrous and destructive were the consequences of any breakdown; and although railway accidents were not the most common accidents of the nineteenth century, nor the most destructive or costly in life and limb, the sheer scale of the railway and the terrible consequences of any failure in its complex and delicate mechanism meant that they were accorded a unique importance in the collective mentality of the age. Just as the Victorian

⁷⁴ The best discussion of the controversies over block working, interlocking and continuous brakes is in Alderman, *Railway Interest*, pp. 48-58.

railway was a vast and highly visible expression of technology triumphant, so the railway accident constituted a uniquely sensational and public demonstration of the price which that triumph demanded — violence, destruction, terror, injury and death. It expressed in a particularly dramatic and striking form the often traumatic nature of the encounter between the human mind and body, and the new industrial realities of the railway.

Progress, instability and accident

The railway, as we have seen, played a key role in nineteenth-century conceptualizations of progress. The prevalence of accidents, however, posed an obvious difficulty for those who associated the railway with continuing material and moral progress of society, a difficulty that increased as accidents were seen to become more frequent and more destructive. According to one influential discourse, the huge, powerful and complex railway machine was an expression, an outcome and a guarantor of the beneficial progress of industrial society. This is clearly one permutation of the more generalized Victorian association of the railway with progress which was discussed earlier;⁷⁵ but in this context it is the stress placed on the specific issue of control which is significant. The energies of the railway, which can be seen as an aspect of the energies of progress itself, are contained within a structure of control and restraint. This structure is erected around the principle that progress, like the railway locomotive, is powerful and fast-moving, but the sources of its power are comprehensible and controllable. Within this analysis, even the violence and destruction of the accident can be seen as offering proof that there is nothing beyond the reach of human understanding and skill; for the accident can be investigated, comprehended and tamed. Its causes can be penetrated, appropriate preventive measures put in place, and it can be transformed into an occasion of improvement — the servant of progress, rather than an obstacle in its way.

However the railway could also be seen as symbolizing a far more threatening nexus of technology, progress and destruction. In this scenario, it stood as the exemplar of the ever more powerful, ever more complex, ever more potentially catastrophic technologies which threatened to escape the flimsy bonds of human

⁷⁵ See above, chapter 1, 'The Spectacle of Progress'.

understanding and restraint and wreak havoc all around them. In this formulation, the railway is no longer the essentially stable subject of the optimistic representations of progress, but a freewheeling machine of destruction, beyond human management or comprehension, carrying its own creators with it towards disaster. Thus the accident is not a by-product of progress but the inevitable catastrophic consequence of the creation and setting in motion of this mechanism. Even where an accident leads subsequently to improvements in machinery and operating procedures, the emphasis is on the price such improvements demand in destruction, suffering and death, rather than the turning of the event to beneficial ends, and on the inevitability of further accidents, of a continued extraction through violence and death of the price demanded by progress.

Nineteenth-century railway accidents were the products of industrialized, mechanized society; although the time, place and nature of a particular accident could not be determined in advance, subsequent investigation almost invariably established that, had the causes been perceived, the accident could have been prevented. In a sense, accidents were retrospectively predictable, because they were products of a particular socio-cultural-technological moment. It was upon this fact that the whole structure of response to railway accidents — investigation, report, remedial action — grew up during the nineteenth century. The response, like the accident itself, was culturally determined. In this context, it can be seen that the view that the accident was ultimately comprehensible and in some sense confinable, and could even be constructive was not necessarily inconsistent with the sentiment that accidents were the acts of fate, or constituted the inevitable price of progress. The key to reconciling these two apparently contradictory theorizations is provided by the issue of human agency. The railway system placed men in situations in which their failings could have disastrous consequences, out of all proportion to the original mishap or mistake. L. T. C. Rolt, an engineer himself as well as a historian, identified this point precisely in his 'history of railway accidents and railway safety', *Red for Danger*, and it is worth quoting his words at some length:

A railway accident is always news . . . the railway disaster is a tragedy with a dramatic quality which is practically unique. Other disasters, often claiming a far heavier toll of human life, frequently fill the pages of our newspapers. A volcano erupts; an

earthquake rocks a town; fire destroys a great building; a ship is lost by storm at sea. Such calamities are almost invariably tragic in the sense that the Greeks understood the word. They reveal man as the victim of forces or circumstances against which he is powerless. Only very rarely in peacetime is he directly responsible for bringing comparable destruction upon himself or others. But in the case of disasters on the railway the reverse is true . . . the pure 'accident' — the accident caused by fate alone — is rare on the railway. Almost invariably human fallibility is responsible. The cause is found to be trivial — a single mistake on the part of engine driver, guard or signalman, fitter, shunter or permanent way man or some fatal lack of co-operation between them. It is in this contrast between trivial error and terrible consequence that the drama of the railway accident lies. Is this not the essential stuff of all great tragedy?⁷⁶

The size, complexity and power of the machinery which railway workers had to control vastly magnified the results of their actions, emphasizing how these mighty technologies had placed huge strains on the capabilities of the human mind and body. As Michael Reynolds observed, 'it is no exaggeration to state that railway working is as delicately sensitive to human touch, or individual agency, as gunpowder is to fire'.⁷⁷

There is a complex relationship between the accident and the concept of progress. The accident can be considered an interruption of progress, erupting unpredictably into a system and disrupting its normal functions. It can equally be understood as a consequence of progress, because the more developed and complicated a system is, the more vulnerable it is to failures and malfunctions; and as a guarantee of continuing progress because the response to an accident generally involves improvements in systems and procedures to prevent it happening again. Reynolds highlights this ambiguous relationship:

⁷⁶ Rolt, *Red for Danger*, pp. 15-16.

⁷⁷ Reynolds, *Engine Driving Life*, p. 178.

There are not more than two or three accidents exactly alike in all particulars; which is assurance that no accidents happen but the officials put into action counteracting means to prevent their being repeated. Still we find some new foe dogging the wheels of our trains, never satisfied without a funeral pile.

Truly we pay for our railway experience with life, dear life. There is scarcely an improvement which has not been brought about by suffering and death; and the dreadful thirst for victims is as keen as ever. Not all the combined wisdom and sagacity of scientific men can grapple with the Hydra-headed victor. Cut down and disarmed today in the east, it springs up again in the west, and new victims fall, never to rise.⁷⁸

The model of technological civilization which Reynolds depicts in this characteristically melodramatic passage, is one of constant improvement, but also one of inherent and ineradicable instability and risk, fraught with precarious dialectical relationships: between energy and constraint, predictability and variability, destruction and innovation, accident and improvement.

The instability which Reynolds describes is not a by-product of railway operation; it is inherent to it, just as it is inherent to the idea of progress itself. Any belief in constant progress and improvement predicates the existence of constant flux and change, and the positive Victorian ideology of evolutionary progress inevitably co-existed with a potentially much darker view of the world as prey to constant disruption and turmoil. The curve of progress seeks to follow a stable, rising path, but the continual change upon which it depends threatens that stability.⁷⁹ Viewed in the evolutionary perspective which came to dominate later Victorian thought, the assertion by Darwin and Huxley of the inevitability of continuous change, both progressive and regressive, appeared fully justified. In geology and biology, in politics and society, the Victorians saw a world fraught

⁷⁸ Reynolds, *Engine Driving Life*, p. 157.

⁷⁹ On the progress/flux-stability/instability paradox in technological society, see Cecilia Tichi, *Shifting Gears: Technology, Literature, Culture in Modernist America* (Chapel Hill, N.C.: University of North Carolina Press, 1987), especially chapter 2, 'Instability, Waste, Efficiency'. Tichi's richly-detailed and insightful study is concerned with the United States, but her analysis and insights can be usefully applied to nineteenth-century Britain.

with instability, subject to relentless change, flux and upheaval, in which a constant condition of disequilibrium undermined their efforts in the direction of improvement and progressive development. To many, instability appeared to be the natural condition of every area of life, as communities dissolved, families fractured, individuals fragmented, and accidents and disasters spread death, destruction and terror.

Technology was a paradoxical presence in this unstable universe. The machine was the epitome of the calculated, the measured, the stable and predictable, an embodiment of human control over the material and natural world; but it was simultaneously a centre of instability, destructiveness and risk. From gas lighting to steamships, omnibuses to fairground pleasure rides, power tools to pumping engines, mechanical devices revealed a potential for unleashing violent, uncontrolled and destructive energies. The railway, that most prominent and pervasive of large-scale modern mechanical devices, was also the foremost embodiment of that potential threat; and the railway accident was a uniquely powerful and terrifying instance of the threat made actual.

Victorian railways strove for an impression of stability and permanence, in the massive solidity of their buildings and earthworks, the regularity of their timetabled operations, their uniformed and ordered hierarchies of staff, their appropriation of the imagery of heraldry in their emblems and liveries (see figure 29). The very tracks themselves were known as the 'permanent way'⁸⁰ (see figure 30). A visitor from America commented in the 1880s that 'The feature of the English railroad system which most forcibly strikes an American observer is its stability' and cited 'the massive stone bridges, the tunnels and viaducts, the station accommodation, and a thousand details of less importance' as contributing to 'an impression of solidity and finish'.⁸¹ Victorian railway enterprise was grand, monumental, and eternal in its ambitions. It was also a dramatic and pervasive embodiment of the principle of constant evolutionary development, continually

⁸⁰ This term, which was in use from the earliest days of railway construction, was originally used to distinguish the completed railway 'from the *temporary* way laid down for the use of the contractor in the construction of the line' (Williams, *Our Iron Roads*, vol. I, p. 227), but the significance of the phrase outgrew its purely practical origins to become an expression of the scale and stability of railway enterprise.

⁸¹ A. T. Hadley, *Railroad Transportation* (1886); quoted in Simmons (ed.), *Anthology*, p. 35.

expanding, connecting, improving. The railway and the telegraph, wrote the reverend John Blakely in 1855,

are not only marvels of science to astonish the learned, but also ministers of physical and mental elevation to the human race. The earth itself is becoming a vast machine . . . encircled with a mechanical framework, it is bearing to and fro, upon iron rings, its living millions, while its electric net work of wire arteries is incessantly throbbing with the quick pulsations of human thoughts.⁸²

For Blakely, who wrote that in 'the rushing carriages of the railway, and the trembling vibrations of the electric telegraph, the Divine presence may be seen and felt as really as when reflected by the sublimest objects of natural scenery',⁸³ this was evidence of the working of divine providence in human affairs, but it was not necessary to invoke the deity to see in the railway and in other technological advances evidence of improvement and progress. An anonymous pamphleteer of 1844 spoke for many, before and after, when he wrote that 'these two mighty pioneers of civilization and science, the Steam-Engine and the Railway, are day by day entering on new tracks, and penetrating regions almost unknown; confined to no hemisphere, indigenous to every soil, careless under what Government they exist, onward are they marching with giant strides'.⁸⁴

With that process of elaboration and development, however, went an inexorable increase in the instability inherent to any complex, developing system. As the railway network extended and became more technologically advanced, as its machinery became more powerful and complex, and as an ever-increasing range of activities became dependent on its operations, the greater became the risk of mishap and the more catastrophic became its impact. A direct relationship existed between the increasing complexity of the railway and the severity of the accidents to which it was subject. *The Encyclopédie des chemins de fer et des machines à vapeur*, a French technical encyclopedia published in 1844, commented on this

⁸² John Blakely, *The Theology of Inventions: or, Manifestations of Deity in the Works of Art* (Glasgow: William Collins, 1855), p. 76.

⁸³ Ibid, p. 248.

⁸⁴ Anon., *Railway Reform*, p. 71.

phenomenon when it stated that 'All man-made things are subjected to accidents. By a kind of compensation . . . the more these things are perfected, the greater the gravity of the accidents that happen to them'.⁸⁵ The significance of the railway accident was that it marked a catastrophic failure of human control over the dangerous forces inherent in mechanised progress; it could be taken as a sign that the price such progress demanded was too high, that ability of humanity to change the world through technology was outstripping human ability to regulate the forces those changes unleashed. The locomotive became the prototype of the autonomous, uncontrollable machine, and the railway accident served as a constant reminder of how seemingly inadequately its potential for disaster and destruction was restrained.

Working the railway

'Discord and confusion underly all railway working', wrote Michael Reynolds in the 1880s, 'but the rightly-prepared mind and eye can steer through the vague mass of points, and traps, and gullets, and signals, and tunnels'.⁸⁶ Reynolds depicts the railway as having an arcane and complex mystery at its heart, which only trained adepts can seek to understand. The complexity and incomprehensibility of the railway machine is a recurrent theme in nineteenth-century texts; Reynolds's view is echoed in many of Dickens's writings on the railway, which in turn reflect sentiments found in all kinds of contemporary responses to the railway. In the 'Mugby Junction' series of stories, the central character, 'Barbox Brothers', is bewildered when he observes the scene at the vast junction:

But there were so many Lines . . . And then so many of the Lines went such wonderful ways, so crossing and curving among one another, that the eye lost them. And then some appeared to start with the fixed intention of going five hundred miles, and all of a sudden gave it up at some insignificant barrier or turned off into a workshop. And then others, like intoxicated men, went a little way very straight, and surprisingly slued round and came

⁸⁵ Quoted in Schivelbusch, *Railway Journey*, pp. 132-3.

⁸⁶ Reynolds, *Engine Driving Life*, p. 57.

back again . . . there was no beginning, middle, or end, to the bewilderment.

Barbox Brothers stood puzzled on the bridge, passing his right hand across the lines of his forehead, which multiplied as he looked down, as if the railway Lines were getting themselves photographed onto that sensitive plate.⁸⁷

The railway is presented as a vast enigmatic presence, confronting onlookers, passengers and workers with an appearance of outward chaos that is all the more perturbing in that it suggests not so much the lack of an order as the presence of an order which is not accessible or understandable, symbolized in the railway signals at the junction communicating 'Unknown languages in the air, conspiring in red, green, and white characters'.⁸⁸ There is a hint here of the railway as a vast intelligence in its own right, an autonomous, occult power preying on society rather than serving it.

In 1866 Charles Dickens's short story *No. 1 Branch Line. The Signalman* appeared in the special *Mugby Junction* Christmas number of *All the Year Round*. In the figure of the signalman, a man haunted by spectral and incomprehensible warnings of impending danger, Dickens created an emblematic figure of the railway age; his desperate plea expressive of the ever present, often overpowering anxiety which conditioned Victorian attitudes to the railway: 'What is the danger? Where is the danger? There is danger overhanging, somewhere on the Line. Some dreadful calamity will happen'.⁸⁹ Those who, like the signalman, worked on the railway were in a different position from that of railway passengers. The latter were powerless; their lack of control over their situation is one of the recurrent themes of this study. But those who worked the railway, signalmen, drivers, guards, station staff, had direct access to the technical and administrative mechanisms of railway control and operation. To the travelling public the railway locomotive, the signal box, the goods yard were places of mystery. To those who worked with them every day, they were their workplaces and the tools of their

⁸⁷ Charles Dickens, *Barbox Brothers*, in *The Nine Christmas Numbers of All The Year Round* (London: Chapman & Hall, c. 1870), p. 4.

⁸⁸ *Ibid*, p. 2

⁸⁹ Charles Dickens, *No. 1 Branch Line. The Signalman*, in *The Nine Christmas Numbers of All The Year Round* (London: Chapman & Hall, c. 1870), p. 24.

trade. Yet for such men (and during the period in question, railway workforces did consist entirely of men) the dangers of the railway were, if anything, more immediately present than was the case for passengers. There was no shielding mechanism protecting the signalman and the engine driver from the industrial realities of the railway machine.

The story of *The Signalman* is not a signalman's story. It is Dickens's story, a narrative in which the central figure is Dickens's imagined signalman. This, however, does not make it any less important as a source text for later nineteenth-century perceptions of the railway. Perceptions as much as realities are the raw materials of the present study. Dickens was both a railway traveller and a railway accident victim; he was part of the Victorian middle-class travelling public, and stands as a uniquely important articulator of significant trends in middle-class attitudes and perceptions. His signalman is a paradigmatic figure, representing the vague but potent dangers of the Victorian railway. The fact that he is not a passenger but a railway worker, and stands within the railway world, deepens rather than lessens his relevance and importance. He is a component of the railway machine, but he is as much a passive subject of its processes as the railway passenger. He, too, is a powerless victim of vast incomprehensible forces. Dickens frames his narrative as a ghost story, giving the forces preying on the signalman a supernatural guise, but, like the claustrophobic and unnatural landscape of the story,⁹⁰ those forces are identified with the railway — its signal lights, bells, telegraph, and rushing trains. The railway itself is the agent which haunts the story, as its presence, its power and its peril haunted the Victorian imagination.

Accident, anxiety and assimilation

The railway was both an agent and an icon of modernization for the middle classes, who had little direct experience of the factory floor, or direct exposure to industrial machinery and its demands. Through the railway journey, the travelling public were confronted with industrialization and compelled to accommodate the modernizing processes which it required. The loss of individuality and autonomy experienced by the railway traveller, the loss of the experience of the journey, the

⁹⁰ See above, chapter 1, 'The Railway Underworld'.

noise, vibration, and other discomforts of mechanized travel, the vulnerability of the railway to crisis, breakdown and disruption, were all aspects of the railway as an agent of industrial civilization, forcing the human components of its processes to conform to its requirements. One of the chief outward manifestations of that process was the anxiety associated with railway travel.

Elizabeth Gaskell's last novel, *Wives and Daughters*, published in the 1860s, is set in the late 1820s and early 1830s.⁹¹ To many later nineteenth-century readers, this period appeared paradoxical, partaking of both the archaic and the modern. In some ways, the early part of the century appeared to have more in common with the 1760s than with the 1860s: a time of unreformed politics, unsophisticated Tory squires, turnpike roads, rotten boroughs, narrow and conservative rural and small-town societies. Yet it was also an age of economic, social and political upheaval and transformation; not least, it was the era which gave birth to the railway. As in the case of George Eliot's *Middlemarch*, the society depicted in *Wives and Daughters* is witnessing the beginning of the railway age, as Doctor Gibson, father of Molly, the central character of the story, remarks:

'... if these new-fangled railways spread, as they say they will, we shall all be spinning about the world; "sitting on tea-kettles," as Phoebe Bromley calls it. Miss Bromley wrote such a capital letter of advice to Miss Hornblower. I heard of it at the Millers'. Miss Hornblower was going to travel by railroad for the first time; and Dorothy was very anxious, and sent her directions for her conduct; one piece of advice was not to sit on the boiler.'

Molly laughed a little, as she was expected to do.⁹²

Richard Altick, in his encyclopaedic study of Victorian fiction, *The Presence of the Present* (1991), uses this passage to demonstrate the successful cultural

⁹¹ Angus Easson, in his introduction to the Oxford World's Classics edition of *Wives and Daughters*, dates the events of the novel to 1827-30, and has some interesting observations on Gaskell's depiction of the era, its significance for Victorian readers, and the nature of Gaskell's 'anachronisms'. See Elizabeth Gaskell, *Wives and Daughters* (1866; Oxford: Oxford University Press, 1987), pp. xiv-xviii (introduction).

⁹² Elizabeth Gaskell, *Wives and Daughters* (1866), in *The Works of Mrs. Gaskell* (8 vols., London: Smith, Elder & Co., 1906), vol. 8, chap. 52, p. 654. The story was published in *Cornhill*, 1864-6, and appeared as a book in the latter year, after Gaskell's death.

assimilation of the railway by the 1860s. Doctor Gibson's remark, he argues, is, for Gaskell's Victorian readership, a joke made at the expense of the unsophisticated 1830s, 'in the spirit of amused condescension with which people in the sixties recalled the fear of the thirties'.⁹³ It is true that by the 1860s a process of adjustment to the railway had been going on for three decades, railways were much more widespread and better understood, and people increasingly accepted them and took them for granted as a part of everyday life, no more remarkable or frightening than savings banks or the penny post. But this process of assimilation was ongoing, not complete, and was more superficial than Altick allows. If Miss Hornblower had been catching her first train in 1866 no-one would have thought it necessary to advise her not to sit on the boiler, but might very well have recommended the middle of the train as safer than the front or the back, suggested that a stopping train was safer than an express, and urged her to get out of her carriage and stand well clear if the train came to a stop on the line between stations. By the 1860s people were surrounded by discussion of railway accidents and references to them in the press, literature, and popular culture, and no particular effort would have been needed to draw Miss Hornblower's attention to the risks of rail travel. It is a suggestive coincidence that it was in 1866, the year in which *Wives and Daughters* was published in book form, that another work appeared which was to become a key text in the articulation of new forms of railway anxiety in the later nineteenth century: John Erichsen's *On Railway and Other Injuries of the Nervous System*.⁹⁴

The anxiety provoked by the railway was submerged, not conquered, by the 1860s; it receded to a deeper level of the collective unconscious, ready to re-emerge among railway passengers whenever danger seemed to threaten, and among the general public whenever a railway accident made the headlines. However widely accepted railway travel became, and however easily people apparently accustomed themselves to it, the awareness of danger and the subliminal anxiety remained, as contemporary observations attest. One medical authority commented in 1868 on

⁹³ Richard D. Altick, *The Presence of the Present: Topics of the Day in the Victorian Novel* (Columbus, Ohio: Ohio State University Press, 1991), p. 195.

⁹⁴ On Erichsen, see chapter 4 below.

how 'some persons get into a fidgety and inexplicably nervous condition when they are about to travel by rail',⁹⁵ while in 1862 *The Lancet* observed:

The mental condition of passengers is commonly, perhaps, sufficiently placid and unconcerned, but several eminently careful observers have . . . alluded to an often experienced condition of uneasiness, scarcely [i.e., almost] amounting to actual fear, which pervades the generality of travellers by rail. The possibility of collision is constantly present to such persons. And everyone knows how, if by chance a train stop at some unusual place, or if the pace be slackened, or the whistle sound its shrill alarm, a head is projected from nearly every window, and anxious eyes are on the look-out for signs of danger. So, too, the frequent lateness of trains, and the bad time which they keep, are causes of anxiety.⁹⁶

For many Victorian railway travellers, anxiety about accidents and mishaps was the automatic accompaniment of rail travel. Throughout the latter half of the century, writers who gave advice to railway travellers clearly took such anxiety for granted. In 1850 Dr Dionysius Lardner offered a set of 'Plain Rules for Railway Travellers' in his influential book *Railway Economy*. He advised intending passengers that 'Express-trains are attended with more danger than ordinary trains. Those who desire the greatest degree of security should use them only when great speed is required', and that 'Special trains, excursion trains, and all other exceptional trains on railways are to be avoided, being more unsafe than the ordinary and regular trains'.⁹⁷ Unexplained stops were one of the chief causes of anxiety among railway travellers, and not without reason. A steam-hauled train could come to an unscheduled halt for a number of reasons — inadequate steam pressure, errors in firing, poor quality coal, an excessively heavy train — and in the days before the adoption of absolute block signalling such an occurrence was

⁹⁵ Alfred Haviland, *Hurried to Death: Especially Addressed to Railway Travellers* (London: Renshaw & Mitchell, 1868), p. 22.

⁹⁶ 'The Influence of Railway Travelling on Public Health', *The Lancet*, 11 January 1862, p. 51.

⁹⁷ Dionysius Lardner, *Railway Economy: a Treatise on the New Art of Transport, its Management, Prospects, and Relations* (London: Taylor, Walton, & Maberly, 1850), pp. 339-40.

fraught with danger. Every passenger had heard of trains being run into from behind while stationary.⁹⁸ When a train was brought to a stand on the line between stations, advised the journalist William Peters in his helpful *Railway Dangers: and How to Avoid Them* (1853), the wise passenger should get out and stand clear, for:

We must not start with supposing that no collision is to ensue, but the very reverse; if we are to talk of the danger of confusion, we must contrast the confusion we or they expect from getting out of the carriages with that attendant on the crash and its results — the utter confusion to those pent in . . .⁹⁹

Certainly, remarked Peters, disembarking from one's train under such circumstances involved 'Delay, and inconvenience'; but these were to be contrasted with what he firmly declared were the 'absolute dangers' of remaining in the stationary carriages.¹⁰⁰

The Railway Traveller's Handy Book (1862) assumed a widespread degree of alarm among its readership about travelling at night, express trains, and location within the train. Night travelling, the traveller was assured, was safer than travelling by day, for 'there is less chance of collision, the line being comparatively clear, and extra precaution being taken to prevent the possibility of accident'.¹⁰¹ Many passengers were nervous of express trains, and the *Handy Book*, in contradiction to Lardner's advice of 1850, sought to reassure them that the faster the train, the safer it was; although the arguments used were perhaps not best judged to appeal to travellers of a timid disposition:

At first blush it would appear that a train travelling at the tremendous pace indicated is peculiarly liable to meet with

⁹⁸ Notable examples of accidents involving stationary trains being run into from behind include Cowlairs (Edinburgh and Glasgow Railway, 1 August 1850), Frodsham (Chester and Warrington Junction Railway, 30 April 1850), Straffan (Great Southern and Western Railway, 5 August 1853), Clayton Tunnel (London Brighton and South Coast Railway, 25 August 1861), Harrow (London and North Western Railway, 26 November 1870). For all these accidents, see Rolt, *Red for Danger*.

⁹⁹ William Peters, *Railway Dangers; and How to Avoid Them* (London: Effingham Wilson, 1853), p. 14.

¹⁰⁰ Peters, *Railway Dangers*, p. 14.

¹⁰¹ *The Railway Traveller's Handy Book of Hints, Suggestions, and Advice, Before the Journey, During the Journey, and After the Journey* (London: Lockwood & Co., 1862), p. 21.

accident, whereas the exact reverse is the case . . . the extraordinary momentum which is attained, enables the train to dash through interposing obstacles without communicating hardly any shock to the passengers . . .¹⁰²

As for selecting the safest portion of the train, the *Handy Book* advised the passenger to take great care, and to bear the possibility of collision, and its consequences, constantly in mind:

In the selection of his carriage, the railway traveller has to take into consideration both comfort and security. The old stager is fully alive to this, and makes his choice with as much deliberation as an alderman would select his port. His decision being influenced by actual experience, as follows:— The middle of the train is safest, because in the event of being run into from behind, or meeting a train in front, the force of the concussion would, in either case, be considerably expended before the centre part were reached.¹⁰³

Some travellers appear to have internalized their anxieties so thoroughly that they became an invariable part of their railway travelling routine. 'I find many persons, like myself,' wrote a correspondent in *The Times*, 'always look out for a carriage having more than two pairs of wheels, for it is obvious they must be safer than when depending upon only wheels at either end'.¹⁰⁴ This was in August 1884, soon after the disastrous Penistone accident of 16 July of that year,¹⁰⁵ but it is clear that this correspondent's concern with identifying the safest carriage was not an immediate reaction to that event but rather a routine precaution on his part, motivated by a constantly-present anxiety. The railway was too powerful, the energies of fire, steam and speed were too alarming, the spectacle of railway

¹⁰² *Handy Book*, pp. 45-6.

¹⁰³ Ibid, pp. 57-8. By contrast, William Peters expressed the view that 'Position in the train would seem to matter little'; *Railway Dangers*, p. 46.

¹⁰⁴ *The Times*, 4 August 1884, p. 6.

¹⁰⁵ An express was derailed at speed near Penistone, between Sheffield and Manchester, when one of the locomotive's axles cracked and damaged the track. The train was completely wrecked and twenty-four people were killed. See Rolt, *Red for Danger*, pp. 83-4.

disaster was too horrific, for the railway to be tamed and the spectres of death, destruction, terror and trauma which accompanied it to be driven away. Beneath the surface of outward acceptance, anxiety remained potent.

Technologies and mythologies

This situation produced what can be seen as a new mythology of machines, industry and steam power, embedded in the language, perceptions and imaginative responses of the nineteenth century. Repeatedly, we find in Victorian culture evidence that the relationship between humanity and machinery is debated, considered and expressed in the terms of myth and religion: quest, struggle, sacrifice, the need to project a transcendent harmony onto the seeming chaos and unpredictability of reality. In a famous Chartist song of the early 1840s, quoted by Engels in his *Condition of the Working Classes in England*, E. P. Mead described steam power as 'a ruthless King' and 'a tyrant fell'. This is the language of straightforward power relationships; factory workers and others subject to the working regime associated with the new technology were the slaves of steam power. But Mead went on to describe this new tyrannical power as a reincarnation of the image of the pagan deity Moloch whose 'bowels are of living fire, / And children are his food', and who was served by a priesthood 'Blood-thirsty, proud and bold; / 'Tis they direct his giant hand / In turning blood to gold'.¹⁰⁶ In her *Notes on the Underground*, the cultural historian Rosalind Williams has illuminated this conceptualization with specific reference to railway accidents, observing that:

there seemed an inevitable and necessary relation between technological advance and human sacrifice. It is not just that progress was seen as having its price, but that progress seemed to demand its price; accidents were the sacrificial offering to appease that god. In this way too, a remnant of the mythological stalked the corridors of the nineteenth century.¹⁰⁷

¹⁰⁶ Quoted in Asa Briggs, *The Power of Steam: an Illustrated History of the World's Steam Age* (Bristol: Book Promotions, 1982), p. 89.

¹⁰⁷ Rosalind Williams, *Notes on the Underground: an Essay on Technology, Society, and the Imagination* (Cambridge, Mass.: MIT Press, 1990), p. 64.

Both Mead and Reynolds offer confirmation of Williams's contention; the 'remnant of the mythological' which each depicts stalking the landscapes of industry is in the literally mythological forms of ancient Canaanite and Greek myths. Reynold's formulation, however, is more problematic. Williams suggests that progress itself is the god upon whose altar the sacrificial offerings of accident victims are laid, but for Reynolds the foe appears to be an external agent, separate from the accident-improvement trope which he describes; it is an embodiment of fate itself. This is in a sense an even more primitive envisioning of man's position, placing him at the mercy of a powerful, violent and incomprehensible universe which blindly kills and destroys.¹⁰⁸ After the Abergele accident of 1868, the *Saturday Review* made the same point:

The Abergele catastrophe occurred under the precise but most unlikely conditions to do the worst possible mischief. It is as though railway accidents were, of some set purpose, so arranged and diversified as to make the impossible possible, and to exhaust every conceivable, or even inconceivable, variety of the remotest and most unlikely dangers. Anyhow, with such instances as these, with some new and altogether unforeseen and un conjectured conjunction of possibilities always turning up, the practical lesson is plain enough. We are, in the matter of railway travelling, always treading the unknown; experience is powerless. All that we know of the future is that it is full of dangers; but what these dangers are we cannot conjecture or anticipate.¹⁰⁹

The *Review* represents the railway as an inherently destabilizing and destructive presence; although it is a human artefact, it constantly eludes and defeats human efforts to understand and tame it.

This perception found its focus in the image of the railway locomotive as autonomous agent of destruction. From the beginnings of the railway era,

¹⁰⁸ For some, this perception had disturbing theological implications; see Moore, 'Theodicy and society', in Helmstadter and Lightman (eds.), *Victorian Faith in Crisis*, especially pp. 156-60. I am grateful to Roger Cooter for drawing my attention to this reference.

¹⁰⁹ 'The railway calamity', *Saturday Review*, 29 August 1868, p. 281.

locomotives shared with ships a high degree of personification. Railway engines 'were given feminine gender from the earliest days, and their individual foibles were the stock-in trade of shedmen, foremen and drivers'.¹¹⁰ Moving, hissing, steaming, noisy, often temperamental, each possessing its individual quirks and peculiarities, steam locomotives seemed to possess many of the qualities of living creatures. 'We are as proud and as fond of our engines as if they were living things', says the engine driver in Andrew Halliday's contribution to the *Mugby Junction* number of *All the Year Round*, 'And a engine [sic] has almost as many ways as a horse; she's a kicker, a plunger, a roarer, or what-not, in her way. Put a stranger on to my engine, and he wouldn't know what to do with her'.¹¹¹ In Samuel Butler's *Erewhon* the individuality and, by implication, the unpredictability and autonomy of locomotives is a key image in Butler's discussion of the evolutionary progress of machines, their association with uncontrollable disorder, and the danger that they will come to dominate mankind:

Since my return to England, I have been told that those who are conversant about machines use many terms concerning them which show that their vitality is here recognised, and that a collection of expressions in use among those who attend on steam engines would be no less startling than instructive. I am also informed, that almost all machines have their own tricks and idiosyncracies; that they know their drivers and keepers, and that they will play pranks upon a stranger.¹¹²

As Daniel Pick has recently observed in *War Machine: the Rationalisation of Slaughter in the Modern Age* (1993), the image of machinery out of control, of human powerlessness in the face of breakdown, catastrophe and unstoppable motion, can be seen as symptomatic and symbolic of the condition of modernity

¹¹⁰ Frank McKenna, *The Railway Workers 1840-1970* (London: Faber & Faber, 1980), p. 90.

¹¹¹ Andrew Halliday, No. 2 Branch Line. *The Engine-Driver*, in *The Nine Christmas Numbers of All The Year Round* (London: Chapman & Hall, c. 1870), p. 27.

¹¹² Samuel Butler, *Erewhon* (1872; Harmondsworth: Penguin, 1970, repr. 1985), p. 220, note.

itself. Pick considers the application of the image of the driverless train as 'an animated and willed machine'¹¹³ to conceptualizations of war in the modern age:

So often both war and mind are cast as machine-like but also as potentially free-wheeling locomotives irreducible to some Clausewitzian political equation. The image of the driverless train is important. For what is being addressed here is how mechanisation in general and mechanised war in particular transports history elsewhere: how causes and effects are powerfully complicated by the course of the conflict. In this scenario, rehearsed again and again between the 1870s and the 1930s, machines are perceived as potentially uncontrollable.¹¹⁴

The model of society which gives rise to this powerful image of uncontrollable machinery is one in which a human abdication of responsibility is taking place in favour of the power of the machine. As we have seen, and as Pick illuminates, perceptions of the railway played a vital role in furthering this view. In the crisis of war, the mobilization of machine-dominated industrial society builds up a momentum which renders it no longer amenable to human control. But the essential point is that war concentrates and accelerates a process which is already occurring, and which is itself an essential concomitant of mechanized civilization. Modern war does not arise in a vacuum, nor is it the product of purely military and strategic determinants, free from the influence of cultural and social factors; it has to be seen in the context of mass-production, factory farming, new visions of a world in which 'technology, factory production and calculated death were coming together in many new ways'.¹¹⁵ Pick's argument is that the driverless train, the autonomous freewheeling locomotive, is a symbol, not so much of modern war, as of the society which gives rise to modern war. The railway accident has the same significance. In the crisis of the accident all the themes which contribute towards the image of the railway as an agent of modernity are focussed and realized with the utmost intensity.

¹¹³ Daniel Pick, *War Machine: The Rationalisation of Slaughter in the Modern Age* (New Haven, Conn., 1993), p. 106.

¹¹⁴ *Ibid.*, p. 108.

¹¹⁵ *Ibid.*, p. 178.

Trajectories of destruction

This image of the train as an uncontrollable, freewheeling agent of destruction finds striking expression in the militarization of language evident in many nineteenth-century descriptions of the railway. The train is frequently conceptualized as a projectile, launched at high speed upon an uncontrollable course: 'When a body is moving at very high velocity', observed the engineer C. H. Greenhow in 1846, discussing the conditions influencing the motion of railway vehicles, 'it then, to all intents and purposes, becomes a projectile, and is subject to the laws governing projectiles'.¹¹⁶ A projectile moves at great speed, and cannot be diverted or stopped once it is set on its way; it is dangerous; it bursts upon the landscape with terrifying and destructive force. The passage of a train could be experienced as a series of explosions, as in Charles Dickens's account of a trip from London to Dover on the South Eastern Railway: 'Bang! We have let another station off, and fly away regardless . . . Bang, bang! A double-barrelled Station! Now a wood, now a bridge, now a landscape, now a cutting, now a — Bang! a single-barrelled Station'.¹¹⁷ Similar imagery is used by Dickens in *Our Mutual Friend*, in which an express train is 'a great rocket', 'shot across the river: bursting over the quiet surface like a bombshell, and gone again as if it had exploded in the rush of steam and smoke and glare'.¹¹⁸ This militarization of the railway, its association with shells, bombs, rockets and explosions, extended beyond the image of the train itself. It was reflected in references to locomotive crews 'who exhibit heroism as genuine as that which graces a battle-field',¹¹⁹ to a railway accident scene as 'a field of slaughter'.¹²⁰

Underlying this use of violent images is an awareness of the speed and danger of the train, and the helplessness of railway passengers as they were projected forward with it. The image of the train as projectile gives added emphasis to the passivity of the passenger, subjected to the repeated traumatic shocks of the journey and no more able to control his flight than can a shell from a cannon. The

¹¹⁶ Greenhow, *Exposition*, p. 6.

¹¹⁷ Charles Dickens, 'A Flight' (1851), in *Selected Short Fiction*, pp. 144-5.

¹¹⁸ Charles Dickens, *Our Mutual Friend* (1864-5; London: Oxford University Press, 1952), book 4, chap. II, p. 751.

¹¹⁹ Reynolds, *Engine Driving Life*, pp. vii-viii.

¹²⁰ *The Times*, 7 September 1861, describing the scene immediately after a collision at Kentish Town, north London.

comments of MP and diarist Thomas Creevey on his first railway journey in 1829, 'It is really flying, and it is impossible to divest yourself of the notion of instant death to all upon the least accident happening',¹²¹ give expression to this submerged anxiety. The journey was smooth, easy, seemingly effortless; unlike all other modes of land transport the railway seemed to be detached from the unevenness of the earth's surface, so that rail travel was like flying above the ground. When the writer Thomas Moore took the train from Birmingham to Liverpool in September 1838 he was 'quite enchanted with the swiftness and ease of the course. There I sat, lolling in a most comfortable arm-chair and writing memorandums in my pocket-book as easily and legibly as I should at my own study-table'.¹²² However, the other side of this speed and ease of motion was risk and danger; the railway journey entailed a sense of violent force, uncontrollable speed, and potential destruction. Flight through the air was by definition unnatural and uncontrollable, and could only end in a violent re-encounter with the earth, just as the flight of a shell or a cannon-ball could only end in explosive destruction. Both images, when applied to rail travel, carried a subtext of violent destruction, implying that the energy, speed and unencumbered motion of the train's trajectory would inevitably end in the violence and catastrophe of the accident.

These aspects of the railway accident contributed to the way in which it was perceived as a modern phenomenon; not merely in the sense that it occurred on a modern, mechanised mode of transport but also in that it appeared to embody certain characteristic attributes of the condition of modernity, of technological, industrial, urbanised, mobile, mass-society existence. It denied its victims any chance of controlling their own fate; it crystallised in a single catastrophic event the helplessness of human beings in the hands of the technologies which they had created, but seemed unable to control; it was a highly public event which erupted directly into the rhythms and routines of daily life; it was no respecter of class or status; it was arbitrary, sudden, inhuman, and violent.

¹²¹ *The Creevey Papers*, ed. John Gore (New York, 1963), p. 256.

¹²² Quoted in Simmons (ed.), *Anthology*, pp. 90-1.

Industrial transport, fatigue and crisis

The railway journey subjected the human body and sensorium to unprecedented sensations and pressures; in some circumstances and for some individuals, these new sensations could be experienced as an assault. Railway passengers were commonly left exhausted by their journeys; the cumulative effects of the physical sensations of the journey (vibration, jolting, discomfort, extremes of heat and cold) and the mental accompaniments of railway travelling (time pressures, confusion, worry, nervousness, anxiety) combined to leave the muscles, eyes and brain tired and aching, the nerves strained and fragile. The railway was a mechanical, industrial device and, as we have seen, railway travel was perceived and experienced as an industrial process, which subjected the traveller to what were in essence industrial stresses and strains.

At the same time as this conceptualization of human industrial fatigue was emerging the railway was contributing to the development of new perceptions of material fatigue. During the 1840s and 50s, cases of the sudden, apparently unaccountable, breakage of such vital components of railway vehicles as axles, wheels, couplings and springs, and the unexplained failure of iron railway bridges, were causing considerable concern in Britain and abroad. The sudden fracturing of an axle in a locomotive travelling at speed brought about the disaster on the Paris-Versailles railway in May 1842,¹²³ while in May 1847 the cast-iron girders of a bridge over the river Dee on the Chester and Holyhead Railway collapsed, taking a passenger train with them;¹²⁴ and major railway accidents at Southall in 1847 and Dixenfold in 1853 were both caused by the sudden breakage of locomotive wheel tyres.¹²⁵ Engineers had long been aware that moving mechanical parts would sometimes break under loads and stresses which were perfectly safe in stationary components,¹²⁶ but the scale of railway engineering and the dreadful consequences of such failures in railway vehicles and structures heightened concern at this little-understood phenomenon. In 1854 the engineer Frederick Braithwaite, addressing

¹²³ Schivelbusch, *Railway Journey*, p. 125.

¹²⁴ Rolt, *Red for Danger*, pp. 94-5.

¹²⁵ *Ibid.*, pp. 75-6.

¹²⁶ R. Gordon, *Structures: or Why Things Don't Fall Down* (Harmondsworth: Penguin, 1978), pp. 333-4.

the Institute of Civil Engineers in London, proposed a new theorization of fatigue in metal components and structures:

There are reasons for believing, that many of the appalling, and apparently unaccountable accidents on railways, and elsewhere, are to be ascribed to that progressive action which may be termed, the 'fatigue of metals'. This fatigue may arise from a variety of causes, such as repeated strain, blows, concussions, jerks, torsion, or tension.¹²⁷

It was in the 1860s that the first systematic research into 'metal fatigue' was carried out by August Wöhler, a German railway official, who carried out experiments on railway axles and, like Braithwaite, identified the repetitive nature of the stresses to which the material was subjected as the crucial factor in bringing about fatigue and ultimate structural failure.¹²⁸ Modern studies emphasize this point: 'Fatigue', explains an engineering textbook, 'is primarily a problem of repeated tensile stresses',¹²⁹ while a standard work on materials science defines fatigue as 'the failure of a structure under the repeated application of a load far smaller than that required to cause failure in one application'.¹³⁰ As nineteenth-century engineers recognized, failure produced by the progressive process of fatigue can be of magnitude far outweighing the relatively minor stresses which brought it about, and can be all the more dramatic for the lack of any warning that it is about to occur: 'Fatigue failures often occur in a catastrophic manner with no gross distortion preceding collapse'.¹³¹ The snapping of an axle, the shattering of a wheel, the collapse of a bridge, could come out of nowhere, sending trains and their passengers into sudden catastrophe.

Against this background of the investigation of mechanical fatigue, the words of *The Lancet* on the physiological fatigue suffered by railway passengers gain additional resonance. As we have seen, a parallel had been drawn as early as 1842

¹²⁷ *Proceedings of the Institute of Civil Engineers*, vol. XIII (1854), p. 463.

¹²⁸ Gordon, *Structures*, p. 334; Schivelbusch, *Railway Journey*, pp. 125-6.

¹²⁹ John Case, Lord Chilver and Carl T. F. Ross, *Strength of Materials and Structures* (1959; 3rd edn., London: Edward Arnold, 1993), p. 44.

¹³⁰ J. C. Anderson *et al*, *Materials Science* (1969; 4th edn., London: Chapman & Hall, 1990), p. 214.

¹³¹ *Ibid*, p. 214.

between the fatiguing effects of railway travel on passengers and the 'fatigue' suffered by railway machinery under similar influences of repeated stresses. In 1862, *The Lancet* discussed 'the hurry and fatigue associated with railway travel' and connected 'that sense of bodily fatigue, almost amounting to soreness, which is felt after a long journey' directly with the 'effect of being placed in a vehicle subjected to rapid, short vibrations and oscillations'.¹³² Just as continual vibration and concussion produces the phenomenon of metal fatigue, so it is also responsible for fatigue in the human body. And, just as metal fatigue is capable of producing catastrophic structural failures and precipitating major accidents, so the fatigue felt by the railway passenger can lead directly to a sudden and devastating breakdown:

It is unnecessary to dwell upon the injurious effects of commotion of the brain or spinal system of nerves. Cerebral or spinal concussions, in their higher degree, annihilate the functions of those organs. In the milder forms they lead up to disease which, remaining for a long time latent, may still end in paralysis.

The jolting of a railway carriage is a series of small and rapid concussions . . . It may therefore be judged, so far as anatomical grounds are concerned, how prejudicial must be the influence of reiterated concussions . . .¹³³

Throughout the report, *The Lancet* is insistent about the importance of the continuous repeated concussions to which railway passengers are subjected: the phrases 'reiterated concussions', 'frequent concussions', 'recurring small concussions' recur constantly in its pages.¹³⁴ It is not the severity of the concussions, but their intensive and continuous nature, that is the root of the danger to health. In machinery, such repeated stresses magnify pre-existing weaknesses and cracks — however small — and enlarge them, transforming them from minuscule flaws to potentially catastrophic fractures.¹³⁵ An analogous process is at work in another type of mechanical mishap which much preoccupied railway

¹³² *The Lancet*, 11 January 1862, p. 51.

¹³³ *Ibid.*

¹³⁴ *The Lancet*, 11 January 1862, p. 51; 25 January 1862, p. 108; 8 February 1862, p. 156.

¹³⁵ Gordon, *Structures*, p. 334.

engineers, boiler failure.¹³⁶ Although much more often the result of deliberate and dangerous tampering, such as weighting or screwing down safety valves, or poor maintenance allowing unremedied corrosion and weakening, than was the case in breakdowns caused by undetectable metal fatigue, explosions in steam boilers similarly represented the exploitation by powerful energies of small flaws and weaknesses.

Again, an analogous process takes place with regard to railway passengers. Many of the commentators on the health risks of railway travelling are concerned to play down the dangers to which healthy individuals are exposed, thus:

Although I admit that incessant railway travelling will produce directly, from the vibration of the carriage, a certain amount of cerebral irritation in highly nervous temperaments, I am quite convinced that, to the healthily organised individual . . . there is no more injury to be anticipated from a railway than an ordinary carriage.¹³⁷

The type of individual most (although not exclusively) at risk from the deleterious effects of railway travelling was what one contributor to *The Lancet*'s survey called 'a constitutionally weak person',¹³⁸ someone who was 'weakly and delicate, or whose physical conformation is not adapted for receiving a constant succession of slight concussions'.¹³⁹ The barrage of concussions experienced by the railway passenger could, like the repeated stresses placed on mechanical components, affect pre-existing flaws and weaknesses in the constitution and bring about crisis and collapse. *The Lancet* gives the example of an individual in whom 'there is a predisposition to spinal softening'; in such a case, it suggests, the 'frequent concussions' associated with railway travelling 'cannot fail to be prejudicial'.¹⁴⁰ The pre-existing weakness could be of various kinds; according to some authorities, psychological disposition could play a role in fostering or exaggerating physical

¹³⁶ For accounts of railway accidents involving boiler explosions, see Rolt, *Red for Danger*, pp. 68-75.

¹³⁷ Anon., 'Railway travelling and its effects on health', *Association Medical Journal*, vol. 4, no. CLX, new series (26 Jan. 1856), p. 72.

¹³⁸ *The Lancet*, 1 March 1862, p. 236.

¹³⁹ *Ibid.*, 18 January 1862, p. 83.

¹⁴⁰ *Ibid.*, 25 January 1862, p. 108.

disorder. 'A person of[an] impressionable kind (not necessarily weak or otherwise unhealthy)', suggested one contributor to *The Lancet's* survey, 'undergoes a succession of . . . small alarms throughout every journey, and often from very slight causes — the sound of a whistle, the passage of another train passing a junction, excessive motion in the carriage, &c.; and this repeated day after day . . . may actually become injurious'.¹⁴¹ Factors on the borderlines of nineteenth-century understandings of the somatic — fear, alarm, nervousness — are thus becoming inscribed in theorizations of the influence of the railway on the mind and body. The image of the railway, its association with power, danger and fear, can be seen reflected in the categorizations and interpretations of Victorian medicine.

Furthermore, it is suggested that there is a continuity between the bodily disorders which can be caused by the concussions experienced during railway travelling and the effects of involvement in a railway accident. 'It is interesting to remark', observes *The Lancet*, 'that the effects which slowly ensue in a previously healthy person after such a violent concussion [in a railway accident] resemble in a more intense degree those symptoms distinctly traced, in cases already related, to the recurring small concussions experienced during prolonged railway travelling'.¹⁴² Thus the railway journey, however safe and uneventful, can be interpreted as a slowed-down accident, while the accident constitutes an intensified form of the stresses and pressures experienced in a diffuse and drawn-out form during the journey.

¹⁴¹ *The Lancet*, 18 January 1862, p. 79.

¹⁴² *Ibid*, 8 February 1862, p. 156.

RAILWAY SPINE

The accident and the dark side of modernity

Few events in ordinary civilian life in the nineteenth century — or indeed in any age — could equal the railway accident for violence and terror. The accident concentrated the speed, power and danger of the railway, and the fear, helplessness and sensory dislocation of railway travel, into one shattering instant of extreme physical and mental trauma. Accidents were the most potent expressions of the dark, destructive side of technological modernity, subjecting their victims to a degree of catastrophic internal and external disruption paralleled only in the experiences of war; and, as we have seen, accidents were frequently described in terms of the battlefield. It is entirely consistent with the powerful culture of unease which had grown up around the image and reality of the railway that in the latter part of the nineteenth century the railway accident should be seen as a calamity without parallel, capable of bringing about new, insidious, highly disruptive forms of injury and disorder in the human body. In mid- and late-nineteenth-century medical and medico-legal discourses, the railway accident came to assume a highly significant role as an agent of traumatic experience.¹ In fact it can be argued that systematic medical theorization about psychological trauma in the modern west commenced with the responses of mid-Victorian medical practitioners to the so-called 'railway spine' phenomenon,² which was characterized by the manifestation

¹ For more on this, in general terms, See George F. Drinka, *The Birth of Neurosis: Myth, Malady and the Victorians* (New York: Simon & Schuster, 1984), chap. 5 'The railway god', pp. 108-22; Ralph Harrington, 'The neuroses of the railway', *History Today*, vol. 44, no. 7 (July 1994), pp. 15-21; and Wolfgang Schivelbusch, *The Railway Journey: The Industrialization of Time and Space in the Nineteenth Century* (Oxford: Basil Blackwell, 1980).

² On 'railway spine', modern historical scholarship begins with the works of Esther Fischer-Homberger, 'Railway Spine und traumatische Neurose — Seel und Rückenmark', *Gesnerus*, vol. 27 (1975), pp. 96-111, and *Die traumatische Neurose: von somatischen zum sozialen Leiden* (Vienna: Hans Huber, 1975). General historical accounts can be found in Drinka, *Birth of Neurosis*, and Schivelbusch, *Railway Journey*, while more detailed medical-historical analyses are given by Michael

of a variety of physical disorders in otherwise healthy and apparently uninjured railway accident victims. The investigation of this condition led nineteenth-century surgeons to examine the role of what would a century later be considered psychological factors — variously referred to as ‘fright’, ‘terror’, or ‘emotional shock’ — in provoking physical disorders, some thirty years before Freud and Breuer considered the matter in *Studies on Hysteria*,³ and half a century before the advent of shell shock⁴ among the soldiers of the First World War brought a general recognition of the reality of the ‘psycho-neuroses’.

It is with the ‘railway spine’ phenomenon that this chapter is concerned; not primarily as a topic in medical history or the history of psychiatry, but rather as a theme in the cultural history of technology. Railway spine is investigated here as one highly significant aspect of the way in which the railway was perceived as an agent of the degenerative forces of technological modernity. During the latter part of the nineteenth century, the association of the railway with a degenerative assault on the human mind and body and the conceptualization of the discomfort, anxiety, nervous over-excitement and exhaustion of railway travel in terms of the

R. Trimble, *Post-traumatic Neuroses: from Railway Spine to Whiplash* (Chichester: John Wiley, 1981); Ralph Harrington, ‘The “Railway Spine” diagnosis and Victorian responses to PTSD’, *Journal of Psychosomatic Research*, vol. 40, no. 1 (January 1996), pp. 11-14; Ralph Harrington, ‘The railway accident: trains, trauma and technological crisis in nineteenth century Britain’, in Mark S. Micale and Paul Lerner (eds.), *Traumatic Pasts: History and Trauma in the Modern Age* (New Haven, Conn.: Yale University Press, forthcoming 1998); and Eric Caplan, ‘Trains, brains and sprains: railway spine and the origins of psychoneuroses’, *Bulletin of the History of Medicine*, vol. 69, no. 3 (Fall 1995), pp. 387-419.

³ Sigmund Freud, *The Standard Edition of the Complete Psychological Works of Sigmund Freud*, trans. and ed. James Strachey (24 vols., London: Hogarth Press/Institute of Psychoanalysis, 1955), vol. 2: *Studies on Hysteria*. Freud’s own earliest writings on hysteria and trauma were related to the debates over railway accident cases to which he had been exposed in Paris and Berlin in the 1880s; see Freud, *Standard Edition*, vol. 1: *Pre-Psycho-Analytic Publications and Unpublished Drafts*, pp. 12, 51-3. For background, see Frank J. Sulloway, Freud, *Biologist of the Mind: Beyond the Psychoanalytic Legend* (New York: Basic Books, 1979), pp. 37-9.

⁴ See Martin Stone, ‘Shell shock and the psychologists’, in *The Anatomy of Madness*, eds. W. F. Bynum, Roy Porter and Michael Shepherd (Cambridge: Cambridge University Press, 1988), vol. 2, pp. 242-71; Harold Mersky, ‘Shell-shock’, in *150 Years of British Psychiatry, 1841-1991*, eds. German E. Berrios and Hugh Freeman (London: Gaskell/Royal College of Psychiatrists, 1991), pp. 246-7. For a convincing interpretation of the significance of shell shock which tends to stress continuity in British medical approaches to traumatic neurosis, and the continuing ascendancy of neurological rather than psychological approaches after the First World War, see Joanna Bourke, *Dismembering the Male: Men’s Bodies, Britain and the Great War* (London: Reaktion Books, 1996), pp. 20-21 and pp. 106-23, esp. 114ff. Bourke’s arguments are largely consistent with the position adopted in this study.

discourse of biological degeneration,⁵ found their most potent expression in medical and cultural responses to the crisis of the accident.

The 'railway spine' phenomenon

On 22nd March 1858, an accident took place on the London & North Western Railway near Oxford. It was not one of the more spectacular, destructive or lethal Victorian railway accidents. A passenger train was derailed while passing over a stretch of faulty track; its speed was low, no other trains were involved, and nobody was killed. A number of passengers did suffer injury, however, and some subsequently took legal action against the railway company for compensation. One such passenger was a Mr Shepherd, whose case came to court at Oxford on 13 July 1858.⁶

The court heard that as the train left the rails Mr Shepherd had been 'thrown violently about the carriage, and other passengers were thrown on top of him'.⁷ He sustained some superficial cuts and bruises, but was able to walk away from the wreckage, and it appeared at first that he had escaped the accident almost uninjured. He 'did not complain of any special injury at the time', the court was told, 'and was able to walk about the scene of the accident and to examine the defective arrangement of the rails; and on arriving at his destination wrote a letter to *The Times* on the subject'.⁸ It was not until the following day, when he attempted to go to his work as usual, that he began to feel seriously unwell:

The next day he went to his office by omnibus, when, finding himself unfit for business, he returned home immediately, took to his bed for some days, and was obliged to go into the country to recover his health. According to his own account, he received

⁵ On the theory of biological degeneration, see Daniel Pick, *Faces of Degeneration: a European Disorder, c. 1848-1918* (Cambridge: Cambridge University Press, 1989). On nervous disorder, neurosis and neurasthenia in the context of degenerationism, see Janet Oppenheim, 'Shattered Nerves': *Doctors, Patients, and Depression in Victorian England* (New York & Oxford: Oxford University Press, 1991), and Drinka, *Birth of Neurosis*.

⁶ For a report of the accident, see the Board of Trade's, *Accident Reports for January-March 1858*, part II (London: HMSO, 1858), pp. 27-8. An account of the court case appears in *The Times*, 14 July 1858, p. 12.

⁷ *The Lancet*, 8 February 1862, p. 157.

⁸ *Ibid.*

a blow on the side, which caused him to pass blood for two or three days; also a blow on the head, which left no bruise, but only a puffiness. His chief complaint at the time of the trial was a feeling of nervous depression, and particularly that the countenances of his fellow-passengers, with terrified eyes, would come before him whenever he attempted to do any reading or writing.⁹

The central issue in the case was the nature of the plaintiff's disorder. During the trial the medical men called by both sides as expert witnesses differed sharply over the seriousness of his condition. The doctors called in support of Mr Shepherd's case predicted a lengthy period of illness for him, claiming 'that the plaintiff would eventually recover, but probably not for twelve months'; while those called to testify by the railway company argued that on the contrary 'he was enjoying fair average health, and that the symptoms described were exaggerated'.¹⁰ In the end the railway's efforts to deprecate the seriousness of the plaintiff's condition were in vain: the jury found for Mr Shepherd, and required the LNWR to pay him the very considerable sum of £700 in compensation.¹¹

The Shepherd case serves as a good example of the thousands of such railway personal injury cases brought before British courts from the late 1840s onwards. *The Lancet*, in whose pages this report appeared in 1862, chose to recount this case precisely because it seemed particularly representative of the whole class of such cases, 'illustrat[ing] exceedingly well the absence of immediate effects, and the more remote consequences which may follow an accident of the kind described'.¹² Mr Shepherd had suffered only minor injuries; not only had he been able to extricate himself from his wrecked train and walk away, he had looked over the accident scene and inspected the permanent way before continuing his journey, writing a letter to the papers and retiring to bed. It was only after a significant interval that he found himself incapacitated, and not by an unambiguous organic

⁹ *The Lancet*, 8 February 1862, p. 157.

¹⁰ *Ibid.*

¹¹ In 1860, £700 was the equivalent of approximately 16 years' wages for a railway worker on typical 'traffic grades' rates. For railway wages, see P. W. Kingsford, *Victorian Railwaymen: The Emergence and Growth of Railway Labour 1830-1870* (London: Faber, 1970), pp. 89-99.

¹² *The Lancet*, 8 February 1862, p. 157.

disease or injury but by a peculiar, ill-defined condition which seemed to be more emotional than physical. Cases such as this became the focus of a vigorous medical and legal debate which lasted from the 1860s into the early years of the twentieth century, and which reflected many central facets of contemporary perceptions of the railway as dangerous and disruptive.

Underlying the pattern followed by such cases as that of Mr Shepherd was a complex pattern of competing agendas and interrelated (and often incompatible) professional discourses. In 1861 *The Lancet* declared, apropos the conflicts between medical men which were occurring in railway cases, that 'Medicine seeks to elicit truth'.¹³ The reality was however, that the high-minded medical quest for truth was complicated by other priorities, as doctors sought to assert their professionalism, independence, and scientific credentials; judges and juries, to protect the bourgeois railway traveller by inflicting damages on negligent companies; railway companies, to guard against expensive and troublesome compensation claims; public opinion, to see the companies punished for their arrogance and lack of care. And behind all these different perceptions and intentions loomed the railway itself, a tumult of speed, noise, smoke and fire, danger and disaster, throwing victim after victim into the lawcourts, the surgeries, and the cemeteries.

Accident and aftermath: the medico-legal context

Unlike roads, rivers and canals, the railways were not simply a passive means of facilitating communication; they were an industrial enterprise in their own right, an extension and elaboration of the mechanized factory on a vast, national scale. The railways were, in effect, the largest factories in the land, and their product was transportation.¹⁴ As an industrial service industry, railways blurred the previously clear distinction between the physical space of production and that of consumption. The consumer of mass-produced furniture, for example, was not present in the furniture workshop; he or she was not at risk from the operations

¹³ *The Lancet*, 14 September 1861, p. 255.

¹⁴ For a discussion of this point, see R. W. Kostal, *Law and English Railway Capitalism 1825-1875* (Oxford: Oxford University Press, 1994), pp. 254-5. My analysis of the legal context for railway accident compensation is heavily indebted to Kostal's study.

entailed in the production of the product, but selected and purchased it in the safe intermediate space of the shop (or, at a yet further remove, by means of advertising and mail-order). The consumer of 'railway product', however, the passenger, was present on the 'shop-floor' itself, and shared with the workforce a degree of exposure to its hazards. The middle and upper classes of Victorian society had generally been insulated from the hazards of industrial work; it was the railways that introduced the danger and terror of factory accidents into their daily lives. The hazards of railway travel — collisions, derailments, fires, bridge failures — killed, injured, and were witnessed by, men, women and children of every social station. 'People of independent fortune do not become panic-stricken over a colliery explosion', observed the *Law Journal* in 1866, 'But the railway accident has no respect of persons, it strikes right and left indiscriminately, and . . . presents the most accurate idea of murder in cold blood that has been realised by the ingenious device of men'.¹⁵ In fact, as we have seen, the railways were a comparatively safe means of overland transportation throughout the nineteenth century. However, the relative safety of the Victorian railway is less relevant to the issue of contemporary perceptions than the increasing numbers of accidents occurring, the ever-rising toll of the dead and injured which resulted, and the high level of publicity given to railway accidents. As the amount of railway traffic and the numbers of railway accidents increased, railway accident victims began increasingly to take legal action for damages against the railways. By 1870 the flood of railway accident litigation had been rising for the best part of three decades, and reached such a level that one leading lawyer expressed the fear that railway lawsuits would 'stifle all other business at *Nisi Prius*'.¹⁶

The dominant principle in mid-nineteenth century accident compensation law was that of negligence. The rise of large-scale industry, and particularly of industrial transportation, observed a government health official in 1856, had given a new dimension to legal questions of responsibility and negligence:

The progress of science has created new forces often fatal, and has produced new substances, of which our forefathers had no knowledge. Machinery is organized on a large scale, so that the

¹⁵ *Law Journal*, 30 March 1866; quoted in Kostal, *Law*, pp. 254-5.

¹⁶ *Law Journal*, 18 November 1870; quoted in *ibid*, p. 255.

lives of numbers of men are liable to be destroyed, not by malicious intent, but by the negligence of other men who have their lives in their charge.¹⁷

An increasingly important medico-legal issue was thus the satisfactory apportioning of responsibility for alleged negligent acts in accident cases involving large, complex, hierarchically-structured organisations in which those in authority were physically remote from the process of production. The particular body of case-law which came to be interpreted and applied in railway cases was concerned with the responsibility of a master for the negligence of his servants. For injured railway passengers (but not, it should be noted, for injured railway workers) the principle of vicarious liability was interpreted to provide for compensation claims against railway companies on the grounds that they were responsible for the negligence of their servants or employees.¹⁸

The Board of Trade inspectors' reports on railway accidents tended to support the conclusion that most accidents could be traced to human error by railway workers; thus Colonel Yolland told a parliamentary select committee in 1877 that most accidents were caused 'by mistakes of servants which are preventable by proper mechanical means'.¹⁹ The attitude of the Board of Trade and its inspectors converged with that of the courts, in placing the responsibility for accidents on the companies, rather than on the men they employed. This view was very much in tune with the contemporary public mood. Newspapers and journals generally showed a great reluctance to put the blame for accidents on individual signalmen, drivers, guards and other employees; on the contrary, railway workers were widely seen as overworked, underpaid, badly treated, and as much the victims of railway mismanagement as were passengers. Press and public were, however, always very ready to place responsibility on the shoulders of railway directors. It was widely believed that the technical means existed to all but eliminate accidents, but that the directors were unwilling to spend money on implementing them; in other words, that railway accidents were not truly accidental, but were rather the

¹⁷ Quoted in Cornelius Walford, *The Insurance Cyclopaedia* (3 vols., London: Charles & Edwin Layton, 1871-4), vol. 1, p. 6.

¹⁸ Kostal, *Law*, p. 256.

¹⁹ *Report of the Commissioners on Railway Accidents*, PP. (Commons) XLVIII (1877), 'Analysis of Evidence', pp. 3-4.

predictable consequence of managerial incompetence and directorial penny-pinching. No matter how strenuously these accusations were denied, it was the overwhelming opinion of Victorian commentators that railway directors would invariably place the protection of profits and the production of dividends above considerations of safety.

Railways and responsibilities: establishing liability

For the first two decades of the railway age, the legal framework within which railways operated was unsettled and prevented the volume of litigation by the injured victims of railway accidents, or the families of those killed, from reaching any significant proportions. In the latter case, relatives could not take any legal action because personal injury actions in common law could only be undertaken by the living; the cause of any such action was extinguished with the life of the victim. In the case of injured passengers, it is less easy to identify a reason for the lack of litigation. There is some evidence that railway companies were prepared to acknowledge some liability for the negligence of their employees, and routinely settled out of court with injured passengers, so it is possible that few victims felt it worthwhile to take the matter any further.²⁰ Perhaps more significant, however, was the general belief that it was necessary to link a given mishap on the railway with the personal negligence of a railway director in order for an action against a railway company to be entered into. According to *The Times* in 1845, any action for damages in would therefore be 'quite idle. The proof sufficient to connect any individual director with the injury would be an insuperable difficulty . . . no respectable lawyer, except in very peculiar circumstances would advise such an action'.²¹ In fact this was a considerable over-estimate of the difficulties involved, but it reflected the lack of clarity in many legal issues affecting this kind of litigation.

The difficulty was that the innovative nature of the railway, carrying very large numbers of passengers in an environment which was potentially very dangerous, and in which the consequences of mishap could be very serious, had not by the 1840s been assimilated into the existing legal structures applying to

²⁰ There is evidence for this practice in the *Report from the Select Committee on the Prevention of Accidents on Railways*, PP. (Commons) VIII (1841), questions 102-7.

²¹ *The Times*, 29 December 1845, p. 5.

transport. The legal obligations of pre-railway age carriers of both people and goods were clear enough:²² by the beginning of the nineteenth century it was beyond dispute that with respect to goods or chattels the common carrier acted as an insurer, and was, according to the precedent established in a late-eighteenth-century judgement, 'liable for any accident, except by an Act of God, or the King's enemies'.²³ The liability of carriers of human passengers was carefully distinguished from this 'strict' liability applied to carriers of goods, for while a carrier might reasonably be expected to exert full control over goods and chattels during transport, human beings were not amenable to control to the same extent. Thus the carrier was only liable if an injury could be proved to have arisen from the negligence of either the carrier or his servants. In other words, the plaintiff could only succeed where negligence could be proved; and the issue of whether such negligence had taken place in a particular case was for a jury to decide. Thus even in the pre-railway age the role of the trial jury was a crucially important and potentially a deeply controversial part of passenger injury law.

This was the legal context within which railway personal injury case-law developed. The two fundamental points with regard to compensation for railway accident victims were first, that the railway's liability to compensate for injury did not arise from any contract between the victim as passenger and the railway as carrier, and second, that whereas in acting as a common carrier for goods the railway also undertook the role of an insurer for those goods against loss and damage, no such undertaking existed with regard to passenger carriage.²⁴ Thus accident compensation cases were civil actions for damages under the law of tort. An 1862 guide to railway accident law summarised the situation by saying that the railway company as a carrier of passengers 'does not warrant their safety, but merely undertakes that so far as human care and foresight can go, he will provide for their safe conveyance', and that 'a carrier of passengers is only liable for any personal injuries which the latter may sustain whilst being carried by him where such injuries have been occasioned by the carrier's negligence and unskilfulness'.²⁵

²² See the summary in Kostal, *Law*, pp. 284-7.

²³ Lord Mansfield, *Forward v. Pittard* (1785); quoted in Kostal, *Law*, p. 285.

²⁴ Henry Andrews Simon, *The Law relating to Railway Accidents* (London: V. & R. Stevens, Sons, & Haynes, 1862), pp. 1-3; Albert Parsons, *The Liability of Railway Companies for Negligence towards Passengers* (London: Horace Cox, 1893), p. 32, pp. 43-4; Ernest Edwin George Williams, *An Epitome of Railway Law* (London: Stevens & Haynes, 1912), pp. 117-124.

²⁵ Simon, *Law relating to Railway Accidents*, pp. 1-2.

Thus, plaintiffs seeking compensation for accident injuries had to establish first, that the railway company in question had been negligent with regard to factors within its control — that is, concerning the operation, maintenance and safety of trains, permanent way, signalling and rolling stock, and the actions of railway employees — and second, that the injury complained of was the direct result of that negligence.

These principles were established by compensation cases of the late 1830s and early 1840s. Railway companies themselves, however, were more concerned prior to 1845 with their vulnerability to coroners' juries armed with the ancient legal mechanism of the 'deodand'. This was a price set by a jury on an object which had caused a death; the owner of the object had to pay the price set or it was forfeited to the crown. The deodand, medieval in origin, had fallen into disuse during the eighteenth century, but was revived in the 1830s by coroners' juries concerned about the rising numbers of people dying as a result of mishaps on the railways. For all their association with the ancient feudal past, Deodands could involve substantial sums and were not merely symbolic gestures. In 1841 the Great Western Railway was ordered to pay a deodand of £1,000 on the locomotive and train involved in an accident at Sonning in which eight passengers lost their lives,²⁶ while in 1840 the London and Birmingham Railway had been ordered to pay a deodand of £2,000.²⁷ Although railway companies seem invariably to have evaded the payment of these fines, it was clear that the deodand was being used as a means of punishing railway negligence, in the absence of any other legal mechanism for so doing. Juries were turning to the deodand for protection against the otherwise unrestrained power and danger of the railway.

Lord Campbell's Act

The railway companies resented deodands, and wanted rid of them; and, motivated in part by a recognition that the use of the deodand was an expression of growing public concern at the costs in accident, death and injury of railway travel, a number of prominent law reformers and politicians led by Lord John Campbell also began to look for the abolition of the deodand and its replacement by a more

²⁶ For an account of this accident, see Rolt, *Red for Danger*, pp. 36-7.

²⁷ Kostal, *Law*, p. 289.

rational means of protecting the public against negligence on the railways.²⁸ Campbell was supported by, among others, the social reformer Edwin Chadwick, who had been concerned for some time at the ability of railway contractors to evade liability for accidents to their workers during railway construction.²⁹ Campbell and his supporters sought to establish a measure of legal deterrence to negligence through the Fatal Accidents Act, which was passed in August 1846.³⁰ This measure was later to become the target of harsh criticism from the railway companies,³¹ but at the time of its passing it seems to have aroused little concern within the industry. This can perhaps be explained by the timing of the measure — in the midst of the speculation and subsequent crash of the stock market ‘railway mania’ — and the fact that it was linked to the Deodands Abolition Bill, which the railways strongly supported.³²

Lord Campbell’s Act established the right of surviving relatives of persons killed in accidents of all kinds (not only on railways, although the railways perceived the measure as particularly directed at them) to recover damages from those whose negligence had caused the fatal accident. It did not have any direct relevance to accident injury claims by living survivors,³³ but had a vital indirect influence on the legal climate for litigation by injured victims. During a period when it was widely felt that ‘the whole scope of existing railway legislation is to protect the companies against the public, rather than the public against the companies’,³⁴ and when only the threat of financial penalty seemed capable of

²⁸ See P. W. J. Bartrip & S. B. Burman, *The Wounded Soldiers of Industry: Industrial Compensation Policy, 1833-1897* (Oxford: Oxford University Press, 1983), p. 99.

²⁹ See R. A. Lewis, ‘Edwin Chadwick and the railway labourers’, *Economic History Review*, 2nd ser., vol. III, no. 1 (1950-1), pp. 107-18.

³⁰ 9 & 10 Vict., cap. 93, ‘An Act for Compensating the Families of Persons Killed in Accidents’, generally known as ‘Lord Campbell’s Act.’

³¹ See, for example, Henry Booth’s two pamphlets, *The Case of the Railways Considered* (London: W. H. Smith & Son/Liverpool: Baines & Herbert, 1852), and *A Letter to the Right Hon. Lord Campbell, on the 9 & 10 Victoria, Cap. 93 . . . Showing the injustice of the measure and the propriety of its repeal* (London: John Chapman, 1854).

³² Kostal, *Law*, pp. 289-90.

³³ Schivelbusch’s assertion (*Railway Journey*, pp. 134-5) that British railway companies only became legally liable for their passengers’ safety through an amendment to Lord Campbell’s Act in 1864 is incorrect. As the above account explains, such legal liability had existed from the beginning under the common law.

³⁴ ‘Railway accidents’, *Quarterly Review*, vol. 145, no. 289 (1878), p. 169.

forcing directors to act on matters of safety,³⁵ the act provided an important means of exerting pressure on the companies. As *The Lancet* commented drily in 1860,

now that [railway] directors are beginning to find how very expensive is the amusement of wounding and maiming aristocratic and commercial passengers, it may be hoped that . . . improvements which have been long and continuously urged as necessary for saving of life [will] be adopted in the end as a means of saving money.³⁶

The Act created a situation in which lawyers, plaintiffs, and the travelling public, saw that judges and juries were prepared to find railway companies guilty of negligence in accident cases, and to impose financial penalties upon them. The result was the beginning of a steep rise in the numbers of personal injury cases taken out against the companies; by 1849 a railway journal was complaining that the problem of personal injury litigation by injured passengers had grown to the 'most gigantic proportions'.³⁷ Thirteen years later, the *Annual Register* for 1861 observed that 'The railway companies have been made to pay heavily for their negligence in the management of their affairs, by the recovery of heavy damages, under Lord Campbell's Act, by the relatives of the slain, or by the maimed and injured'.³⁸

By the later 1840s the establishment of the principle that railway companies were legally liable for the negligence of their servants had created the legal framework necessary to bring personal injury lawsuits against the companies. Lord Campbell's Act provided the vital financial incentive, in allowing juries to set a monetary value on human life, and accustomed judges, juries, and the public to a situation in which legal means were used to punish the railways for acting with a perceived culpable disregard for the safety of their patrons.

³⁵ For some illustrations of this public perception, see Jack Simmons, 'A powerful critic of railways: John Tenniel in *Punch*', in *The Express Train and Other Railway Studies* (Nairn: Thomas & Lochar, 1995), p. 150.

³⁶ 'The costs of railway collisions', *The Lancet*, 25 August 1860, p. 195; see also *Saturday Review*, 1 September 1866, p. 266.

³⁷ *Herepath's Railway Journal*, 6 January 1849, p. 9.

³⁸ *Annual Register for 1861* (London: J. & F. H. Rivington, 1862), chronicle, p. 81.

The limits of liability

Where a plaintiff claimed compensation for injuries sustained in a railway accident the burden of proving that their claim was not valid lay with the defendant — that is, with the railway company in question. There was rarely any serious dispute when the injury complained of was of an obvious physical character, such as a broken bone or a serious burn, and was clearly the direct result of the accident. Difficulties arose, however, when the injury was of a more obscure nature, and when the claim that it was caused by the accident could be questioned — as was often the case when the condition in question was ‘railway spine’ or a similar ailment. The plaintiff would attempt to prove that the company was guilty of negligence towards his or her safety, and that the injury complained of was the direct result of that negligence; the company would seek to convince the court that either the plaintiff’s ailment was either invented or greatly exaggerated in order to gain damages, or that it was the result of a pre-existent condition such as rheumatism,³⁹ which the railway company could not have known about and which was quite beyond their control, and therefore no negligence on their part could be claimed. Both sides would call medical testimony to support their claims. Thus from the mid-century onwards doctors found themselves increasingly involved in railway cases, and the question of the nature of the injuries at issue in such cases became an important one within the medical profession.

Railway companies and their lawyers argued that the sufferings of ‘railway spine’ victims existed only in their minds — in other words, were either consciously or unconsciously invented — and thus did not qualify for damages. In British courts there was no provision for compensating sufferers for what was seen as straightforward mental distress following an accident in which they had sustained no apparent physical injury, although in Scotland the relatives of persons killed could claim monetary compensation (‘solation’) for ‘injured feelings’.⁴⁰ It is interesting to note that from its foundation in 1849 the Railway Passengers’ Assurance Company did appear to recognize both physical and mental pain as deserving of recognition, offering ‘reasonable and liberal compensation’ for

³⁹ For an example, see *The Lancet*, 12 December 1885, pp. 1110-1.

⁴⁰ Francis Deas, *The Law of Railways Applicable to Scotland* (Edinburgh: Edmonston & Douglas, 1873), p. 492; in the second, enlarged edition (Edinburgh: William Green & Sons, 1897), the relevant passage is on p. 719.

physical injury 'as well as for the pain of mind and body' consequent on a railway accident.⁴¹ In neither of these cases, however, was it argued that mental pain and suffering was the product of an organic injury. In the courts the case for sufferers from railway spine rested on the distinction between what was defined as an 'intellectual' or 'mental' shock, which was defined as consisting in an emotional reaction, and 'nervous' shock, which was construed as organic in nature. Railway accident cases did not erode this distinction, but played an important part in bringing about the recognition of 'nervous shock' as a genuine medical condition. In 1893 a legal writer asserted the importance of distinguishing

between *mental* shock, in the sense of an emotion of the *intellectual* feelings, and *nervous shock*, as expressing a physical disorder of the nervous system. It is no doubt true that in the former case damages cannot be recovered, however deep the wound to the feelings may be, or however severely the consequent state of mind may react on the physical health; and that damages are not to be awarded for mere grief and pain of mind is a generally accepted proposition. Nervous shock, however, in the sense explained above, is surely a natural and direct result of any sudden and violent terror, quite independent of the 'moral' feelings . . .⁴²

The increasing importance of 'nervous shock' as a recognized post-accident condition was reflected in legal textbooks dealing with railway liability. In 1873 Francis Deas, in his work on *The Law of Railways Applicable to Scotland*, contained no reference to nervous shock, whereas the 1897 edition included a section on 'Are damages recoverable for fright or nervous shock?' in which such shock was recognized as the consequence of physical injury.⁴³ It seems clear that by the 1890s

⁴¹ The wording is from the Act of Parliament under which the Railway Passengers Assurance Company operated, 12 & 13 Vict. Cap. 40 (1849), quoted in Michael Stewart, *The Railway Passengers Assurance Company* (Transport Ticket Society [no place of publication given], 1985), p. 3. Stewart notes that 'the enormous latitude of these words was to give rise to a number of preposterous claims for injuries'.

⁴² Parsons, *The Liability of Railway Companies*, pp. 22-3. Emphasis in original.

⁴³ Francis Deas, *The Law of Railways Applicable to Scotland*, 2nd edn., revised, enlarged and extended by James Ferguson (Edinburgh: William Green & Sons, 1897), pp. 720-1.

lawyers, judges and juries had seized upon the concept of nervous shock as an organic injury, explicitly rejecting in their judgements the view that it was a purely mental, emotional or 'moral' condition without an organic basis, in order to inflict punitive damages upon railway companies which failed to ensure the safety of the bourgeois travelling public. That they were able to do so was a consequence not only of the medical debate within the medical profession over the true nature of the railway injuries, but of their conscious and selective use of certain aspects of that debate to sustain their position of hostility towards the railway companies.

Railway accidents and railway doctors

By the 1860s railway companies had suffered two decades of continual reverses over personal injury claims, and were paying out very large sums in compensation.⁴⁴ A collision at Shrivenham in May 1848, in which six people died and thirteen were injured, had cost the Great Western Railway over £11,000 in personal injury settlements.⁴⁵ Twelve years later, in February 1860, a derailment at Tottenham killed seven passengers and left dozens injured, costing the Eastern Counties Railway £57,457 in compensation payments — the equivalent of a two shillings per share reduction in dividends.⁴⁶ By 1860 few in the railway industry would have argued with the claim of William Denison, the well-respected chairman of the Great Northern Railway, that 'railway property was most scandalously treated by the law and juries'.⁴⁷ Directors and railway trade journals frequently criticised the sizes of awards against the companies, and warned that the financial viability of both individual companies and of the whole industry was at risk. Such complaints received short shrift from the popular press. In the wake of an accident at New Cross on the London, Brighton and South Coast Railway in 1869 the *Saturday Review* remarked, 'There is something peculiarly touching in the way in which the directors bewail this great calamity'; for the directors, the Review suggested, 'The grief and pain of the thing consist, not in the sufferings of

⁴⁴ See Kostal, *Law*, pp. 304-5, tables 4 and 5.

⁴⁵ *Report of the Select Committee on Accidents on Railways*, PP. (Commons) XIV (1857-8), appendix, p. 196.

⁴⁶ *Herepath's Railway Journal*, 11 September 1860.

⁴⁷ *Railway Record*, 1 September 1860.

the smashed victims or the hapless survivors, but in the pecuniary mulct thereby inflicted on the Company'.⁴⁸

Even by 1860 the railway companies had resigned themselves to the inevitability of losing personal injury cases, and had settled on a policy of minimizing the amounts paid out by settling as many cases as possible out of court without disputing responsibility: 'in only the rarest scenario could the railway win on the liability issue'.⁴⁹ In 1862 the *Annual Register* estimated the compensation bills for eight railway companies as totalling £331,000 over the previous ten years, but went on to observe that 'besides the sums recovered through the agency of a jury, it is well known that companies prefer settling privately claims evidently just; and it is said that some sums, paid in particular cases, were larger than any that have yet been awarded by a jury'.⁵⁰ The tendency was now to fight only those cases in which damage claims were either excessive or clearly fraudulent. A large number of such cases involved dispute over the character and severity of injuries sustained in accidents; and it was this which gave railway spine such prominence henceforth in personal injury litigation, and led to disputes over medical evidence becoming such a striking element in such cases between 1860 and the end of the century.

Railway companies made much use of doctors in their efforts to settle accident claims out of court. The company doctor would examine the victim and offer a reasonable compensation payment on the spot, before other medical and legal men could influence him or her to take the claim to court on the grounds that their injuries were more severe than initially believed and that a court case was the only way to gain proper compensation. The railways were convinced that there existed large numbers of 'railway accidents doctors' who would support the efforts of 'railway accidents attorneys' in persuading railway accident victims to take the companies to court.⁵¹ Others were equally convinced that doctors, in particular, were selling their services to the companies in order to prevent accident victims

⁴⁸ *Saturday Review*, 29 January 1870, p. 139.

⁴⁹ Kostal, *Law*, p. 303.

⁵⁰ *Annual Register for 1861* (London: J. & F. H. Rivington, 1862), chronicle, p. 82.

⁵¹ Sir Edward Watkin, chairman of the South Eastern Railway, claimed in his evidence to a parliamentary select committee in 1870 that 'railway accidents doctors', 'railway accidents engineers' and 'railway accidents attorneys' were readily available in the wake of every accident to give evidence against the companies. *Report of the Select Committee on the Law of Compensation for Accidents*, PP. (Commons), X (1870), question 893. See also Kostal, *Law*, pp. 378-80.

claiming the compensation that was rightfully theirs. The *Saturday Review* sought in 1868 to draw its readers' attention to certain 'points of contact between railways and the medical profession, about which the public know little or nothing, and which, to say the least, invite very serious scrutiny . . .'

There was the railway doctor who thrust himself into the presence of a patient suffering under the effects of a severe collision, and announced himself as a great authority on such matters. The credulous patient placed faith in his assertions, accepted a cheque for some trifling amount, and signed a printed form of receipt releasing the railway from all further responsibility. Of course this was not the only form so signed, nor the only document of the sort thus printed. Nor was it ever told what percentage doctors receive on such transactions.⁵²

The *Review's* comments were made in the course of a review of James Ogden Fletcher's *Railways in their Medical Aspects*. Fletcher was medical officer to the Manchester, Sheffield and Lincolnshire Railway and the Great Northern Railway, and the *Review* saw his book as little more than railway company propaganda: '[Fletcher's] real views on the matter appear to be that Lord Campbell was an impertinent meddler, and that it is the duty of the travelling Englishman to take his railway smashing kindly'.⁵³ The review of Fletcher's book in *The Athenæum*, while kinder than that in the *Review*, also observed that 'his position naturally raises the suspicion that he may look upon the effects of railway travelling on the favourable side'.⁵⁴

The position of doctors such as Fletcher was clearly a difficult one, and one which placed the profession generally in something of a dilemma. The *British Medical Journal* addressed the problem in detail in an editorial of 1863 on 'Medical superintendents of railway companies':

⁵² *Saturday Review*, 16 May 1868, p. 658.

⁵³ *Ibid.*

⁵⁴ *The Athenæum*, 19 October 1867, p. 504.

The position in which a medical superintendent of a railway company is placed is a mixed one. He has to attend to the interests of the company which he serves, as well as to the performance of the more proper and immediate duties of his profession — the cure of the sick and wounded. This compound position, in which he is often called to act, naturally sometimes renders the performance of his duties somewhat difficult and delicate.⁵⁵

The essence of that difficulty, suggested the *British Medical Journal*, lay in the undeniable fact that 'One of the duties of the medical superintendent, besides that of ministering to the injured individual, is to protect the company against possible and probable imposition'; thus the railway doctor 'in this respect, certainly represents the interests of the company, as against the interests of the patient'.⁵⁶

That a situation could arise in which a doctor placed any concern above the interests of his patient troubled both doctors and the public. The *Saturday Review* accused doctors of allowing the high fees paid by railway companies 'to outweigh the sense of professional decorum'. However, given that 'an occasional high fee on a railway trial would be a poor set-off to the whispered comments, and the openly expressed belief, that doctors will swear to anything if sufficiently paid', the *Review* suggested that the relationship between certain medical men and the railway companies was in effect a conspiracy to benefit the doctors financially and deny the victims of accidents their rightful compensation:

It is well known to lawyers that a large majority of cases where injuries result from railway accidents are privately argued, or, if the sufferer perseveres, are settled out of court. Here the representative medical officer of the Company becomes an important person, and nets a handsome income by the weight which his position, his experience, and his personal aplomb give

⁵⁵ *British Medical Journal*, 22 August 1863, p. 214.

⁵⁶ *Ibid.*

to him in the professional conferences which determine the amount of damages in each case.⁵⁷

It was not only the popular press which made such claims. The *British Medical Journal* accused some doctors in railway service of betraying their professionalism, and emphasized that railway companies 'have no power to enforce upon any injured person the attendance of their medical man', and that 'no medical officer of a railway company can claim as a right the power of visiting a party so injured, in order to learn the extent of his injuries, or for any other purpose'.⁵⁸ That such occurrences were far from unknown is suggested by the journal's reference to 'the very strong language in which judges have reprobated in courts of justice the abuse of the influence exercised by medical men in this character'.⁵⁹

For the railway companies, however, the costs of compensation payments were such that they made every effort to prevent as many cases as possible from getting to court, and to discredit those accident victims whose claims they decided to contest. Not only would the companies invariably have the claimant examined by one of their own doctors, they also became adept at using private investigators and other sources of intelligence in their assessments of injury claims.⁶⁰ In 1868 John Charles Hall, a doctor who had often worked for railway companies in compensation cases, stated that 'persons who have received very slight injuries, frequently exaggerate their degree, or consequence, in order that they may induce a jury to give them a disproportionate compensation', and went on to explain:

When, therefore, I am asked to examine, for the purpose of legal investigation, one of these doubtful cases of impaired function — said to have been the result of an accident — I feel it incumbent to collect all the information in my power respecting the person's moral, and probable motives; and to enquire if the alleged causes of the disease are founded on fact, or probable.⁶¹

⁵⁷ *Saturday Review*, 16 May 1868, p. 658.

⁵⁸ *British Medical Journal*, 22 August 1863, p. 214.

⁵⁹ *Ibid.*, p. 215.

⁶⁰ Kostal, *Law*, pp. 381-2.

⁶¹ John Charles Hall, *Medical Evidence in Railway Accidents* (London: Longmans, 1868), p. 17.

Where the claimed injury was of a nervous character, seemingly involving no obvious organic damage, there was undoubtedly scope for deception on the part of the plaintiff. The lack of physical evidence of injury, the delay in the onset of symptoms, the often long drawn out progress of the disorder, the necessity of relying largely or entirely on the plaintiff's own account of his or her sufferings with little or no corroborating physical evidence, made railway passenger compensation claims in such cases an extremely complex and contentious area of medico-legal activity. As *The Lancet* commented in 1861,

The development of railway travelling has brought out quite a new subject of medical inquiry. The injuries to the human frame resulting from the various and numerous accidents to which railway trains are liable, have already furnished the material for many costly legal disputes, and not a few medical conflicts . . . The difficulties proverbially attached to the exposure of the tricks of military malingerers are as nothing compared with the task of determining the reality of some of the injuries to health, physical or mental, which those interested in recovering 'substantial' damages assign to railway collisions.⁶²

Doctors were becoming increasingly concerned that railway cases were revealing medical men as unable to agree over the nature, or even the existence, of the injuries involved; or, worse, that doctors would be seen by the public as the paid stooges of the railways, 'at the service of a railway company to give evidence, pro or con, just as surveyors and architects are'.⁶³ As the *British Medical Journal* commented in 1865, 'we do not believe that railway companies have gained much by the practice of calling witnesses to declare that the plaintiff is doing something like attempting to humbug them; and we are sure that our profession has not gained much credit with the public by assisting the companies in the matter'.⁶⁴

This was a thoroughly unsatisfactory situation for doctors to be placed in, at a time when the coherence, prestige and public image of their profession were

⁶² *The Lancet*, 14 September 1861, p. 255.

⁶³ *British Medical Journal*, 8 April 1865, pp. 354-5.

⁶⁴ *Ibid*, 25 March 1865, p. 300.

matters of great importance to medical practitioners. Furthermore, the numbers of railway accidents and the numbers of compensation cases were rising continuously, indicating that the problem was going to become more acute as time went on. One response was *The Lancet's* suggestion that an independent 'competent medical assessor' be appointed by the court 'in all cases where conflicting medical testimony would be likely to arise'.⁶⁵ Another was to urge, as both a professional and a medical priority, the careful investigation of these troublesome disorders, in order to establish a medical account of them upon which doctors could agree. In 1861 *The Lancet* urged that this was 'a question deserving of the most painstaking clinical investigation', and appealed for a careful record to be made of cases of nervous disease 'particularly if following upon a fall or blow, or other accident involving shock . . . in order to elucidate the histories that are constantly being put before medical practitioners by plaintiffs against railway boards'.⁶⁶ Four years later the *British Medical Journal* similarly commented that a 'collection of certain of the consequences of these modern kind of accidents, with a true history of their results, would be a very valuable addition to our pathology'.⁶⁷ These appeals were answered during the 1860s by a small flood of publications devoted to the health aspects of railway travel, many of which focussed specifically on the question of railway accident injuries.⁶⁸

The doctors concerned with railway injuries, and the contributors to the growing body of literature treating of the subject which accumulated from the 1860s, recognized from the outset that — as the above has made clear — the clinical history of 'railway cases' could not be considered separately from the medico-legal issues raised in the courtroom. The drama of railway spine took place, not solely within the closed circle of the doctor-patient relationship, in the privacy of the

⁶⁵ *The Lancet*, 24 June 1871, p. 867.

⁶⁶ *Ibid.*, 14 September 1861, p. 255.

⁶⁷ *British Medical Journal*, 25 March 1865, p. 300.

⁶⁸ For example: Thomas Wharton Jones, *Failure of Sight from Railway and Other Injuries of the Spine and Head* (London: J. Walton, 1855; 2nd edn., 1866); William Camps, *Railway Accidents or Collisions: Their Effects upon the Nervous System* (London: H. K. Lewis, 1866); John E. Erichsen, *On Railway and Other Injuries of the Nervous System* (London: Walton & Maberly, 1866); Edwin Morris, *A Practical Treatise on Shock after Surgical Operations and Injuries, with Special Reference to Shock caused by Railway Accidents* (London: Robert Hardwicke, 1867); James Ogden Fletcher, *Railways in their Medical Aspects* (London: J. E. Cornish, 1867); John Charles Hall, *Medical Evidence in Railway Accidents* (London: Longmans, 1868). In other, more general medical works, authors made specific reference to railway injuries, e.g. Frederic C. Skey, *Hysteria* (London: Longmans, Green, Reader, & Dyer, 1867).

patient's home or the consulting-room, nor in the carefully controlled realm of the medical laboratory, but in the public arena of the courtroom. In such circumstances, the privileged scientific status which doctors claimed for medical knowledge was undermined, as medicine became a debatable realm of competing assertions. The medical questions could not be separated from legal issues of liability and compensation and isolated from the influence of those outside the privileged circle of medical adepts — judges, juries, lawyers — no matter how much surgeons such as John Erichsen might regret the fact:

There is certainly nothing discreditable in the fact that the Bench and the Bar should be equally ignorant even of the most ordinary facts in anatomy and pathology, or of the elementary principles of physiology . . . But . . . the system under which they act can scarcely be commended, when men who, on the highest legal authority, are said to know little of science should be the arbiters of cases for the proper comprehension of which a knowledge . . . of medical science . . . is imperatively necessary.⁶⁹

Nor could the clinical and medico-legal issues involved in the phenomenon of railway spine be isolated from their cultural context of railway-inspired fear and anxiety. For the doctors confronted with the condition, and the lawyers who debated it, as well as for the public who read horrific reports of railway accidents in the press and followed the progress of compensation cases in the courtrooms, the mysterious disorders suffered by railway accident victims were more than merely the random injuries inflicted by a violent and terrifying event. They acquired a subtext of metaphorical and implied meanings, becoming emblematic of the condition of modern humanity, subject both to the remorseless efficiency of an increasingly mechanized civilization and the violent unpredictability of seemingly irrational and uncontrollable machines.

⁶⁹ J. E. Erichsen, *On Surgical Evidence in Courts of Law, with Suggestions for its Improvement* (London: Longmans, Green, & Co., 1878), pp. 12-13.

As medical writers on 'railway spine' never ceased to point out, the phenomenon of apparently severe disorders unrelated to any discernible physical injury was not a new development of the railway age. Such cases had been recorded for centuries. What was new was the sheer numbers of sufferers produced by railway accidents, and the cultural context, as reflected in medical and legal discourses, within which such cases now developed. In narrow clinical terms, however, doctors were not short of precedents to draw on in their discussions of 'railway spine' cases. In particular, early investigations of the 'railway spine' phenomenon drew on the diagnostic category of 'concussion' injury, which had been a focus of surgical enquiry for much of the preceding century.

The 'spinal concussion' diagnosis, developed in the early years of the nineteenth century,⁷⁰ sought to account for symptoms of nervous debility in patients who had received a blow of some kind, often in the back, without sustaining any apparent serious organic injury. The defining characteristic of concussion injury was essentially a negative one: it did not manifest itself in obvious organic damage. It could also produce a baffling wide range of symptoms, often nervous in character, and had a very uncertain prognosis; some victims recovered entirely, some suffered permanent paralysis or other disorder, and some declined and died. In 1829 the surgeon John Abercrombie had observed that concussion of the spinal cord 'may be speedily fatal without producing any morbid appearance that can be detected on dissection',⁷¹ and drew attention to the chronic and insidious nature of the disorders associated with the condition, observing that 'such conditions may supervene upon very slight injuries of the spine, which do not at the time of receiving them induce any urgent symptoms, and perhaps attract little or no attention'.⁷² Surgeons of the 1820s and 1830s, and subsequently, relied on a nosology of symptoms as the basis of diagnosis and treatment. By referring the causes of the symptoms observed in such cases to a disrupted nervous system they were able to plead the limitations of contemporary medical science for their

⁷⁰ For an outline of the development of the 'spinal concussion' diagnosis, see Trimble, *Post-traumatic Neurosis*, pp. 3-4.

⁷¹ John Abercrombie, *Pathological and Practical Researches on Diseases of the Brain and the Spinal Cord* (Edinburgh: Waugh & Innes, 1829), p. 391.

⁷² *Ibid.*, pp. 395-6.

ignorance of the precise nature of the injury or disease involved. In 1837 the surgeon Benjamin Brodie suggested that:

The minute organisation of the spinal cord may suffer from a blow inflicted on the spine, even where there is neither fracture nor dislocation, and where the investing membranes do not appear to participate in any way in the effects of the injury . . . the effect of a violent concussion is at once to impair and even to destroy the function of the spinal cord, sometimes even causing the patient's death in the course of a few hours.⁷³

Brodie went on to observe that organic 'changes and alterations' could occur in the brain in cases of concussion 'which our senses are incapable of detecting', and commented that 'These remarks are not less applicable to concussion of the spinal cord than they are to those of concussion of the brain. We cannot doubt that the nature of the injury is the same in both of them'.⁷⁴ The prevalence of back, neck and head pain in railway accident cases, the long-drawn out progress of the condition, and the perceived vulnerability of the spinal column to blows, jarring and straining during accidents made 'spinal concussion' an obvious model for medical authorities to use in their discussion of the novel railway ailments.

Even in the 1830s, however, an ambiguity existed over the precise role of the physical concussion involved, and the significance of non-physical factors in provoking, exacerbating and otherwise influencing the subsequent disorder. In 1835 Herbert Mayo, professor of anatomy, physiology and pathological anatomy in King's College London, observed that 'It sometimes happens, that symptoms, and indeed a whole course of disorder and death, take place, closely resembling those which commonly flow from organic lesion, and yet no organic lesion can be found'. He suggested that the seat of such disorders lay in the cerebro-spinal nervous system, and illustrated his theory with the example of chorea, or St Vitus's Dance, a disorder characterized by irregular involuntary movements of the limbs and face. Mayo suggested that the regions of the spinal column in which the nerves

⁷³ Benjamin Brodie, 'Injuries to the spinal cord', *Medico-Chirurgical Transactions*, vol. 20 (1837), p. 118.

⁷⁴ *Ibid.*

connected to the affected areas of the body originated were 'capable of being rendered, by impressions conveyed from the brain, preternaturally irritable for a larger or shorter period. The ordinary jactitation of chorea might then result from common sensation telling upon the irritable points of origin of the voluntary nerves'.⁷⁵ The crucial phrase here is 'impressions conveyed from the brain'. Mayo is suggesting that an 'impression' affecting the brain is sufficient to provoke a physical response involving nervous and muscular disorder in the body. The 'will' of the brain, transmitted along the 'nerves of volition', stimulates the relevant portion of the spinal cord, and the resulting impulse is referred to the area of the body connected to the affected spinal region. Furthermore, Mayo suggests, the initial 'impression' transmitted through the nervous system by the brain may be of the sort produced by a profound emotional shock: 'Chorea', he notes, 'is commonly produced by fright'.⁷⁶ The concept of a strong emotion producing organic disorder was thus not born with the study of railway spine in the 1860s; a tradition of surgical enquiry along these lines existed within the somatic orientation of nineteenth-century medicine in the 1820s and 30s.

This was still an essentially somaticist tradition of investigation, but by concentrating on nerve function at a chemical or electrical level (at this stage the electrical nature of the nerve impulse was not universally accepted⁷⁷) it opened the possibility of relating the action of the imagination or the emotions to the behaviour of the nervous system, and via nervous function to the organic substance of the body, without any readily detectable organic injury having taken place. Mark Micale has subtly characterized this approach as 'a tradition within the British medical community of studying the differentiation of organic and functional disorders based on the absence of structural pathology'.⁷⁸ Micale traces this tradition to Benjamin Brodie, professor of surgery at St George's Hospital, London, and his lectures of the 1830s, published under the title *Lectures Illustrative of Certain Local Nervous Affections*. In these lectures, Brodie sought to explain why

⁷⁵ Herbert Mayo, *Outlines of Human Pathology* (London: Henry Renshaw, 1835), pp. 169-70.

⁷⁶ *Ibid.*, p. 170.

⁷⁷ The view that the nervous impulse was electrical in nature, although accepted by many doctors by the 1830s, did not achieve general acceptance in the medical profession until the middle of the nineteenth century. See Oppenheim, 'Shattered Nerves', pp. 81-4; J. A. V. Chapple, *Science and Literature in the Nineteenth Century* (Basingstoke: Macmillan, 1986) pp. 22-3, 35-8.

⁷⁸ Mark S. Micale, *Approaching Hysteria: Disease and its Interpretations* (Princeton, N.J.: Princeton University Press, 1995), p. 126.

‘an impression made upon one part of the body will often produce a nervous affection elsewhere, at a distance from the original seat of the disease’.⁷⁹

What is the real nature of the disease on which these various and anomalous symptoms depend? We cannot doubt that its locality is in the nervous system. This is sufficiently demonstrated by the character of the symptoms themselves. Dissection, which illuminates so many of the darkest regions of pathology, affords us little assistance here; at least, we derive from it only negative information.⁸⁰

A range of symptoms — pain, paralysis, extreme sensitivity, muscular spasms — were manifested in patients whose physical injuries or disorders, if any, bore no relation to the part of the body in which the symptoms were displayed. Brodie asserted that the disorder which manifested itself in this obscure symptomatology was seated in the nervous system itself, but that it produced no visible organic damage; on several occasions, he tells us, he has carefully dissected affected parts of bodies which had suffered these disorders, ‘but I have never been able to discover in them any thing different from what belonged to their natural condition’.⁸¹

‘Spinal concussion’ was thus never an unproblematic explanation for the insidious disorders associated with railway accident cases; as exasperated Victorian doctors complained, it raised as many questions as it answered, and was fraught with difficulties about the division between the mental and the physical, the manner in which the mind interacted with the body, the role played by the nervous system in transforming mental idea into physical action or reaction. This is a point which has not always been adequately recognized by historians approaching nineteenth-century medicine from a modern Freudian or post-Freudian viewpoint. Thus, Eric Caplan has recently characterized the Victorian medical debate over ‘railway spine’ in the following terms:

⁷⁹ Benjamin C. Brodie, *Lectures Illustrative of Certain Local Nervous Affections* (London: Longman, Rees, Orme, Brown, Green, & Longman, 1837), p. 11.

⁸⁰ *Ibid.*, p. 66.

⁸¹ *Ibid.*

. . . rather than provide a psychological explanation for what were indisputably post-traumatic symptoms, the overwhelming majority of physicians offered instead a compelling materialistic rationalization for the disorder. The very name of the condition, railway spine, was indicative of late-nineteenth-century medicine's materialistic orientation.

Not all physicians accepted this somatic interpretation, however. Some argued that those suffering from this so-called disease were, in fact, conniving malingerers who had feigned their symptoms for the purpose of suing the railroads. Others dissented vigorously from this line of argument. Railway spine, they proclaimed, while perhaps a misnomer, was a mentally induced affliction that could be treated best by psychological intervention.⁸²

I would suggest that this is a skewed picture of the debate. There is no evidence for any of the doctors involved in the issue condemning all railway spine sufferers as 'conniving malingerers'; even those, such as John Charles Hall, who believed that there were many cases of deception and malingering accepted that some of the cases were genuine.⁸³ More importantly, the distinction between the 'materialistic' interpretation of the disorder and the categorization of it as a 'mentally induced affliction' is too sharply drawn, and perhaps betrays an underlying teleology which privileges non-somatic interpretations as pointing the way 'forward' to 'modern psychiatry'. This attitude can be detected in modern historical views of Victorian medicine as dominated by a narrowly organicist perspective which excluded the possibility of any injury or disease not traceable to detectable organic damage. Michael Trimble, for example, writes:

It is clear that the general consensus of medical opinion around the midpoint of the last century was that 'concussion of the spinal cord' or 'spinal concussion' was a delineated entry in clinical literature, similar in its mechanism of production to

⁸² Caplan, 'Trains, brains, and sprains', p. 389.

⁸³ Hall, *Medical Evidence*, p. 17.

concussion of the brain, and that the symptoms patients developed resulting from injury were due to organic lesions of the brain or spinal cord.⁸⁴

Trimble regards the work of John Erichsen, the most significant writer on railway spine in the 1860s and 70s, as typical of the era of somatic medicine, ascribing nervous symptoms to organic causes and marginalizing such non-organic influences as shock, fear and strong emotion. He writes that it was not until 'the end of the nineteenth century, with the writings of such authors as Page and Charcot, [that] ideas were altering to accept "psychic" factors in the aetiology of neurotic symptoms, and [that] the concept of "nervous shock" became accepted in the literature'.⁸⁵ This is too limited a view of the tradition of surgical theorizing from which Erichsen, a pupil of Benjamin Brodie in the 1830s, emerged. As we shall see, Erichsen's theorization of 'railway spine' adopted an organicist orientation which was in many ways unusually narrow and restrictive, and he should not be taken as representative of the general surgical opinion of his time. As the evidence from the work of Brodie, Mayo and others suggests, the interaction of the emotional and the physical was being approached in a more complex way from early in the nineteenth century. It is argued here that it is more accurate to see nineteenth-century medicine as broadly united on the somatic nature of the disorders throughout the period of this study, but divided over the acceptability of an organic theorization which permitted the direct action of what were normally identified as the non-organic factors of 'mind', 'emotion', 'moral' or 'emotional shock' upon the functions of the body, and which located that interaction in the brain and nervous system. This is consistent with the overall development of psychiatric medical thought and practice during a period in which, as Michael Clark has observed, 'the physiology and pathology of the brain and nervous system were regarded as the only possible basis for the "scientific" study of mental disorders'.⁸⁶

⁸⁴ Trimble, *Post-traumatic Neurosis*, pp. 8-9.

⁸⁵ Ibid, p. 142.

⁸⁶ Michael J. Clark, *'The Data of Alienism': Evolutionary Neurology, Physiological Psychology, and the Reconstruction of British Psychiatric Theory, c.1850-c.1900* (Oxford University: unpublished D.Phil. thesis, 1982), p. 80.

Railway travel and public health in The Lancet

The influence of this tradition of medical thought can be seen in the earliest significant contribution to the serious medical study of 'railway cases', an eight-part report on 'The Influence of Railway Travelling on Public Health' which appeared in *The Lancet* between January and March 1862.⁸⁷ This series of articles provided the first detailed consideration of railway accident disorders, preceding the first published work on this subject by John Erichsen — usually considered the medical pioneer in this field⁸⁸ — by four years. *The Lancet's* report thus stands at the beginning of the medical and medico-legal debates over 'railway spine' and related conditions which were to burgeon over the following half-century, and serves to illuminate the mid-century perceptions of the health aspects of railway travel and railway accidents which gave rise to Erichsen's work.

The series was subtitled 'Report of the Commission', and represented the outcome of one of a number of investigative 'commissions' undertaken by *The Lancet* during the nineteenth century. The journal would invite contributions on a particular topic from a number of medical authorities and other relevant experts, and combine their views with other comment and analysis to produce a detailed survey of the issue under examination. *The Lancet's* commissions arose, as the journal itself explained in its centenary edition of 1923, from 'a desire to inquire into all and every circumstance or position where medicine was directly interested . . . under the title of Commissions, articles were written, the result of investigations by competent persons, upon widely differing manifestations of social activity and development'.⁸⁹ The first was the 'Analytical Sanitary Commission', which ran from 1851 to 1854, and investigated the composition and effectiveness of commercial medical preparations and the tainting and adulteration of food and drink. Detailed, wide-ranging, ostentatiously asserting its impartial 'scientific' credentials, the Sanitary Commission brought the issues it examined to an audience far beyond the boundaries of the medical profession, and compelled political

⁸⁷ 'The Influence of Railway Travelling on Public Health', *The Lancet*, 4 January 1862, pp. 15-19; 11 January, pp. 48-52; 18 January, pp. 79-83; 25 January, pp. 107-110; 1 February, pp. 130-2; 8 February, pp. 155-8; 1 March, pp. 231-5; 8 March, pp. 258-60. Also published as a self-contained pamphlet under the same title (London: The Lancet, 1862).

⁸⁸ J. E. Erichsen, *On Railway and Other Injuries of the Nervous System* (London: Walton & Maberly, 1866). On Erichsen, see below.

⁸⁹ *The Lancet*, 6 October 1923, p. 721.

reaction. The establishment in 1855-6 of the Select Committee on the Adulteration of Food and the subsequent passing of the Adulteration Act of 1860 and the Sale of Food and Drugs Acts of the 1870s were in large part directly inspired by *The Lancet's* investigations.⁹⁰ By the time *The Lancet* decided to institute a commission to inquire into railway travelling the reputation of the Analytical Sanitary Commission was established and its influence was widely recognized; thus, by employing the same technique to investigate railway issues *The Lancet* was acknowledging the importance of the topic in the field of public health and announcing its intention to have a direct influence on public debate and on any resulting legislative response.

The Lancet's inquiry attracted considerable public interest, sufficient to justify the republishing of the whole series of articles in a self-contained booklet in June 1862;⁹¹ according to the introduction, 'The publication of the successive Reports was followed with so general and deep an interest, that it became a duty to present them in a collected form'⁹² (the proceedings of the Analytical Sanitary Commission had similarly been published as a separate volume in 1854⁹³). That there was significant interest in the inquiry beyond the confines of the medical world is confirmed by the lengthy review which *The Cornhill Magazine* devoted to it at the end of 1862. While expressing some reservations about the inquiry's claimed scientific credentials, the reviewer generally welcomed it as a valuable contribution to 'the discussions recently excited respecting the influence of railway-travel':

There are alarmists proving railways to be the source of new diseases, and of increased severity in the old. There are optimists who prove that railway-travel is a source of health. Statistics and cases are freely invoked on both sides: science is invoked to prove, on mechanical, chemical and physiological principles, that this travel is terribly injurious — and perfectly innocuous . . . if the evils could be made clear, and traced to their sources, much might be done towards their mitigation. In this sense we consider

⁹⁰ See John Burnett, *Plenty and Want: a Social History of Diet in England from 1815 to the Present Day* (London: Scolar Press, 1966; rev. edn. 1979), pp. 240-3, 249, 257.

⁹¹ *Lancet*, *The Influence of Railway Travelling on Public Health* (London: The Lancet, 1862).

⁹² *Ibid*, p. v.

⁹³ Burnett, *Plenty and Want*, p. 240.

the proprietors of *The Lancet* were well inspired, when they conceived the idea of appointing a commission to inquire into the 'The Influence of Railway Travelling upon Public Health.'⁹⁴

The Lancet's survey was certainly wide-ranging; among the aspects considered were the 'influence on the cerebral and spinal centres' and the 'effects on the eye' of railway travelling; 'accidents, and their primary and secondary effects', the 'morbid effects of railway travelling', and the 'rapid ageing of season-ticket holders'. Underlying the whole project, however, was a recognition that the railway was still a cause of fear and anxiety, and a determination to find out what justification, if any, there was for that anxiety. *The Lancet* was at pains from the outset to distinguish its 'scientific' approach from the exaggerated fears of such early anti-railway critics as the medical men of the 1820s whose predictions that the 'immense velocity [of trains] was fraught with danger to the respiration', and that 'Boiling and maiming were to be every-day occurrences' were quoted at the beginning of the inquiry.⁹⁵ 'We have outlived the time of these prejudices', claimed *The Lancet*:

We have reached a period when loose inferences and vague surmises should no longer be permitted to usurp the place of exact knowledge. For the immense collection of facts and data already made in reference to railways, and the experience accumulated by the rapid development of railway travelling, supply materials abundantly sufficient to justify a systematic inquiry into the health of railway travelling, with reasonable prospect of attaining reliable results and determining many harassing doubts.⁹⁶

The early fears of the railway had indeed receded over the years, but as we have seen, below the general outward acceptance which the railway had achieved by the 1860s, deep disquiet and many 'harassing doubts' remained. *The Lancet* explicitly

⁹⁴ 'Effects of railways on health', *Cornhill*, vol. 6 (July-December 1862), no.34, pp. 480-1.

⁹⁵ *The Lancet*, 4 January 1862, p. 15.

⁹⁶ *Ibid.*

identified this change of attitudes as one of the chief reasons for embarking upon its investigations:

Medical men are often asked whether they consider railway travelling prejudicial to health . . . the very frequency of the interrogation points to the same conclusion which careful inquiry has led us to form — that there has been gradually growing up in the public mind a suspicion of the dangers from railway travelling widely different from that apprehension with which the thoughts of travellers were at first uneasily possessed. It is no longer the fear of accidents so much as a vague dread of certain undefined consequences to health resulting from influences peculiarly produced by this mode of travelling.⁹⁷

Railway accidents were an important focus of the Report's attention; but in considering the consequences which they had for the health of their victims, *The Lancet* carefully distinguished between their 'primary' and 'secondary' effects.⁹⁸ The 'primary' effects were the obvious physical injuries such as broken bones, lacerations and burns. Such injuries could be very severe in 'railway-smashed'⁹⁹ casualties, but they were straightforward, well-understood, and treatable. Much more problematic were the chronic and insidious 'secondary' effects of accidents, which were characterized by a bafflingly broad range of symptoms: 'giddiness, loss of memory, pains in the back and head',¹⁰⁰ 'tingling and numbness of the extremities, local paralysis, paraplegia, functional lesions of the kidney and bladder', and even 'slowly ensuing symptoms of intellectual derangement'.¹⁰¹ The journal's use of the term 'functional' to describe these disorders reveals the

⁹⁷ *The Lancet*, 4 January 1862, p. 15.

⁹⁸ *Ibid.*, 18 January 1862, pp. 83-4; 8 February 1862, pp. 156-8. A substantial portion of the section on 'Accidents, and their primary and secondary effects' was contributed by Dr Waller Lewis, principal medical officer to the Post Office, who had carried out an investigation of the effects of extensive railway travel on postal workers in 1859. That the Post Office had commissioned such a survey is itself an indication of the extent of contemporary concern over the health consequences of railway travelling.

⁹⁹ This graphic term is from a leading article on 'Medical superintendents of railway companies', *British Medical Journal*, 22 August 1863, p. 214.

¹⁰⁰ *The Lancet*, 8 February 1862, p. 157.

¹⁰¹ *Ibid.*, p. 156.

influence of the tradition of locating such disorders in the nervous apparatus controlling the proper function of the affected organs, rather than in the substance of the organs themselves. This explanation gave support to *The Lancet*'s suggestion that the origins of the disorder lay in nervous damage of some description, perhaps produced by 'the violent concussion of the nervous centres experienced during the shock'.¹⁰²

The Lancet went on to summarise some cases in which people who had seemingly escaped entirely unhurt in railway accidents, or had suffered only superficial injury such as bruising or abrasions, gradually succumbed to progressively worsening nervous complaints. We have already seen their account of one such case, that of Mr Shepherd, the victim of the LNWR crash in 1858. Another involved a Post Office employee, who had been aboard a mail-train involved in an accident in November 1860. The train had jumped the tracks, and the man was 'thrown from one end of the carriage to the other, when he fell on the back of his neck, and was for a moment insensible'. However, he did not appear to be seriously injured, and 'was able to proceed to London the next morning, when he was seen by Dr. Waller Lewis, who found him suffering from giddiness, loss of memory, pains in the back and head, &c'. He took action against the railway company, winning £275 in compensation despite the assertion by the railway company's medical witnesses that 'there was nothing wrong with him'.¹⁰³

The Lancet did not attempt any detailed analysis of such post-accident cases; it is not clear, for example, how far pre-existing conditions may have contributed to any of the disorders described, nor are the descriptions of symptoms particularly informative: 'slight headache', 'feverishness', 'much pallor', 'nervousness'.¹⁰⁴ However, this imprecision is typical of mid-nineteenth-century medical case histories, and serves to emphasise the vague nature of the nervous conditions with which the doctors were confronted. The unifying factor was that the disorders were seemingly out of all proportion to such minor physical injuries as the victims had actually sustained. In seeking to account for this, *The Lancet* focussed on an issue which was to remain at the heart of the 'railway injuries' debate for the next half-century: the nature and significance of the shock which the accident inflicted

¹⁰² *The Lancet*, 8 February 1862, p. 157.

¹⁰³ *Ibid.*

¹⁰⁴ *Ibid.*

upon the victim. As in the cases of American civil war combat trauma¹⁰⁵ and first world war shell shock,¹⁰⁶ the medical debates over 'railway spine' came to revolve around the precise nature of the shock which apparently acted as the catalyst for any ensuing disorder.

The Lancet particularly emphasised the unique degree of violence associated with the accident, and implied a link between this extreme violence and the nervous conditions subsequently suffered by the accident victims:

... neither the direct shocks produced by the accident, nor the physical injury inflicted at the time, afford any trustworthy indication of those insidious results which may subsequently ensue at a more or less distant period. That these are chiefly due to the violent concussion of the nervous centres experienced during the shock, is clearly shown by the character of the symptoms presented . . . The vehemence and suddenness of the jolts experienced during a collision exceed in violence any other kind of shock to which human beings are exposed in travelling . . . Persons escape the immediate danger, and, believing that they are uninjured beyond the severe mental impression of fright, go on their way rejoicing, and neglect the necessary precaution of affording that long period of perfect rest to the brain and spinal column which may enable them to recover from the shock.¹⁰⁷

Here we can recognize a further manifestation of the pervasive ambiguity of the concussion model of disorder, regarding the nature of the injury or disease produced by the accident. It is not clear whether the condition consists in pathological injury of the cerebral and spinal structures, or in physiological

¹⁰⁵ See Eric Dean, 'We will all be lost and destroyed: post-traumatic stress disorder and the Civil War', *Civil War History*, no. 37 (June 1991); John Talbott, 'Combat trauma in the American Civil War', *History Today*, vol. 46, no. 3 (March 1996), pp. 41-7.

¹⁰⁶ See Martin Stone, 'Shell shock and the psychologists', in William F. Bynum, Roy Porter and Michael Shepherd (eds.), *The Anatomy of Madness* (3 vols., Cambridge: Cambridge University Press, 1988), vol. 2, pp. 242-71; Ted Bogacz, 'War neurosis and cultural change in England, 1914-22: the work of the War Office Committee of Enquiry into "shell-shock"', *Journal of Contemporary History*, vol. 24, no. 2 (April 1989), pp. 227-56.

¹⁰⁷ *The Lancet*, 8 February 1862, p. 156.

disruption of nerve function. *The Lancet*'s own ambiguity, in the absence of clear organic evidence on which to base a conclusion, is clear in passages such as the following:

These symptoms are manifested through the nervous system chiefly, or through those physical conditions which depend upon the perfect physiological balance of the nerve-forces for their exact fulfilment. They vary . . . from simple irritability, restlessness and malaise after long journeys up to a condition of gradually supervening paralysis, which tells of the insidious disease of the brain or spinal cord, such as . . . follows on violent shocks or injuries to the nervous centres. These latter are the symptoms which frequently ensue from the vehement jolts and buffetings endured during a railway collision.¹⁰⁸

The Lancet itself seems ultimately to favour a physiological model of nervous disruption rather than a pathological model of organic lesion, to judge from its suggestion that the severe physical shock experienced during the accident results 'in the nervous system being shaken, and, for a time, sometimes considerably weakened',¹⁰⁹ and that in its weakened condition an 'impairment of nervous forces'¹¹⁰ supervenes, disrupting the action of muscles and organs throughout the body.

The continuities that can be traced from the work of Abercrombie and Brodie in the 1820s and 30s to *The Lancet*'s enquiry of 1862 are important in establishing the context of surgical and clinical investigation within which medical responses to 'railway spine' developed. Too many modern studies begin the story with John Erichsen's *On Railway and Other Injuries* in 1866; thus Caplan writes that railway spine was 'Born in 1866 as an exclusively somatic disease'.¹¹¹ Railway spine cases were certainly occurring before 1866, and were taking their place in the well-established British surgical tradition of the somaticist theorization of apparently non-somatic disorders. Despite the controversies over 'railway spine' between the

¹⁰⁸ *The Lancet*, 1 March 1862, p. 234.

¹⁰⁹ *Ibid*, 18 January 1862, p. 84.

¹¹⁰ *Ibid*, 8 February 1862, p. 158.

¹¹¹ Caplan, 'Trains, brains and sprains', p. 388.

1860s and the 1900s, investigation of the condition would remain firmly within this tradition.

John Erichsen and 'railway spine'

The first full-length medical text on 'railway spine' and related conditions appeared in 1866. The author was John E. Erichsen (1818-96), an eminent and well-respected London surgeon. He was author of a highly successful standard surgical textbook, *The Science and Art of Surgery*, first published in 1853, which reached its tenth edition by 1895, and was to end his career as a surgeon to the royal household.¹¹² Erichsen turned his attention to the medical sequelæ of railway accidents while holding the post of professor of surgery at University College, London, and his book, *On Railway and Other Injuries of the Nervous System*, was a collection of six lectures delivered by Erichsen to the medical students at University College Hospital in the spring of 1866. It is clear from his books on the railway issue and from a work he published in 1878 dealing with the role of the medical expert in court¹¹³ that by the mid-1860s Erichsen had accrued considerable direct experience of railway compensation cases through his work as a medical expert witness, and it seems that it was this experience which led him to address the topic of railway injuries in such detail after half a career in general surgery. The prevailing atmosphere of concern over the danger of the railway and the high profile of the accident compensation issue may also have played a part in convincing him that the subject was worthy of investigation.

Erichsen's book was enormously influential; in 1894 a distinguished American neurologist, looking back at the previous thirty years of debate over the 'Railway Spine' condition, called it 'epoch-making'.¹¹⁴ The book certainly had considerable impact within the medical profession, and was well-received by his fellow doctors who made extensive use of it as a diagnostic and practical manual. However, its

¹¹² For Erichsen's career see *DNB* and his obituary in *The Times*, 24 September 1896, p. 10. Ironically, he was at one time thought to have been killed in a railway accident in France: see *The Times*, 9 October 1874, p. 7.

¹¹³ J. E. Erichsen, *On Surgical Evidence in Courts of Law with Suggestions for its Improvement* (London: Longmans, Green, 1878).

¹¹⁴ Charles D. Dana, 'The traumatic neuroses: being a description of the chronic nervous disorders that follow injury and shock', in Allan McLane Hamilton & Lawrence Godkin (eds.), *A System of Legal Medicine* (2 vols., New York: E. B. Treat, 1894), vol. 2, p. 299; quoted in Caplan, 'Trains, brains, and sprains', p. 390.

influence was not limited to physicians and surgeons; for a medical text-book dealing with a fairly narrow field of interest, *On Railway and Other Injuries* had an unusually high public profile.¹¹⁵ 'It is not often that a strictly medical book is reviewed in our pages', remarked *The Spectator* in its review; 'In the present instance, however, a surgeon of great repute . . . has given us . . . a careful opinion upon a point interesting to every member of the community'.¹¹⁶ The continuing high incidence of railway accidents meant that the subject which the book addressed was indeed one of continuing general interest, and the extensive use of its various editions in the courtroom during railway accident compensation cases associated the name of Erichsen firmly with the 'Railway Spine' condition in the public mind. As the Philadelphia neurosurgeon S. V. Clevenger commented in 1889, 'Neurologists, surgeons and attorneys find so much useful information in Erichsen's book that lawsuits wherein spinal concussion is an issue are seldom undertaken without reference to this London surgeon's lectures'.¹¹⁷ The sympathetic attitude which the courts took towards compensation claims against railway companies ensured that Erichsen's work, and the personal testimony of the author himself, became very influential in the courtroom. As a result, those who believed the conditions Erichsen described to be entirely fictitious or grossly exaggerated did not hesitate to blame him for producing 'a guide book that might mislead the dishonest plaintiff, if he felt so disposed, to set out upon the broad range of imposture and dissimulation with the expectation of getting a heavy verdict'.¹¹⁸

Erichsen put forward an explanation of 'Railway Spine' based essentially on the spinal concussion model of actual organic damage to the substance of the spinal cord. He sought to explain the lack of physical evidence in the form of bleeding, bruising or inflammation for 'any local and direct implication of the spinal column

¹¹⁵ Public concern over 'Railway Spine' was reflected in the interest shown by general periodicals in medical publications on the subject. *The Lancet's* survey of 1862 was discussed in *Cornhill*, vol. 6 (July-December 1862), pp. 480-1, and *The Spectator*, 12 July 1862. Erichsen's 1866 book was also reviewed in *The Spectator*, 28 July 1866, as well as in medical periodicals, and James Ogden Fletcher's *Railways in their Medical Aspects*, published the following year, was reviewed in *The Athenæum*, 19 October 1867 and the *Saturday Review*, 16 May 1868.

¹¹⁶ 'The "Railway Spine"', *The Spectator*, 28 July 1866, p. 834.

¹¹⁷ S. V. Clevenger, *Spinal Concussion* (Philadelphia & London: F. A. Davis, 1889), p. 3. Clevenger suggested calling the Railway Spine condition 'Erichsen's Disease'; *ibid.*, pp. 207-8.

¹¹⁸ Allan McLane Hamilton, *Railway and Other Accidents, with Relation to Injury and Disease of the Nervous System: A Book for Court Use* (London: Balliere, Tindall & Cox, 1904), p. 2.

by external violence' in such cases by suggesting that the injuries which caused the nervous symptoms were 'of a more chronic and less directly obvious character . . . consist[ing] mainly of chronic and sub-acute inflammatory action in the Spinal Membranes, and in Chronic Myelitis, with the changes in the structure of the Cord that are the inevitable consequences of a long-contrived chronic inflammatory condition developed by it'.¹¹⁹ Erichsen's claim was that 'the whole train of nervous phenomena arising from shakes or jars or blows on the body, and described . . . as characteristic of so-called "Concussion of the Spine," are in reality due to chronic inflammation of the spinal membranes and cord';¹²⁰ but he was continually forced by the complete lack of evidence in the majority of cases for any inflammation or other physical injury to distinguish 'mental' or 'emotional' shock from 'physical' shock and to accept, if only implicitly, the causative role of the former in provoking the disorders associated with 'Railway Spine'.

Thus, Erichsen's attitude towards 'Railway Injuries' was ambiguous; confronted, like all his contemporaries, by the undeniable power and danger of the railway, he accepted that the railway accident was an event of unprecedented violence and horror, but tended to resist any suggestion that the degree of psychological or mental shock associated with it could contribute directly to the nervous disorders suffered by its victims. This ambiguity was reflected in his concern to interpret the particular characteristics of railway injuries in the context of spinal and nervous injuries generally, rather than granting to them a unique medical status of their own; railway injuries, he asserted, were 'peculiar in their severity, not different in their nature from injuries received in the other accidents of civil life'.¹²¹ Yet his emphasis on the degree to which railway accidents were set apart by their violent character and their infliction of a unique degree of psychological shock upon their victims compels him to allow some recognition to them as occupying a distinct category of their own:

. . . in no ordinary accident can the shock be so great as in those that occur on Railways. The rapidity of the movement, the momentum of the person injured, the suddenness of its arrest,

¹¹⁹ Erichsen, *On Railway and Other Injuries*, pp. 112-3.

¹²⁰ *Ibid*, p. 123.

¹²¹ *Ibid*, p. 46.

the helplessness of the sufferers, and the natural perturbation of mind that must disturb the bravest, are all circumstances that of a necessity greatly increase the severity of the resulting injury to the nervous system, and that justly cause these cases to be considered as somewhat exceptional from ordinary accidents. This has actually led some surgeons to designate that peculiar affection of the spine that is met with in these cases as the 'Railway Spine.'¹²²

Furthermore, by including in his list of factors 'the helplessness of the sufferers' and the 'natural perturbation of mind' associated with involvement in a railway accident, Erichsen moved towards an acceptance that the psychological effects of the experience could have a direct influence on any resulting nervous disorder. As we have seen, this ambiguity was intrinsic to the 'spinal concussion' diagnosis. Furthermore, it was a crucial factor in the medico-legal debates over how far an organic cause, traceable to the influence of the railway accident itself, could be identified as the origin of the nervous and psychological disorders of 'railway spine'.

When the *British Medical Journal* reviewed the book in December 1866 the reviewer detected Erichsen's ambiguity and questioned his implicit identification of a category of 'railway injuries', linking this clinical categorisation clearly with its medico-legal consequences:

The only differences which, as far as we can see, are to be found between railway and other injuries, are purely incidental, and relate to their legal aspect. A man, whose spine is concussed on a railway, brings an action against the company, and does or does not get heavy damages. A man, who falls from an apple-tree and concussed his spine, has . . . no railway to bring an action against.¹²³

¹²² Erichsen, *On Railway and Other Injuries*, p. 9.

¹²³ *British Medical Journal*, 1 December 1866, p. 612.

The *British Medical Journal* reviewer went on to criticise the use of the title *Erichsen on Railway Injuries* on the cover and spine of the book, suggesting that this was 'calculated to mislead', for 'The book really contains an account only of the effect of shocks and concussion of the spinal cord and brain . . . It is, therefore, quite superfluous to make of them a special class of railway nervous injuries'.¹²⁴

Erichsen immediately responded to the review with a lengthy letter of self-justification, in which he claimed (almost certainly justly) that the publishers alone were responsible for the title used on the outside of the book, and that his own title *On Railway and Other Injuries*, did reflect more accurately his own belief that railway injuries were indeed fundamentally the same as injuries from other causes. Yet he went on to justify the particular attention which he and (he clearly implies) other surgeons gave to railway injuries by stressing the ways in which they did differ from other, superficially similar, injury cases:

With reference to the term 'railway injuries,' I beg to say that I have used it in the same sense that the term 'gunshot injuries' is commonly employed by surgeons: not so much as denoting any specific difference in the nature of the injury, but rather as indicative of the peculiar and exceptional agency by which it has been occasioned. In this sense, the terms 'railway injury' or 'railway accident' are commonly used in ordinary hospital practice.

A surgeon asks his house-surgeon, 'Any fresh cases in to-day?' The answer is, 'Yes, sir, a bad railway case.' The house-surgeon would not say 'a bad cab case' . . . But he knows and recognises that there is a peculiarity about railway accidents that causes him to place them in a category by themselves . . .¹²⁵

Erichsen's attitude towards this 'peculiarity about railway accidents' is equivocal. The peculiarity lay in the uniquely powerful forces unleashed in the railway accident, the extreme violence to which railway accident victims were subjected, and Erichsen repeatedly stresses that this is the only characteristic which

¹²⁴ *British Medical Journal*, 1 December 1866, p. 612.

¹²⁵ *Ibid*, p. 678.

distinguishes railway accident injuries from injuries suffered in other circumstances. His ostensible claim was not that railway accidents had created a new form of injury, but that an existing disorder, well-known to medical science, had been made more frequent and more serious by the appearance of railways. In the medical records of the late eighteenth and early nineteenth centuries, he claimed, there were 'many cases recorded that prove incontestably that precisely the same trains of phenomena that of late years have led to the absurd appellation of 'Railway Spine,' had arisen from accidents . . . a quarter of a century or more before the first Railway was opened'.¹²⁶

However, Erichsen's repeated claims that the disorders associated with railway accident victims do not represent a new type of injury, but a more serious and widespread manifestation of an old one are undermined by the emphasis he continually places on the importance of that unique degree of violence and 'intensive shock to the System' occasioned by a railway accident. Despite his denials, he does appear to be suggesting that 'Railway Injuries' constitute a new form of medical condition:

These concussions of the Spine and Spinal Cord not unfrequently occur in the ordinary accidents of civil life, but none more frequently or with greater severity than in those which are sustained by Passengers who have been subjected to the violent shock of a Railway Collision . . . from the absence often of evidence of outward and direct physical injury, the obscurity of their early symptoms, their very insidious character, the slowly progressive development of the secondary organic lesions, and functional disarrangements entailed by them, and the very uncertain nature of the ultimate issue of the case, they constitute a class of injuries that often tax the diagnostic skill of the Surgeon to the utmost.¹²⁷

Furthermore, the unique characteristics of the railway accident are not limited to the purely physical effects of sudden and extreme violence upon the body;

¹²⁶ Erichsen, *On Railway and Other Injuries*, pp. 10-11.

¹²⁷ *Ibid*, p. 2.

Erichsen further distinguishes the railway accident as a cause of spinal concussion injuries leading to nervous disorder from other, similar accidents by emphasising the psychological effects of involvement in such an accident — a highly significant admission of the role of non-somatic factors. Thus, Erichsen has not only implicitly accepted that the railway accident was an event of unprecedented violence and horror, but has also been forced to concede that there might be a direct connection between the psychological experiences of railway accident victims and the disorder, which he believed to be a physical disease, which they subsequently suffered; that is, he suggests that in the case of 'Railway Spine' victims, the mind is acting, through some little-understood mechanism, on the physical condition of the body.

In the second, considerably expanded and rewritten edition of his book, published in 1875 as *On Concussion of the Spine, Nervous Shock, and Other Obscure Injuries of the Nervous System in their Clinical and Medico-Legal Aspects*, Erichsen significantly altered his view of the pathology of 'Railway Spine', attempting to place the origins of the disorder with a disrupted nervous system rather than with any organic lesion: 'the primary effects of these concussions or commotions of the spinal cord are probably due to molecular changes in its structure. The secondary are mostly of an inflammatory character, or are dependent on retrogressive organic changes'.¹²⁸ However, in the face of the dearth of physical evidence for such organic changes, Erichsen had to plead the limitations of contemporary medical knowledge and the obscurity of the conditions underlying the nervous symptoms:

We should indeed be taking a very limited view of the Pathology of Concussion of the Spine if we were to refer all the symptoms, primary and remote, to inflammatory conditions . . . there are undoubtedly states, both local and constitutional that are primarily dependent on molecular changes in the cord itself, or on spinal anaemia induced by the shock of the accident acting directly on the cord itself, or indirectly, and at a later date . . .¹²⁹

¹²⁸ J. E. Erichsen, *On Concussion of the Spine, Nervous Shock, and Other Obscure Injuries of the Nervous System in their Clinical and Medico-legal Aspects* (London: Longmans Green, 1875), p. 15.

¹²⁹ *Ibid*, p. 175.

Once again Erichsen was confronted by the absence of any discernible physical injury, admitting that it was 'rather by clinical inference than by positive observation that such a state can be termed one of anaemia'.¹³⁰ However, by 1875, Erichsen's ideas had changed sufficiently to permit him to move towards a more open acceptance of the role which psychological factors could play in provoking nervous disruption than that which had characterised his views in 1866. He was now moving away from the spine altogether as the focus of the complaint towards the brain, and, by implication, the mind; his suggestion was that a condition of 'mental or moral unconsciousness' could be caused by the terror of the accident, producing a temporary breakdown in the brain's ability to control the nervous system:

The mental or moral unconsciousness may occur without the infliction of any physical injury, blow, or direct violence to the head or spine. It is commonly met with in persons who have been exposed to comparatively trifling degrees of violence, who have suffered nothing more than a general shock or concussion of the system. It is probably dependent in a great measure upon the influence of fear . . .¹³¹

This suggestion did not lead Erichsen to abandon his belief that the causes of the nervous disorders lay ultimately in some kind of physical injury to the nervous system, but his acceptance of the role played by a purely psychological influence, in the form of fright, as a causative agent in the traumatization of railway accident victims reflected a significant re-orientation of his medical thought.

Nervous shock and the moment of terror

Erichsen's books had immense influence, in both the legal and the medical worlds. It would be incorrect, however, to see them as creating an unchallenged medical orthodoxy. On the contrary, the narrowly organic view which Erichsen adopted

¹³⁰ Erichsen, *On Concussion of the Spine*, p. 193.

¹³¹ *Ibid*, p. 195.

was, if anything, untypical of the surgical views of this time. As we have seen, Erichsen himself had, against his own inclination, implicitly recognised the role of psychological factors in 'Railway Spine', and others were prepared to go further along the same road. In 1868 the prominent surgeon Frederic Le Gros Clark commented that:

there certainly are distinctive characteristics attending railway concussion of the spine, which are exceptional, to say the least, in a similar injury otherwise produced. And this exceptional character consists in the curiously diversified results which are met with; sequences which seem to be more allied with general nervous shock, and consequent deteriorated innervation, than upon special shocks or concussion of the spinal cord.¹³²

Clark stressed that where the spine had clearly received a blow in the course of the accident, 'the symptoms are usually immediate and decisive, and assume very much the character of spinal shock from other causes'. Yet even in these apparently clear cases of spinal concussion, railway accident cases were differentiated by their unique psychological characteristics; in such cases, asserted Clark, 'very often, the sequelæ are more varied and protracted than in ordinary concussion; a circumstance which is probably explained, in a measure, by the influence of emotion'.¹³³ Clark accepted that some cases of 'railway spine' did involve spinal concussion as Erichsen suggested; but he claimed that that was an insufficient explanation in most cases. Physical shock had a role to play, but the direct action of a psychological shock on the nervous system — producing an organic change of some kind which interfered with nervous function — was, he suspected, the more likely cause of the disorder: 'I think it not inconsistent with acknowledged facts, to affirm that protracted functional disturbance, or even fatal disease, may be the consequence of a rude shock, simultaneously, to the nerve-centres of the emotions, of organic and of animal life'.¹³⁴

¹³² F. Le Gros Clark, 'Lectures on the Principles of Surgical Diagnosis', Lecture VI, *British Medical Journal*, 3 October 1868, p. 355.

¹³³ *Ibid.*

¹³⁴ *Ibid.*

The surgeon John Furneaux Jordan, writing in 1873, similarly emphasised the importance of taking account of both physical and psychological factors in considering such conditions, and stressed the uniqueness of the railway accident in the extremity of the 'psychical' shock which it inflicted on its victims:

The principal feature in railway injuries is the combination of the psychical and corporeal elements in the causation of shock, in such a manner that the former or psychical element is always present in its most intense and violent form. The incidents of a railway accident contribute to form a combination of the most terrible circumstances which it is possible for the mind to conceive. The vastness of the destructive forces, the magnitude of the results, the imminent danger to the lives of numbers of human beings, and the hopelessness of escape from the danger, give rise to emotions which in themselves are quite sufficient to produce shock, or even death itself . . . All that the most powerful impression on the nervous system can effect, is effected in a railway accident, and this quite irrespectively of the extent or importance of the bodily injury.¹³⁵

Such views did not undermine the argument that an actual organic injury underlay cases of 'railway spine', they rather urged an extension of what the courts were willing to accept as real, somatic, compensative injury; and this the legal system, as we have seen, was prepared to countenance. It could be argued that the divisive nature of the medico-legal 'railway spine' debate arose in no small measure from the fact that the single most influential medical writer on the subject, Erichsen, popularized what many of his contemporaries regarded as a crudely organic model of the disorder, allowing the debate to proceed on the basis of a sharply-drawn distinction between those who held to the view that there was an organic injury at the root of the disorder and that all other considerations were secondary to this essential point (which was fundamentally Erichsen's attitude) and those who held that 'railway spine' and similar disorders had no real existence.

¹³⁵ John Furneaux Jordan, *Surgical Inquiries* (London: J. & A. Churchill, 1873), pp. 37-8.

Thus, in contrast to the acceptance which his views found in the courtroom, Erichsen's model of 'railway spine' never achieved wide acceptance within the medical profession. This fact must be remembered when the work of the second 'big name' of railway accident medicine is considered: Herbert Page, surgeon to the London and North Western Railway company. Modern historians have almost invariably positioned Page in opposition to Erichsen, challenging the dominant Erichsenian model of organic disorder with a theorization of 'railway spine' which emphasized the psychological aspects of the phenomenon. For this reason, Page is seen as representing the challenge of 'modern' psychological medicine to the somaticist orientation of Victorian medicine. I would argue, in common with Mark Micale, for a very different perspective. Herbert Page, far from offering a revolutionary challenge to nineteenth-century theorizations of such disorders as 'railway spine', represented the continuing development of the mainstream of Victorian surgical thought, traceable back to Abercrombie and Brodie. Page, like his hero Charcot, was entirely an organicist, who sought the causes of mental and nervous disorder in physical injury and disease. What he rejected in Erichsen was his crude characterization of lesions in the spinal cord, and his outright refusal to countenance any role played by what he (Erichsen) considered the non-organic influences of emotion, idea, or thought. For Page these phenomena *were* organic, and such cases as 'railway spine' demonstrated the way in which they acted upon and through the physical matter of the body.

In his *Injuries of the Spine and Spinal Cord Without Apparent Mechanical Lesion* (1883; revised 2nd edition, 1885), Page was very critical of Erichsen's theories, asserting that it was very unlikely that the spinal cord could be injured without the spinal column showing signs of damage, and arguing that there were 'few or no facts'¹³⁶ to support the theory of actual physical injury of any kind to the spinal cord being responsible for post-accident nervous disorder. Page's focus, from the outset, was on the mind. Erichsen had used the analogy of a watch dropped to the floor to explain why the nervous disorders rarely manifested themselves in individuals who had suffered a serious physical injury; if the watch-glass was

¹³⁶ Herbert W. Page, *Injuries of the Spine and Spinal Cord Without Apparent Mechanical Lesion, and Nervous Shock, in their Surgical and Medico-Legal Aspects* (London: J. & A. Churchill, 1883), p. 162.

broken, the mechanism was intact, whereas unbroken glass was indicative of a broken mechanism. Thus, he suggested, the patient who had received a major physical injury would tend not to suffer any nervous disorder.¹³⁷ The terms in which Page rejects this argument are revealing: 'we doubt the force of the analogy, unless, indeed, it can be shown that the watch has a nervous system or that it is a sentient organism like ourselves'.¹³⁸ Page placed great emphasis on the sentient, conscious mind as the channel through which the accident influenced the nervous system; a point he reinforced by asking why, if the consciousness and the mind played no role, did sleep — as was well-known — effectively protect accident victims from nervous disruption?¹³⁹

Page echoed Clark and Jordan in going much further than Erichsen in emphasising the 'element of great fear and alarm' associated with railway accidents, 'which [is] perhaps altogether absent from what may be called the less formidable and less terrible mode of accident',¹⁴⁰ and developed their ideas about the role of the mind. For Page, the emotion of fear alone was sufficient to inflict severe shock on the nervous system, and he saw the purely psychological effects of involvement in a railway accident as quite capable of inducing nervous illness and collapse:

. . . medical literature abounds with cases where the gravest disturbances of function, and even death or the annihilation of function, have been produced by fright and by fright alone. It is this same element of fear which in railway collisions has so great a share — in many cases the only share — in inducing immediate collapse, and in giving rise to those after-symptoms which may be almost as serious as, and are certainly far more troublesome than, those which we meet with shortly after the accident has occurred.¹⁴¹

¹³⁷ Erichsen, *On Concussion of the Spine*, p. 156.

¹³⁸ Page, *Injuries of the Spine*, p. 85.

¹³⁹ Ibid.

¹⁴⁰ Ibid.

¹⁴¹ Herbert W. Page, *Railway Injuries: with Special Reference to those of the Back and Nervous System, in their Medico-legal and Clinical Aspects* (London: Charles Griffin & Co., 1891), p. 62.

Page believed that a physiological process of some kind underlay such nervous disorders, but he specifically rejected Erichsen's suggestion that organic lesions of the spinal cord were the cause. In 1891 he returned to the subject of railway cases in his *Railway Injuries: with Special Reference to those of the Back and Nervous System*, and clarified his view of the physiology underlying the disorder:

It has always been my opinion that some material or morbid change must underlie the nerve disorder, but it seems to me most unlikely that such a change can be of the same nature as the coarse pathological lesions, which we are wont to see in the post-mortem room, or which are shown us by the microscope. For all we know the change may be a chemical one, and the nervous disturbance altogether secondary.¹⁴²

Whereas Erichsen saw the neuroses of 'Railway Spine' as the results of a physical concussion injury, Page saw the psychological influence of fear as the primary causative element, bringing about the symptoms of nervous disorder through physiological changes, perhaps chemical in nature, in the nervous system, directly induced by the reaction of the conscious mind to the terrifying circumstances of the accident. Thus, Page inverted Erichsen's model of 'railway spine'; for Erichsen, the physical injury to the spinal cord came first, and caused the nervous symptoms; for Page, the psychological shock suffered by the mind came first, and itself produced the physical changes in the nervous system which underlay the subsequent disorders. To accord with this psychological model of post-traumatic nervous disruption, Page employed the concept of 'general nervous shock', which he defined in terms of 'some functional disturbance of the whole nervous balance or tone rather than any structural damage to any organ of the body'.¹⁴³ This might appear to echo the explanation offered by *The Lancet* in 1862, but Page accords no significance to the physical shock which was the basis of *The Lancet*'s physiological model: 'The thing essential for suggestion to have any influence is the special psychic state, induced immediately by nervous shock',¹⁴⁴ that is, by the mental

¹⁴² Page, *Railway Injuries*, p. 62.

¹⁴³ Ibid, p. 25.

¹⁴⁴ Ibid, p. 69.

trauma, the terror of the accident. The novelty of Page's position was not his stress on the non-physical nature of the shock, but his willingness to disregard the physical accompaniments of involvement in the accident entirely in favour of the emotional, nervous and psychological. Herbert Page's model of the disorder was indeed a physicalist one, but — crucially — the shock he postulated had nothing physical about it.

While Erichsen's work had served the interests of those claiming compensation from railway companies for accident injuries, Page's books were much cited in defence of the companies, whose used them to claim that 'railway spine' and similar conditions had no basis in actual injury. This was something of a misrepresentation of Page's position; essentially his purpose was to free post-traumatic nervous disorder as he conceived it from dependence on gross organic injury caused by the physical concussion of the accident, whether sustained by the brain or the spinal cord. In 1895 he summarized his own view as deriving from his rejection of 'the opposing views of imposture on the one hand, and of hopeless injury to the spine and the contents of the spinal canal on the other', and from his conviction 'that the phenomena of railway injuries [are] to be explained on entirely different lines. Too much account [has], in fact, been taken of the body, too little of the mind'.¹⁴⁵

This explanation owed much to evolving conceptualisations of hysteria, which in turn built upon the extensive work which had been carried out since early in the nineteenth century on distinguishing functional from organic disorders in cases where there was no detectable pathological injury.¹⁴⁶ This body of work had by 1890 created a somaticist model of hysterical nervous disorder which did not rely on lesions or other physical injury or disease in nerves, muscles or organs, nor necessarily on heredity or constitutional weakness (although such factors could play a part in making an individual vulnerable to hysterical disorders). The crucial element was the role of an 'idea', a mental impression of some powerful kind, in affecting the function of the nervous system through the mind, which opened the way for nervous and other disorders without any underlying structural pathology to account for them, being induced directly by psychological shock.

¹⁴⁵ Herbert W. Page, 'On the mental aspect of some traumatic neuroses' (1895), in *Clinical Papers on Surgical Subjects* (London: Cassell, 1897), p. 25.

¹⁴⁶ See Micale, *Approaching Hysteria*, pp. 126-8.

In 1866, Erichsen had characterised hysteria as ‘a disease of women rather than of men, of the young rather than of the middle-aged and the old, of people of an excitable, imaginative, or emotional disposition rather than of hard-headed, active, practical men of business’,¹⁴⁷ and had firmly rejected any suggestion that ‘railway spine’ and similar cases were hysterical in nature:

In those cases in which a man advanced in life, of energetic business habits, of great mental activity and vigour, in no way subject to gusty fits of emotion of any kind, — a man, in fact, active in mind, accustomed to self-control, addicted to business, and healthy in body, suddenly, and for the first time in his life, after the infliction of a severe shock to the system, finds himself affected by a train of symptoms indicative of serious and deep-seated injury to the nervous system, — is it reasonable to say that such a man has suddenly become ‘hysterical’ like a love-sick girl?¹⁴⁸

He had taken a similar line in 1875, suggesting that ‘We use the term “hysteria” to hide our ignorance of what this condition really consists’;¹⁴⁹ that is, of the organic injury which actually underlay the condition. Page, however, while disliking the term ‘hysteria’ on the grounds of its imprecision,¹⁵⁰ was prepared to suggest that hysterical and post-traumatic disorders were manifestations of the same psychological and physiological processes. The model of the nervous system accepted by both Erichsen and Page was based on a hierarchy of nervous function, in which the highly-developed cerebral functions of the human mind kept the animal functions of the body in due subjection. For Erichsen, to suggest that an active, unemotional businessman was vulnerable to hysteria, and could be reduced to the condition of an animal through a breakdown of mental control was to undermine not merely a medical, but a moral model of what it meant to be a civilised human being. Page, by contrast, had no difficulty in asserting that the

¹⁴⁷ Erichsen, *Railway and Other Injuries*, p. 126.

¹⁴⁸ Ibid, pp. 126-7.

¹⁴⁹ Erichsen, *On Concussion of the Spine*, p. 199.

¹⁵⁰ Page, *Railway Injuries*, p. 61.

extreme emotional trauma of the railway accident was quite capable of shattering even the most resilient mind into hysterical splinters:

the 'hysterical' condition is essentially one in which there is loss of control and enfeeblement of the power of the will . . . there is loss of the habitual power to suppress and keep in due subjection the sensations, which are doubtless associated with the various functions of the organic life of the individual . . . Let some sudden, profound psychical disturbance arise, such as may well be induced by the shock and terror of a railway collision, forthwith the intellectual control is lessened, while organic sensations declare their being, and force themselves into the conscious life of the individual.¹⁵¹

In a lecture from 1885, Page sketches a model of traumatic nervous disruption in which hysterical symptoms develop when the shock and terror of the railway accident abruptly drains the nervous system of the force it requires to retain control over the organic functions of the body. Railway accidents, he explains, provide

. . . the requisite conditions for inducing profound exhaustion of the nervous system or traumatic neurasthenia . . . Railway collisions . . . provide the conditions for inducing severe effects upon the nervous system and they do so because the circumstances of most railway accidents are such as to produce a very profound mental impression upon many persons subjected to them . . . the determining cause of the nervous condition which underlies the neurasthenia is very largely fright and alarm.¹⁵²

In this emphasis on the role of the instant of terror experienced by the railway accident victim, and this constant recourse to the pathogenic role of fear in

¹⁵¹ Page, *Railway Injuries*, p. 52-3.

¹⁵² Page, *Clinical Papers*, pp. 136-7.

provoking traumatic neurosis, Page anticipates certain diagnostic developments associated with Charcot, who was greatly interested in the English surgeon's ideas and cited his work with approval in his Salpêtrière lectures of the late 1880s.¹⁵³ Indeed, Page dedicated his 1891 work to the French neurologist, and sent him a signed copy.¹⁵⁴

From shaken spines to splintered minds

Page's comments on effects of the railway accident on the human mind and body return us to the ambiguity with which the railway was viewed in the nineteenth century. The railway, the great symbol of technological civilization, could shatter the internal structures which sustained the model of civilized humanity. Such themes are found in many contemporary literary works, from Charles Dickens's *Dombey and Son* (1848) to George Gissing's *In the Year of Jubilee* (1894),¹⁵⁵ but perhaps attained their most dramatic expression in Émile Zola's *La Bête humaine* (1890). For Zola's characters, the train is 'une belle invention', but it cannot change the basic animality of human nature: 'People go fast now, they know more . . . But wild beasts are still wild beasts, and they can go on inventing bigger and better machines for as long as they like, there'll still be wild beasts underneath there somewhere'.¹⁵⁶ When an accident occurs on the railway, the catastrophe instantly destroys the veneer of civilization worn by the passengers in the doomed train. The victims in the shattered carriages at the front of the train lie amid the wreckage, uttering 'inarticulate animal yells', but it is the uninjured passengers from the intact rear carriages whose behaviour is suddenly that of primitive beasts, as they pour out of the train 'in a raging mob':

¹⁵³ See Mark Micale, 'Charcot and *les névroses traumatiques*: scientific and historical reflections', *Journal of the History of the Neurosciences*, vol. 4, no. 2 (June 1995), pp. 101-19, especially pp. 107-9. See also Kenneth Levin, 'Freud's paper "On Male Hysteria" and the conflict between anatomical and physiological models', *Bulletin of the History of Medicine*, vol. 48, no. 3 (1974), pp. 377-97, especially pp. 381-2.

¹⁵⁴ Christopher Goetz, Michel Bonduelle & Toby Gelfand, *Charcot: Constructing Neurology* (New York & Oxford: Oxford University Press, 1995), p. 216.

¹⁵⁵ For an outline of the image of the railway in nineteenth-century literature, and particularly in Dickens, see Simmons, *Victorian Railway*, chapter 8 'Literature', pp. 195-218.

¹⁵⁶ Émile Zola, *La Bête humaine*, trans. Roger Pearson (Oxford: Oxford University Press, 1996), p. 41 (ellipsis in original). On modernity out of control and the image of the driverless train in Zola, see Pick, *War Machine*, pp. 106-10.

They were stumbling over the line, picking themselves up again, fighting their way clear with fist and foot. Then, as soon as they felt they were on solid ground, with open countryside ahead of them, they took to their heels, jumping over hedges, cutting across fields, yielding to their overriding instinct to get far away from the danger, far, far away. Women, men, all screaming, disappeared into the woods.¹⁵⁷

Such behaviour was attested in the aftermath of railway accidents, and not only in France.¹⁵⁸ Whether the collapse happened immediately after an accident, or after an interval of several hours or days, however, the suggestion was the same: the railway could, in a moment of catastrophe, strip the mantle of civilization from its passengers and make them revert to the level of beasts.

This outline of the development of the 'Railway Spine' concept between the 1860s and the 1890s has brought us from a condition produced by a jolted and shaken spinal cord to one of traumatically-induced mental and nervous collapse fraught with implications of hysteria, neurasthenia and degeneration. On one level, the growth and elaboration of the railway system during the nineteenth century was an indicator of progress, of an increase in the complexity of the social and economic organism in accordance with the doctrines of evolution; but at the same time it also represented a restriction of human freedom by subjecting human behaviour to a high degree of regulation and control,¹⁵⁹ and a great increase in the risk to which people were exposed — for the more complex and highly evolved an organism becomes the more fragile its organisation is, and the more dangerous are the consequences of a breakdown in that organisation. As Herbert Page wrote in 1895:

¹⁵⁷ Zola, *La Bête humaine*, pp. 290-1.

¹⁵⁸ In the immediate aftermath of the accident of 2 September 1861 at Kentish Town, *The Times* reported, passengers from the trains involved ran screaming into the fields around the line and disappeared; *The Times*, 7 September 1861. For more on this accident, see also Neale, *With Disastrous Consequences*, p. 218.

¹⁵⁹ For a detailed discussion of the application of models of modernist efficiency and machine metaphors to the human body, see Anson Rabinbach, *The Human Motor: Energy, Fatigue, and the Origins of Modernity* (Berkeley: Sage, 1991).

Elaboration of structure and complexity of function are indeed acquired at the risk of instability . . . not only is the organism brought into relation with changes going on around and outside it, with the environment . . . but inside it also the various bodily parts are kept in due relation and harmony with each other, so that if one member suffer all the members suffer with it.¹⁶⁰

Just as the highly-developed circulatory systems of the railway showed themselves to be delicately balanced and vulnerable to the crisis of the railway accident, so the complex and highly-evolved human cerebral and nervous system, the summit of evolutionary development and the guarantee of the intellectual and moral elevation of humanity over the animal nature of the body, was shown to be fragile, easily unbalanced and thrown into crisis.¹⁶¹ As John Senior has observed,

The body in late Victorian and early Edwardian England had become the centre of a web of metaphors that linked the railroad, telegraphy, electromagnetism and disease . . . the body was . . . construed as a system of connections in which the technological reification of the concept of circulation (of products, of electricity, of nervous force) allowed the distinction between the organic and the mechanical to be further blurred.¹⁶²

The traumas of rapid industrialization, of human independence surrendered to the vast powers of the machine, of uncontrollable speed, of sudden, shattering, catastrophe, found expression through the neuroses of the railway age. Conceptualizations of 'railway spine' had begun with shaken spines; they had ended with splintered minds.

¹⁶⁰ Page, *Clinical Papers*, p. 15.

¹⁶¹ See Sander L. Gilman, 'The image of the hysteric', in *Hysteria Beyond Freud*, eds. Sander L. Gilman, Helen King et al. (Berkeley, Los Angeles & London: University of California Press, 1993), pp. 417-8.

¹⁶² John D. Senior, *Rationalising Electrotherapy in Neurology, 1860-1920* (Oxford University: unpublished D.Phil. thesis, 1994), p. 6, 8.

CONCLUSION: THE NEUROSES OF THE RAILWAY

The fundamental guiding principle throughout this study has been that the Victorian railway, as a subject of historical analysis, should be approached, not narrowly as a topic in the social history of transport, but as an interdisciplinary and integrative concept, existing within, acting upon and being influenced by a complex assembly of the Weberian cultural 'webs' referred to in the Introduction. The exploration of its significances has therefore required the accommodation and synthesis of inputs from a number of seemingly disparate fields of enquiry, and the discussion of a range of Victorian ideas, institutions and social practices. In particular, close attention has been paid to the ways in which nineteenth-century perceptions of and responses to the railway were mediated and expressed through a range of literary, visual and other 'texts': imaginative and technical literature, journalism, social and cultural criticism, paintings, cartoons, architecture and other material evidence, medical and legal writings. From this evidence, a range of the meanings accorded the Victorian railway have emerged, both positive and negative.

It is with the exploration of the latter, negative, significances of the railway that this study has been chiefly concerned. It is the purpose of this conclusion to review these ambivalent and hostile perceptions, and to summarize their importance for our understanding of the place of the railway in the nineteenth-century cultural landscape, and for the relationship of the railway as one particularly potent symbol of technological modernity to wider nineteenth-century cultural currents of fear, anxiety and hostility towards the perceived dangers of an increasingly mechanized civilization.

Ambivalence and anxiety

The principal postulate underlying this thesis is that the Victorian railway represented in a particularly dramatic and important form the ambivalence of the

age towards technological modernity, and that the pervasiveness and persistence of the anxieties it provoked demonstrate its central significance as a locus of that ambivalence. In his poem 'The Optimist and the Pessimist: A Dialogue', the popular versifier George Barlow (1847-1913) articulated this ambivalence and gave explicit formulation to the widespread belief that behind the bright façade of modernity which the railway presented lay a dark threat of danger and destruction:

Optimist:

How shout these people, 'mid the groves of pine
That edge the picturesque Alsatian line
Of railway passing! Light of heart and gay,
They start off for a summer holiday,
Shouting and singing.

Pessimist:

And at night they lie
A bloodied maimed heap beneath the un pitying sky.
From town to town the dismal news is sent:
'Fifty lives lost in a railway accident'.¹

Other aspects of industrial civilization, from gas lights to steamships, were on occasion dangerous and destructive; but no other technological system required large numbers of ordinary people to surrender their security and safety to a vast, fast-moving machine driven by incomprehensibly powerful and barely controllable energies, nor did any do so as frequently, and on such a scale, as the railway; and no other mechanical mishap was as destructive, terrifying, and public, as the railway accident. Many would have shared the horror expressed by Lady Dunstane at the prospect of 'hideous accidents' in George Meredith's 1884 novel, *Diana of the Crossways*: 'They will be wholesale and past help. Imagine a collision!'² As argued above, the railway accident was privileged in fictions such as Meredith's,

¹ George Barlow, 'The optimist and the pessimist: a dialogue', in *An Actor's Reminiscences and Other Poems* (London: Remington, 1883), p. 262.

² George Meredith, *Diana of the Crossways* (1884), in *The Works of George Meredith: Memorial Edition* (London: Constable, 1910), vol. XVI, ch. 8, p. 59.

journalism and popular culture, and in ostensibly more factual and 'scientific' medico-legal texts, as a uniquely violent, disastrous and disruptive event. It is not necessary to accord a universal validity to Freudian interpretations of subconscious motivation to accept that Peter Gay's observations on the significance of the railway, and particularly of railway accidents, in nineteenth-century society reflect an important truth:

Almost since its first spectacular runs in the mid-1820s, poets and novelists had employed the railroad as a symbol for power and revenge. Especially the locomotive, which often proved a killer in sober reality, seemed suitable as an engine of retribution, a social superego punishing offences against man and the gods.³

For those who believed that there was a price to be paid for progress, railway accidents were the most dramatic expressions of that price; but other aspects of the railway were widely perceived as reflecting the same intrinsic relationship between the advance of technological civilization and the price demanded in danger, disaster and death. Against the convenience of the journey had to be weighed the isolation of the compartment, the discomfort and deleterious consequences for health of noise, draughts, vibration and jolts; travel was faster than ever before, but there was the constant sense of danger and the risk of catastrophic disaster; mobility was more widely available, but the bustle and confusion of the crowded railway station exhausted the nerves of travellers; the service provided by the railways was extensive and comprehensive, but passengers had to grapple with the complexity of timetables, connections and bureaucracy.

The 'neuroses of the railway' which have formed the central concern of this study were the consequences of the machine-dominated, urbanized, fast-moving civilization of industrial modernity; the civilization of which the railway, perhaps more than any other technological system, was the symbol and the embodiment. The railway, with its speed, power and danger, was a focus of nervous and psychological disorders; the neuroses associated with the shock of the railway's appearance in the landscape, the exhaustion and sensory disturbance of the

³ Peter Gay, *The Bourgeois Experience: Victoria to Freud*, Vol. 2, *The Tender Passion* (New York & Oxford: Oxford University Press, 1986), p. 320.

journey, the catastrophe of the railway accident, were all aspects of the railway's potency as a focus and agent of the destructive, destabilizing, degenerative energies of technological modernity.

The railway and degeneration

The overall socio-cultural context of this project has been provided by the phenomenon of degenerationism. 'Degeneration' is a nebulous term, with a range of meanings both specific and general; as Daniel Pick observes in his *Faces of Degeneration: A European Disorder*, the concept has undergone a constant process of flux and change throughout the nineteenth and twentieth centuries.⁴ From a historical perspective, the core of the fluctuating language of degeneration can perhaps be located most firmly in the biological and medical realm in which evidences of a reversal or inversion of progress, in the form of evolutionary regression as a response to adverse environmental circumstances or atavistic regression (often implicated with hereditarian perspectives of mental and bodily disorder) to more primitive archetypes, were found in bodies, faces, behaviours, diseases and disorders, patterns of reproduction. This conception of bio-medical decline was paralleled by perceptions of analogous processes in other areas of life:⁵ arts and literature, politics, social structures, military activity, sexual roles.⁶ Discussing the process of redefinition undergone by the language of degeneration between the 1840s and the end of the nineteenth century, Pick distinguishes:

a general shift from notions of the individual degenerate . . . towards a bio-medical conception of crowd and mass civilization as regression; the "individual" was reconceived in relation to the mesh of evolutionary, racial and environmental forces which, it

⁴ Daniel Pick, *Faces of Degeneration: A European Disorder, c. 1848-1918* (Cambridge: Cambridge University Press, 1989), p. 222.

⁵ Max Nordau, *Entartung* (1892), translated into English as *Degeneration*, (London: Heinemann, 1895), argues for the pervasiveness of decline throughout late nineteenth-century society and culture.

⁶ An overview of degenerationist perspectives across a range of themes can be found in J. E. Chamberlin & S. L. Gilman (eds.), *Degeneration: the Dark Side of Progress* (New York: Columbia University Press, 1985).

was now insisted, constituted and constrained his or her condition.⁷

The 'crowd and mass civilization' which forms the focus of Pick's study was the creation of industrial modernity; it is impossible to envisage without great industrial cities, mass media, mass leisure, modern technological methods of communication and transport. At the heart of this complex of phenomena lay the railway, an archetype of mass civilization, and, as we have seen, every aspect of the railway — the ugliness of viaducts and tunnels, the crowds at stations, the 'democratic' nature of rail travel, the effects of the terror and violence of accidents — could be read as evidence of that process of 'regression' which Pick cites. The case-study of the railway illuminates one aspect of the 'mesh of forces' which Pick's essentially bio-medical and sociological study of degeneration does not discuss: the role of the powerful technologies of modernity, and specifically that most powerful and dramatic expression of mass civilization, the railway, in bringing about a dissolution of social, cultural and biological stabilities.

Pick's words reflect the way in which the pervasiveness of the degenerationist perspective contributed to a wider cultural context, developing from the mid-nineteenth century, in which the concept of stability — in social relations, cultural production, bodily integrity — was perceived as being under assault from agents of instability. Pick writes that the language of degenerationism threatened 'a world of entropy or some future dissolution of stable positions'.⁸ These destabilizing elements were often themselves located in aspects of what could be comprehended from other perspectives as the discourse of progress. It is within this relationship of progress, instability and degeneration that the image and reality of the railway, as explored in this study, is located.

'Market culture and machine culture'

In his recent *Bodies and Machines*, the American critic and theorist Mark Seltzer addresses an issue crucial to this study: the dialectical and fraught relationship

⁷ Pick, *Faces of Degeneration*, p. 222.

⁸ Ibid, p. 231.

between human agency and mechanized control, between the freedom of the human subject in a liberal culture and the extension of regulation and discipline required by machine-dominated modernity. Selzer comments that tensions inevitably develop 'between possessive individualism and market culture, on the one side, and what I call disciplinary individualism and machine culture, on the other',⁹ and he positions the tensions and anxieties associated with the increasing dominance of the machine during the nineteenth century in the context of the development of a liberal free-market capitalism which ostensibly encouraged innovation, unpredictability, individualism:

The principle of locomotion which in liberal market culture is the sign of agency is in machine culture the sign of automatism . . . since the recalcitrant tensions between the imperatives of market culture and machine culture are central here, what must be considered is how the uncertain status of the principle of locomotion precipitates the melodramas of uncertain agency and also what amounts to an erotics of uncertain agency. Not surprisingly, the crisis of agency and its appeals are most evident in the figure of the railway locomotive itself.¹⁰

Selzer's brilliant phrase, 'the melodramas of uncertain agency', and his identification of the railway as the locus of this 'crisis of agency', takes us to the heart of the subject we have been examining in this study, the questions of ambivalence, the persistence of anxiety, in human relations with the railway throughout the nineteenth century.

Yet the issue is not quite as neatly packaged as he suggests. It is an oversimplification to place the origins of this ambivalence and anxiety in the tensions between the liberal condition of free-market capitalism and the rigid control necessitated by the machine. For those who observed, experienced, and responded to the railway during the period covered by this study, the railway was in harmony with the economic system, not in tension with it; the tension was between the mechanical and the human, not the mechanical and the liberal. The

⁹ Mark Selzer, *Bodies and Machines* (New York: Oxford University Press, 1992), p. 5.

¹⁰ *Ibid.*, pp. 17-18.

railway was in many ways the foremost example of a mechanical system which enabled the free trade economy to function more effectively; whether you thought that was a good thing or not depended on your attitude towards the prevailing economic system. Many of the critics we have noted as being particularly hostile to the railway — John Ruskin and William Morris are foremost instances — were bitterly hostile to the social and economic conditions of their era, and saw the railways as existing in unholy harmony with the system they opposed.

Beyond this, there is another more subtle difficulty with Selzer's argument. He cites the machine as the embodiment of stability, predictability, rigid control; yet, as we have seen in the course of this study, the railway was widely perceived as dangerous and threatening because it was unstable, unpredictable, pushing against (and too often disastrously breaking through) the systems of control erected to subject its energies to human discipline. It is in this aspect of the machine, rather than its discipline and rigidity, that the 'melodramas of uncertain agency' — the exhaustion and confusion of the station, the discomfort of the journey, the terror of the accident, the disputes of the surgery and the compensation case courtroom — are located.

Selzer's interpretation is not inaccurate, but it is only partial; to put it simply, it is too economically determined. It assumes that what guides people's responses to experiences, institutions and practices is the economic system which structures their lives and their attitudes. Many Victorians did object to the enforced rationalisation of individual freedom associated with railway travel: timetables, classes, tickets, arrangements for luggage, all provided opportunities for resentment at the inflexibility of railway rules and regulations; and perhaps such objections did arise to some extent from a self-perception on the part of the Victorian middle classes of an ideal of personal freedom which was linked, either explicitly or implicitly, with the economic liberalism which had contributed so greatly to their class's success and prosperity. But it is worth remembering that many of the strongest objections to railway regulations and the tyranny of timetables, compartments and the rest of it came, not from the middle classes but from members of the upper classes who cited an ideal of aristocratic individualism which owed nothing to the liberal individualism of free-market capitalism. It was in the terms of such aristocratic resentment that John Davidson — himself lower-middle-class in origin — chose to couch his longest and most violent assault on the railway, 'The Testament of John Simplex'. When the motor car arrived on the

scene at the end of the nineteenth century, it was welcomed by its wealthy enthusiasts as a restoration of the privileges of aristocratic travel.

For the middle classes, the railway was an icon, not a tyrant. It was this which made middle-class ambivalence towards it all the more profound and insidious. As Matthew Arnold's response to the Briggs murder of 1864 suggests,¹¹ for the class which placed its faith in progress, technology, the free circulation of people, goods and ideas, the presence of a constant dark undercurrent of accidents, anxiety and neurosis, and the suggestion inherent in such events that progress was demanding its price, were deeply disturbing.

Railway, mind and body: 'from railway spine to shellshock'

The most potent instance of that instability was the railway accident, which disrupted not only the external physical world of the railway traveller's environment but also appeared capable of shattering the internal world of his or her mind and body. The effects of the accident, its ability to cause the breakdown of the strongest constitution in hysterical collapse, its association with unaccountable seemingly non-organic disorders, were the ultimate expression of the railway's power to break down the structures of established order and dissolve stabilities with its power and danger. The accident was the logical culmination of those interpretations of the railway which saw in it the destruction and violence of war, the uncontrollable energies of a society careering out of control towards destruction.

It has been argued in these pages that this association of the railway with war was not a random association of images, but a reflection of a widespread anxiety that humanity was creating a new type of society dominated by complex and powerful mechanisms that could not be adequately controlled and which constantly threatened destruction.¹² Mechanized and automated means of production, communication and mobility were perceived as placing increasing strains on the human body's physical, nervous and mental constitution. This led

¹¹ See above, pp. 84-5.

¹² Daniel Pick's *War Machine: the Rationalisation of Slaughter in the Modern Age* (New Haven, Conn. & London: Yale University Press, 1993) is an exploration of this phenomenon.

to two consequences: an increase in the prevalence of nervous disorders such as neurasthenia, and a tendency for sudden crises to manifest themselves in nervous breakdown and collapse. The railway was central to both phenomena: 'railway exhaustion', the weariness of nerves, muscles and sensorium suffered by railway travellers was one of the most widely-recognized manifestations of neurasthenic disorder, while 'railway spine' was the first large-scale instance of nervous breakdown precipitated by apparently non-organic, psychological, shock. In this respect the militarization of railway language and imagery which we have noted reflected a sense in which the railway was itself being experienced as a slowed-down, etiolated, civilian version of the traumas of war. If the history of first world war shell-shock¹³ is compared with that of nineteenth-century 'railway spine', the same phenomena can be identified: the difficulty in fitting the disorder into the accepted categories of 'real' and 'imagined' (or 'feigned') illness; the reluctance among many medical professionals to expand the notion of hysterical disorder to encompass men; the competing agendas of different groups within the medical profession. The essential dynamics of the two debates were the same: an obscure disorder (or category of related disorders), seemingly the direct result of certain of the social and cultural conditions uniquely associated with modern, industrialized, mechanized life, was seen to transcend and challenge the established structures of medical nosology and diagnosis.

It is important, however, to place the phenomenon of railway spine in context, and, in particular, not to view it through the distorting lense of the subsequent development of non-organic, psycho-dynamic psychiatry and interpret it as having pointed the way towards the 'psycho-dynamic revolution' which laid the foundations for modern psychiatry. From first to last, railway spine was viewed by the medical men who investigated the condition as an organic disorder. It has already been emphasized that the disagreement between Erichsen and Page in the 1870s and 80s was not based on a clash between the 'Victorian' organic outlook of the former and the 'modern' psychological approach of the later, but rather over the nature of the organic processes underlying the condition and the precise role of the 'shock' experienced by the accident victim in triggering the disorder. As discussed above, the tradition of organic theorization of 'hysterical'

¹³ See Joanna Bourke's discussion of 'shell-shock' in *Dismembering the Male: Men's Bodies, Britain and the Great War* (London: Reaktion Books, 1996), pp. 107-8.

disorder in British medicine, initiated by Brodie in the 1830s, largely shaped the nature of this firmly somatic approach, and it remained influential up to and beyond the first world war, largely unaffected by the debates surrounding railway spine or shell-shock itself.¹⁴ The most fruitful approach to the phenomenon of railway spine is not to see it as a step on the path from somatic to non-somatic understandings of psychological disorder, but to relate it to the wider cultural context of the fear and anxiety which the railway provoked and read it as a particular cultural response to this aspect of the dark, destructive, threatening, exhausting side of mechanized modernity. The most important continuity between the phenomena of 'railway spine' is not the triumph of non-somatic over somatic theorizations of trauma and psychological disorder, but the cultural continuity of a society struggling to comprehend and control the dangerous energies of technological modernity, whether encountered in the debris of the railway collision or the violence of the battlefield.

For the same reasons, it can be argued that the relevance of the railway spine issue to our own society at the end of the twentieth century is not a purely clinical matter of the type of disorder and its origin in the mind or the body, but a socio-cultural one. In this, the era of post-traumatic stress disorder,¹⁵ there is more emphasis than ever before on the interactions between medical and non-medical, particularly legal, agendas when dealing with compensable injuries; and never more so than when those injuries have no apparent organic base, but are characterized by what are seemingly emotional and mental symptoms. The nineteenth-century debates associated with 'railway spine' and similar conditions, with the concern with the interaction of mind and body, the role of legal proceedings and compensation in influencing the character and prognosis of the conditions complained of, have all been re-run in recent years. The main difference has been that, since the American Psychiatric Association's recognition of the reality of PTSD as a condition precipitated entirely by external stress, with no necessity for objectively verifiable organic injury, the cultural climate has become positively sympathetic towards claims for compensation for non-organic, purely

¹⁴ See above, pp. 203ff; and Bourke, *Dismembering*, pp. 121-2.

¹⁵ For a general introduction to PTSD in the modern era, see David Healy, *Images of Trauma: From Hysteria to Post-Traumatic Stress Disorder* (London: Faber, 1993). See also the entry for 'Post-traumatic stress disorder' in Michael Gelder et al, *Oxford Textbook of Psychiatry* (Oxford: Oxford University Press, 1983, 3rd edn., 1996).

psychological traumatic stress. Victorian surgeons had to insist on the somatic nature of 'railway spine' to gain compensation for their patients; in the contemporary world the question of the somatic or non-somatic nature of the disorder is widely (although not universally) seen as irrelevant in the courtroom.¹⁶

In 1854 Benjamin Brodie observed that even if improved microscopy revealed 'exactly the changes which take place in the arrangement or aggregation of the ultimate molecules of the brain', medicine would not be much advanced in knowledge; 'The link between the physical and the mental would still be lacking'.¹⁷ The majority of late twentieth-century psychiatrists are as firmly organicist in their orientation as their Victorian predecessors; it is not that there is no organic process behind psychological disorder, they claim, it is just that we do not yet know how it works. Nor does modern psychology, committed to a Freudian or post-Freudian world of abstract theorization, divorced from clinical practice, have anything to offer by way of an answer to the questions of how far such disorders are in fact non-somatic, and where lies the boundary between the organic and the psychological in medicine. The so-called psycho-dynamic revolution has left the essential question raised by the 'railway spine' phenomenon and articulated by Brodie unanswered; the nature of the link between the physical and the mental remains elusive for twentieth-century, as for nineteenth-century, somaticist medicine.

¹⁶ For a critique of the contemporary culture of 'psychological epidemics' of 'hysterical disorders' partly sustained by 'social appropriations' of psychosomatic disorders such as PTSD, see Elaine Showalter, *Hystories: Hysterical Epidemics and Modern Culture* (New York: Columbia University Press, 1997). These phrases come from pp. 3, 5, 13.

¹⁷ Benjamin Brodie [under initials 'B.J.B.'], *Psychological Inquiries: in a Series of Essays, Intended to Illustrate the Mutual Relations of the Physical Organization and the Mental Faculties* (London: Longman, Brown, Green, & Longman, 1854), p. 160.

APPENDIX:

RAILWAY ACCIDENT STATISTICS, 1860-1914

The purpose of this appendix is to summarize the statistics of railway accidents and railway safety which underpin the structures of cultural perception and response outlined in the preceding chapters. The following general points should be noted about the information contained in tables and figures below.

1. **Sources.** The basic source of information used is the series of returns submitted twice yearly to the Railway Department of the Board of Trade by the railway companies, and printed in the various volumes of *Parliamentary Papers*. Until 1871 these returns were submitted on an informal basis, and there is no means of knowing how complete and accurate are the figures before this date. The Regulation of Railways Act of 1871 made the provision of accident returns obligatory, and specified the accidents to be reported in some detail. A convenient one-volume summary of the returns, with analysis and commentary, can be found in H. Rayner Wilson, *Railway Accidents: Legislation and Statistics 1825 to 1924* (London: Rayner Wilson, 1925); to ensure accuracy, however, I have drawn the figures used here directly from the original sources in *Parliamentary Papers*. I have also made use of the information in B. R. Mitchell, *British Historical Statistics* (Cambridge: Cambridge University Press, 1988). The sources used in each case are detailed beneath each table and figure.
2. **Geographical scope.** All statistics refer to the railways of Great Britain and Ireland.
3. **Missing statistics.** There were no returns for track mileage or passenger journey numbers made to the Board of Trade in 1868 and 1914. In Table 2, I have in each case interpolated estimated figures (clearly marked as such) based on an average of the previous five years' rate of growth; 3.8% for track mileage and 9.6% for passenger journeys in 1868, 0.4% for mileage and 2.7% for journeys in 1914. These figures, especially the latter set, are not to be relied

upon; they are simply to complete the picture in accordance with the general trends suggested by the figures we have.

4. **Figures for passenger journeys.** These are necessarily imprecise, for a number of reasons. First, especially in the earlier part of the period companies differed in the ways in which they counted the journeys undertaken across their networks. Second, journeys made by season-ticket holders are excluded from the figures, as these tickets were not collected at the end of a journey and thus could not be counted. A method for estimating season-ticket journeys was introduced in 1913, but for the sake of consistency I have excluded the resulting figures from the tables. Third, the basis upon which the statistics were collected by the government was changed in minor ways in 1871 and 1913. However, in general terms the figures provide a generally accurate picture of the usage of the rail system during this period; if they err, it is on the side of under-estimation.¹
5. **Fatal accidents.** With the exception of Table 5, only fatal accidents involving one or more passenger trains are included in the figures; accidents solely involving freight trains are excluded.
6. **Passenger fatalities.** The figures given for fatalities refer to passengers only throughout; railway workers are excluded. Those who worked on the railways suffered a very high rate of accidental death and injury throughout this period,² and the travelling public were certainly aware of this, and concerned about it; but this study is essentially concerned with the experience of the passenger, and the most important factor in shaping the railway traveller's perceptions of the dangers of the railway was the casualties among passengers produced by accidents involving passenger trains.

¹ For more on these statistics, see Simmons, *Victorian Railway*, pp. 316-17.

² An 1865 survey of railway accidents claimed that it was fifty times more dangerous to work on a railway than to travel on one; Frank McKenna, *The Railway Workers 1840-1970* (London: Faber & Faber, 1980), p. 38. See also P. W. J. Bartrip & S. B. Burman, *The Wounded Soldiers of Industry: Industrial Compensation Policy 1833-1897* (Oxford: Oxford University Press, 1983), pp. 74-9, and Kostal, *Law*, pp. 257-79.

Table 1 offers a summary of the pattern of railway accidents during the period of this study. In addition to figures for fatal accidents and numbers of passenger casualties brief descriptions of some of the most notable accidents for each year are provided. The aim here is to illustrate the continuous stream of incidents, and the occasional periods in which a series of serious accidents would occur in quick succession; for example, 1860-62, 1870, 1874, 1905-7. These are periods in which public concern about railway safety was at its height. The same figures are summarized in the graph, Figure A, in which the importance of the early 1860s, the first half of the 1880s, and, above all, the disaster-prone 1870s in terms of numbers of accidents and of fatalities is clearly revealed. The graph should be used in conjunction with Table 1 in order to bring out the scale of some individual accidents; thus, whereas the prominent peak in the casualty figures for 1870 is accounted for by four major accidents (Newark, Harrow, Stairfoot and Hatfield) and ten (comparatively) lesser ones, the high total for 1879 is almost entirely accounted for by the 73 people who died in the fall of the Tay Bridge. Similarly, the collision in Clayton Tunnel alone provides half the fatalities for 1861, while of the 88 passengers killed in 1889 all but eight died in the catastrophe at Armagh.

Table 1. *Fatal railway accidents: a summary, 1860-1914.*

<i>Year</i>	<i>Fatal accidents</i>	<i>Passenger casualties</i>	<i>Notable accidents</i>
1860	7	29	Helmshore (L&Y): collision, 11 killed. Atherstone (LNW): collision, 9 killed.
1861	8	46	Clayton Tunnel (LBSC): rear collision in tunnel, 23 killed. Kentish Town (HJ): collision, 15 killed.
1862	8	24	Winchburg (E&G): 15 killed.
1863	5	13	
1864	6	14	
1865	3	22	Rednal (GW): derailment, 11 killed. Staplehurst (SE): derailment, 10 killed.
1866	6	15	
1867	7	19	Warrington (LNW): collision, 8 killed.
1868	5	39	Abergele (LNW): collision & fire, 31 killed.

<i>Year</i>	<i>Fatal accidents</i>	<i>Passenger casualties</i>	<i>Notable accidents</i>
1869	8	16	
1870	14	95	Newark (GN): collision, 16 killed. Harrow (LNW): rear collision, 7 killed. Stairfoot (MSL): collision, 15 killed.
1871	8	11	
1872	6	19	Kirtlebridge (Cal): collision, 10 killed.
1873	15	38	Wigan (LNW): derailment, 13 killed.
1874	12	80	Bo'ness Junction (NB): collision, 16 killed. Norwich (GE): collision, 21 killed. Shipton (GW): derailment, 34 killed.
1875	9	18	
1876	7	36	Abbot's Ripton (GN): double collision, 14 killed. Radstock (S&D): collision, 12 killed.
1877	7	13	
1878	5	24	Pontypridd (TV): collision, 13 killed.
1879	3	75	Tay Bridge (NB): bridge failure, 73 killed.
1880	6	29	Wennington (Mid): derailment, 12 killed.
1881	7	23	Blackburn (L&Y): collision, 7 killed.
1882	9	19	
1883	4	11	
1884	4	31	Penistone (MSL): derailment, 24 killed.
1885	3	6	
1886	3	8	
1887	1	25	Hexthorpe (MSL): rear collision, 25 killed.
1888	4	10	
1889	4	88	Armagh (GNI): collision, 80 killed.
1890	1	18	Norton Fitzwarren (GW): collision, 10 killed.
1891	4	6	
1892	5	21	Thirsk (NE): rear collision, 9 killed.
1893	3	16	Llantrisant (TV): derailment, 13 killed.

<i>Year</i>	<i>Fatal accidents</i>	<i>Passenger casualties</i>	<i>Notable accidents</i>
1894	3	16	Chelford (LNW): collision, 14 killed.
1895	4	5	
1896	3	5	
1897	6	18	Welshampton (Camb): derailment, 10 killed.
1898	8	25	
1899	7	14	
1900	6	16	
1901	0	0	
1902	3	6	
1903	5	25	Glasgow (GSW): buffer-stop collision, 6 killed.
1904	3	6	
1905	4	39	Hall Road (L&Y): cause unknown, 21 killed. Witham (GE): derailment, 11 killed.
1906	5	60	Salisbury (LSW): derailment, 24 killed.
1907	5	18	Shrewsbury (LNW): derailment, 11 killed.
1908	0	0	
1909	1	1	
1910	4	23	Hawes Junction (Mid): collision, 12 killed.
1911	3	14	Pontypridd (TV): collision, 11 killed.
1912	4	20	Ditton Junction (LNW): derailment, 13 killed.
1913	7	33	Ais Gill (Mid): collision, 16 killed.
1914	2	6	Carr Bridge (Hld): bridge failure, 5 killed.

Key to railways. Cal: Caledonian; Camb: Cambrian; E&G: Edinburgh & Glasgow; GSW: Glasgow & South Western; GE: Great Eastern; GN: Great Northern; GNI: Great Northern (Ireland); GW: Great Western; HJ: Hampstead Junction; Hld: Highland; L&Y: Lancashire & Yorkshire; LBSC: London Brighton & South Coast; LNW: London & North Western; LSW: London & South Western; Mid: Midland; MSL: Manchester Sheffield & Lincolnshire; NB: North British; NE: North Eastern; S&D: Somerset & Dorset Joint; SE: South Eastern; TV: Taff Vale.

Sources: railway accident figures from accident returns published in *Parliamentary Papers*; details of accidents from Rolt, *Red for Danger*.

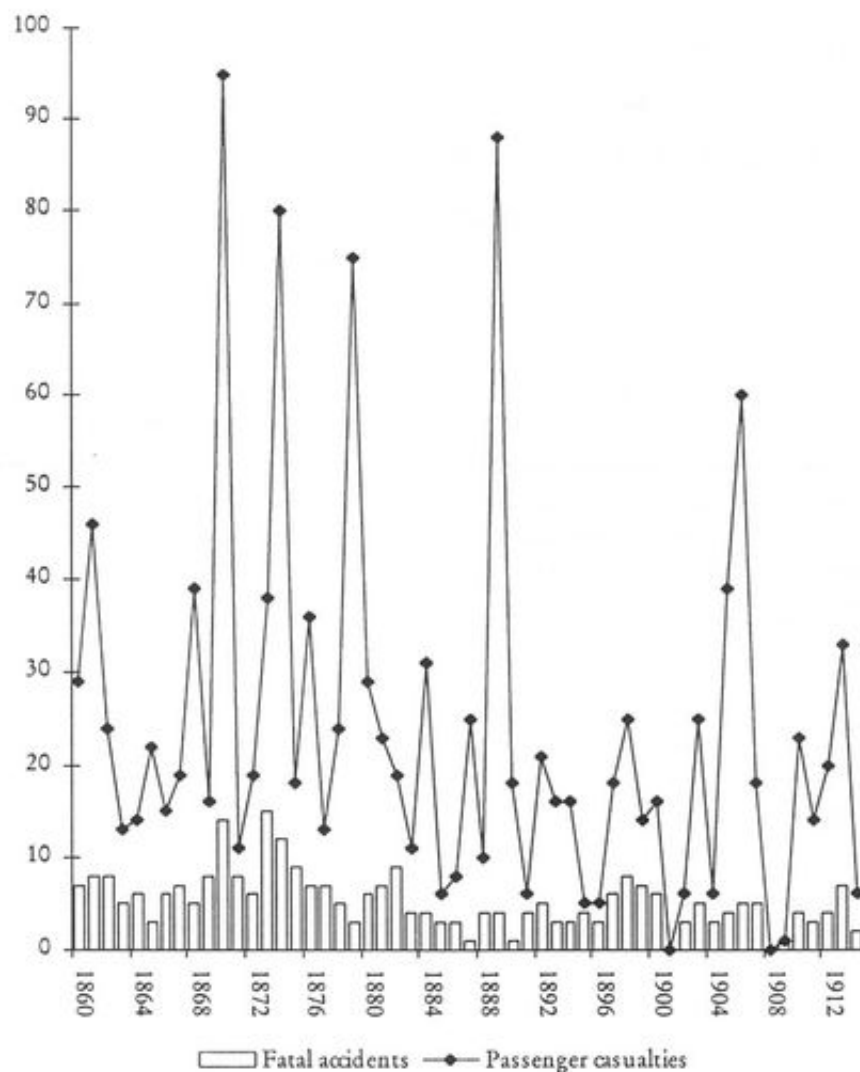


Figure A. Railway accidents and passenger casualties, 1860-1914.
 Source: accident returns published in *Parliamentary Papers*.

Table 2 reveals the improving safety record of British railways throughout this period. The most significant indicators are the two columns on the right, giving the number of journeys per fatal accident and the number of journeys per passenger fatality for each year, as these figures relate the accident and death rates of the railways directly to the growth in traffic. These indicators are prone to sudden dips and surges as they register the effects of particularly good or bad years: in 1870, for example, when the very high total of 95 deaths causes the number of

journeys per fatality to fall to 3.5 million. However, the trend for both these indicators is upwards, indicating a continually improving safety rate at a time when both the network and the traffic were expanding continually (as shown in columns 2 and 3). Nevertheless, in terms of public perceptions, the litany of disasters contained in column four of Table 1 comprised a far more influential factor in affecting the mood of the public during this period than the dry statistics of safety to be found in this table.

Table 2: *Summary of numbers of railway accidents and passenger fatalities relative to number of passenger journeys, 1860-1914.*

<i>Year</i>	<i>Track mileage open</i>	<i>Number of passenger journeys*</i>	<i>Number of fatal accidents</i>	<i>Number of passenger fatalities†</i>	<i>Journeys per fatal accident‡</i>	<i>Journeys per passenger fatality†</i>
1860	10,103	163	7	29	23.3	5.6
1861	11,069	173.7	8	56	21.7	3.1
1862	11,551	180.4	8	24	22.6	7.5
1863	12,321	203.5	5	13	40.7	15.7
1864	12,789	228.9	6	14	38.2	16.4
1865	13,289	252.2	3	22	84.1	11.5
1866	13,854	274.9	6	13	45.8	21.1
1867	14,247	288	7	19	41.1	15.2
1868 <i>a</i>	14,853	299.5	5	39	59.9	7.7
1869	15,145 <i>b</i>	312.3	8	16	39.0	19.5
1870	15,537 <i>b</i>	336.3	14	95	24.0	3.54
1871	15,376	375.5	8	11	46.9	34.1
1872	15,814	423.3	6	19	70.6	22.3
1873	16,082	455.3	15	38	30.4	12.0
1874	16,449	477.5	12	80	39.8	6.0
1875	16,658	506.9	9	18	56.3	18.2
1876	16,872	534.4	7	36	76.3	41.1
1877	17,077	549.3	7	13	78.5	42.3
1878	17,333	564.9	5	24	113.0	23.5
1879	17,696	562.4	3	75	187.5	7.5
1880	17,933	614.3	6	29	102.4	21.2
1881	18,175	625.6	7	23	89.4	27.2
1882	18,457	654.7	9	19	72.8	34.5
1883	18,681	683.3	4	11	170.8	62.1
1884	18,864	694.6	4	31	173.7	22.4
1885	19,169	697.1	3	6	232.4	116.2

<i>Year</i>	<i>Track mileage open</i>	<i>Number of passenger journeys*</i>	<i>Number of fatal accidents</i>	<i>Number of passenger fatalities†</i>	<i>Journeys per fatal accident‡</i>	<i>Journeys per passenger fatality†</i>
1886	19,332	725.7	3	8	241.9	90.7
1887	19,578	733.5	1	25	733.5	29.3
1888	19,812	742.9	4	10	185.7	74.3
1889	19,943	775.0	4	88	193.8	8.8
1890	20,073	817.4	1	18	817.4	45.4
1891	20,191	845.2	4	6	211.3	140.9
1892	20,325	864.6	5	21	172.9	41.2
1893	20,646	872.7	3	16	290.9	54.5
1894	20,908	911.5	3	16	303.8	57.0
1895	21,174	930.2	4	5	232.6	186.0
1896	21,277	980.6	3	5	326.9	196.1
1897	21,433	1,030.9	6	18	171.8	57.3
1898	21,659	1,062.6	8	25	132.8	42.5
1899	21,700	1,106.4	7	14	158.1	79.0
1900	21,863	1,142.7	6	16	190.5	71.4
1901	22,078	1,172.9	0	0	—	—
1902	22,152	1,188.2	3	6	396.1	198.0
1903	22,435	1,195.6	5	25	239.1	47.8
1904	22,634	1,199.0	3	6	399.7	199.8
1905	22,847	1,199.0	4	39	299.8	30.7
1906	23,063	1,240.2	5	60	248.0	20.7
1907	23,108	1,259.7	5	18	251.9	70.0
1908	23,205	1,278.0	0	0	—	—
1909	23,280	1,264.6	1	1	1,264.6	1,264.6
1910	23,387	1,306.7	4	23	326.7	56.8
1911	23,417	1,326.8	3	14	442.3	94.8
1912	23,441	1,294.2	4	20	323.6	64.7
1913	23,676	1,454.3	7	33	207.8	44.1
1914 <i>a</i>	23,771	1,493.6	2	6	746.8	248.9

* Passenger journeys in millions; excludes season ticket holders.

† Figures refer to those passengers described in the accident returns as having died 'from causes beyond their own control.'

‡ Passenger journeys in millions.

a There are no mileage or journey figures for these years, and the figures shown in italic are estimates. See note at the beginning of the Appendix.

b For 1869 and 1870, figures give mileage constructed, not mileage open.

Sources: railway accident figures from accident returns published in *Parliamentary Papers*; track mileage and passenger journey figures from B. R. Mitchell, *British Historical Statistics* (Cambridge: Cambridge University Press, 1988).

Tables 3 and 4, the results of which are displayed graphically in Figure B, summarize the general trends of railway safety by decade from 1850 to 1909. Table 3 shows the average number of passenger fatalities per year for each decade, Table 4 the average number of fatal accidents to passenger trains per year for each decade. In each case, two points are revealed: first, the 1870s stand out as a relatively bad decade for railway safety; but second, the overall trend in accidents and fatalities is downwards. Figure B demonstrates both points more clearly, and also enables the two indicators to be compared with the dramatically rising indicator of the number of journeys safely conducted for every one passenger fatality. It is this factor which demonstrates more clearly than any other the continual improvement in railway safety which occurred throughout the period of this study.

Table 3. *Average passenger fatalities per year by decade, 1850-1909.*

<i>Period</i>	<i>Total passenger fatalities</i>	<i>Average passenger fatalities per year</i>
1850-59	147	14.7
1860-69	237	23.7
1870-79	409	40.9
1880-89	250	25
1890-99	144	14.4
1900-09	171	17.1

Table 4. *Average number of fatal accidents to passenger trains per year by decade, 1850-1909.*

<i>Period</i>	<i>Total fatal accidents to passenger trains</i>	<i>Average fatal accidents per year</i>
1850-59	57	5.7
1860-69	63	6.3
1870-79	86	8.6
1880-89	45	4.5
1890-99	44	4.4
1900-09	32	3.2

Source for tables 3 and 4: accident returns published in *Parliamentary Papers*.

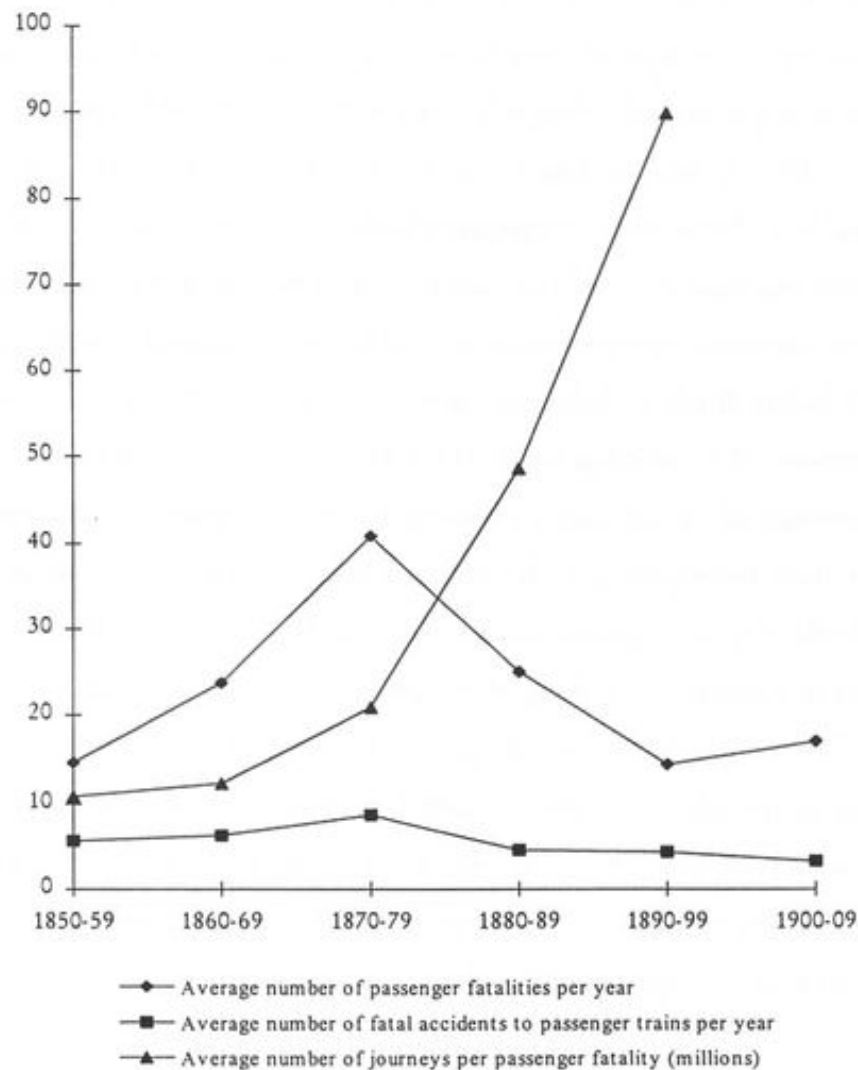


Figure B. *Average numbers of passenger fatalities and fatal accidents to passenger trains per year compared to average number of journeys per passenger fatality, by decade, 1850-1909.*

Sources: railway accident figures from accident returns published in *Parliamentary Papers*; passenger journey figures from B. R. Mitchell, *British Historical Statistics* (Cambridge: Cambridge University Press, 1988).

Table 5 is a consolidated table of all the accidents reported to the Board of Trade from 1861 to 1915, by five-yearly period. There is a strong case for arguing that the statistics for all kinds of accidents represent a more accurate record of the safety record of British railways than can be obtained by concentrating, as do Tables 1-5 above, on accidents involving passenger fatalities alone. However, a number of

changes made by the Board in the ways in which accidents were reported and recorded mean that it is much more difficult to make an accurate and consistent comparison of railway performance across this period by looking at all accidents than is the case with fatal accidents alone, which at least provide consistent standards of measurement. One dead passenger in 1865 would still have been counted as one dead passenger in 1905; a fatal accident is defined and recorded in the same way throughout the period. In other respects, however, important changes took place in the accident statistics recorded by the Board of Trade; in particular the Regulation of Railways Act 1871 and an Order of 21 December 1905 both extended the range of types of accidents which had to be reported to the Board. As an overall picture of railway safety during this period, then, the table should be used with caution. However, some interesting pointers to the changing character of accidents emerge. The effect of the gradual introduction of signal and point interlocking can be seen in the steady decline in the numbers of accidents caused by trains being wrong-roaded (that is, sent down the wrong tracks by inaccurate setting of points and signals); after 1895 the Board of Trade no longer required this statistic to be included in the returns. Failures of axles, wheels and wheel tires similarly fall continually from the 1870s, as improved qualities of steel manufacture and testing take effect.

Table 5. *Summary of all railway accidents reported to the Board of Trade, 1861-1915, by five-yearly period.*

<i>Types of accident</i>	<i>1861- 1865</i>	<i>1866- 1870</i>	<i>1871- 1875</i>	<i>1876- 1880</i>	<i>1881- 1885</i>	<i>1886- 1890</i>	<i>1891- 1895</i>	<i>1896- 1900</i>	<i>1901- 1905</i>	<i>1906- 1910</i>	<i>1911- 1915</i>
	<i>a</i>					<i>b</i>					
Collisions involving passenger trains	207	317	1022	742	467	444	376	443	401	523	533
Other collisions*	27	21	267	151	108	100	91	224	214	773	701
Buffer-stop collisions (excessive speed)†	2	19	88	119	88	107	97	71	68	74	57
Buffer-stop collisions (other causes)°	—	—	—	—	—	—	—	67	78	95	135
Passenger train d'railments	57	82	387	426	299	258	227	261	297	414	375
Other d'railments	18	8	209	115	59	50	46	84	80	1344	1256
Trains wrong-roaded	24	37	217	102	85	34	31	—	—	—	—
Trains striking obstructions‡	—	—	928	1169	941	863	953	1110	1098	1637	1765
Fires in trains‡	—	—	97	43	26	43	15	69	59	614	945
Misc. accidents in trains	—	2	—	—	—	—	—	—	14	17	52
Boiler explosions and failures	17	4	41	38	16	10	13	17	26	49	17

Types of accident	1861- 1865	1866- 1870	1871- 1875	1876- 1880	1881- 1885	1886- 1890	1891- 1895	1896- 1900	1901- 1905	1906- 1910	1911- 1915
			<i>a</i>							<i>b</i>	
Failure of locomotive equipment‡	—	—	51	47	21	44	37	31	26	305	286
Failure of tires‡	—	—	826	5297	5478	3546	2389	1687	894	662	403
Failure of wheels and axles	35	29	1193	2652	2119	1397	1068	875	761	698	476
Failure of brake apparatus‡	—	—	11	8	9	4	5	—	—	—	—
Failure of couplings	6	5	77	81	52	47	50	70	105	9497	2809 9
Failure of bridges, tunnels etc.‡	—	—	12	42	21	14	20	11	6	5	17
Broken rails‡	—	—	1442	2336	1940	1254	1360	1470	1588	1457	1247
Other accidents‡	—	—	274	366	257	192	242	314	406	463	686

* From 1896, incorporated collisions with trains and vehicles fouling the line.

† Until 1896, recorded as accidents caused by 'trains entering stations at too high a speed.'

° Recording commenced in 1896.

‡ Recording commenced in 1871.

|| Omitted 1871-1900.

a Act of 1871 made provision of accident returns obligatory, and extended the range of accidents required to be reported to the Board of Trade.

b Order of 21 December 1905 extended the range of accidents required to be reported to the Board of Trade.

Sources: table based on H. Rayner Wilson, *Railway Accidents: Legislation and Statistics 1825-1924* (London: Rayner Wilson, 1925), table I, p. 21. Statistics checked against accident returns published in *Parliamentary Papers*.

BIBLIOGRAPHY

This bibliography is divided into sections as follows:

A. Primary Sources

- I. Newspapers and periodicals
- II. Parliamentary papers
- III. Works concerned with railway law and the medical aspects of railways
- IV. Other medical works
- V. General works concerned with railways
- VI. Other works

B. Secondary Sources

- I. Works concerned with medicine and medical history
- II. Works concerned with railways and railway history
- III. Other works

A. PRIMARY SOURCES

I. Newspapers and periodicals

Annual Register
Architect
Association Medical Journal
Athenæum
British Medical Journal
Building News
Contemporary Review
Cornhill
Edinburgh Medical Journal
Fortnightly Review

Herepath's Railway Journal
Lancet
Magazine of Art
Nineteenth Century
Quarterly Review
Railway Times
Saturday Review
Spectator
The Times

II. Parliamentary papers

- Report of the Select Committee on Railways*, PP. (Commons) XXV (1841).
Report from the Select Committee on the Prevention of Accidents on Railways, PP. (Commons) VIII (1841).
Report of the Select Committee on Accidents on Railways, PP. (Commons) XIV (1857-8).
Report of the Select Committee on the Law of Compensation for Accidents, PP. (Commons), X (1870).
Report of the Commissioners on Railway Accidents, PP. (Commons) XLVIII (1877).

III. Works concerned with railway law and the medical aspects of railways

Books

- Camps, William, *Railway Accidents or Collisions: their Effects upon the Nervous System* (London: H. K. Lewis, 1866).
Clevenger, S. V., *Spinal Concussion: surgically Considered as a Cause of Spinal Injury, and Neurologically Restricted to a Certain Symptom Group, for which is Suggested the designation Erichsen's Disease, as one form of the Traumatic Neuroses* (Philadelphia & London: F. A. Davis, 1889).
Deas, Francis, *The Law of Railways Applicable to Scotland* (Edinburgh: Edmonston & Douglas, 1873).
— *The Law of Railways Applicable to Scotland*, 2nd edn., revised, enlarged & extended by James Ferguson (Edinburgh: William Green & Sons, 1897).
Dell, Barton, *Railway Accidents and Personal Injuries; Important Questions for Shareholders* (London: Elliot Stock, 1873).
Erichsen, John Eric, *On Railway and Other Injuries of the Nervous System* (London: Walton & Maberly, 1866).
— *On Concussion of the Spine, Nervous Shock, and Other Obscure Injuries of the Nervous System, in their Clinical and Medico-legal Aspects* (London: Longmans, Green, 1875).
— *On Surgical Evidence in Courts of Law with Suggestions for its Improvement* (London: Longmans, Green, 1878).
Fletcher, James Ogden, *Railways in their Medical Aspects* (London: J. E. Cornish, 1867).
Hall, John Charles, *Medical Evidence in Railway Accidents* (London: Longmans, 1868).
Hamilton, Allan McLane, *Railway and Other Accidents, with Relation to Injury and Disease of the Nervous System: a Book for Court Use* (London: Ballière, Tindall, & Cox, 1904).
Haviland, Alfred, *Hurried to Death: Especially Addressed to Railway Travellers* (London: Renshaw & Mitchell, 1868).

- Jones, Thomas Wharton, *Failure of Sight from Railway and Other Injuries of the Spine and Head* (1855; 2nd edn., London: Longmans, 1866).
- Knocker, Douglas (ed.), *Accidents in their Medico-legal Aspect by Leading Medical and Surgical Authorities* (London: Ballière, Tindall & Cox/Butterworth & Co., 1910).
- Morris, Edwin, *A Practical Treatise on Shock after Surgical Operations and Injuries, with Special Reference to Shock caused by Railway Accidents* (London: Robert Hardwicke, 1867).
- Page, Herbert W., *Injuries of the Spine and Spinal Cord without Apparent Mechanical Lesion, and Nervous Shock in their Surgical and Medico-legal Aspects* (London: J. & A. Churchill, 1883).
- Injuries of the Spine and Spinal Cord without Apparent Mechanical Lesion, and Nervous Shock in their Surgical and Medico-legal Aspects* (2nd revised & expanded edn., London: J. & A. Churchill, 1885).
- Railway Injuries: with Special Reference to those of the Back and Nervous System, in their Medico-legal and Clinical Aspects* (London: Charles Griffin & Co., 1891).
- Clinical Papers on Surgical Subjects* (London: Cassell, 1897).
- Parsons, Albert, *The Liability of Railway Companies for Negligence towards Passengers* (London: Horace Cox, 1893).
- Shelford, Leonard, *The Law of Railways* (London: Henry Butterworth, 1845).
- The Law of Railways* (2nd edn., London: Henry Butterworth, 1846).
- The Law of Railways* (3rd edn., London: Butterworth's, 1853).
- Shelford's Law of Railways*, revised & enlarged by William Cunningham Glen (4th edn., London: Butterworth's, &c., 1869).
- Simon, Henry Andrews, *The Law Relating to Railway Accidents* (London: V. & R. Stevens, Sons, & Haynes, 1862).
- Williams, Ernest Edwin George, *An Epitome of Railway Law* (London: Stevens & Haynes, 1912).

Periodical articles

- Anon., review of James Ogden Fletcher, *Railways in their Medical Aspects* (1867), *The Athenæum*, no. 2086 (19 Oct. 1867), p. 504.
- review of J. E. Erichsen, *On Railway and Other Injuries of the Nervous System* (1866), *The Athenæum*, no. 2496 (28 Aug 1875), pp. 272-3.
- 'Effects of railways on health', *Cornhill*, vol. VI, no. 34 (1862), pp. 480-9.
- 'The medical aspects of railways', *Saturday Review*, vol. 25, no. 655 (16 May 1868), pp. 658-9.
- 'Perils of the train', *The Spectator*, vol. 35, no. 1776 (12 July 1862), pp. 779-80.
- 'The "Railway Spine"', *The Spectator*, vol. 39, no. 1987 (28 July 1866), pp. 834-5.

IV. Other medical works

Books

- Abercrombie, John, *Pathological and Practical Researches on Diseases of the Brain and Spinal Cord* (Edinburgh: Waugh & Innes, 1829).
- Ballet, Gilbert, *Neurasthenia*, trans. from the 3rd French edn. by P. Campbell Smith (London: Henry Kimpton, 1911).
- Beevor, Charles E., *Diseases of the Nervous System: a Handbook for Students and Practitioners* (London: H. K. Lewis, 1898).
- Bramwell, Byron, *Diseases of the Spinal Cord* (1882; 3rd edn., Edinburgh: William F. Clay, 1895).
- Brodie, Benjamin Collins, *Lectures Illustrative of Certain Local Nervous Affections* (London: Longmans, Rees, Orme, Brown, Green, & Longman, 1837).
- [under initials 'B.C.B.'], *Psychological Inquiries: in a Series of Essays, Intended to Illustrate the Mutual Relations of the Physical Organization and the Mental Faculties* (London: Longmans, Brown, Green, & Longmans, 1854).
- Browne, Ralph, *Neurasthenia and its Treatment by Hypodermic Transfusions (According to the Method of Doctor Jules Chéron)* (1895; 2nd edn., London: J. & A. Churchill, 1899).
- Buzzard, Thomas, *Clinical Lectures on Diseases of the Nervous System* (London: J. & A. Churchill, 1882).
- On the Simulation of Hysteria by Organic Disease of the Nervous System* (London: J. & A. Churchill, 1891).
- Carter, Robert Brudenell, *On the Pathology and Treatment of Hysteria* (London: John Churchill, 1853).
- On the Influence of Education and Training in Preventing Diseases of the Nervous System* (London: John Churchill, 1855).
- Cattell, Henry W. (ed.), *Lippincott's New Medical Dictionary* (Philadelphia & London: J. R. Lippincott., 1910).
- Charcot, Jean-Martin, *Clinical Lectures on Disease of the Nervous System, delivered at the Infirmary of La Salpêtrière*, trans. Thomas Savill; ed. Ruth Harris (1889; London & New York: Routledge/Tavistock Classics in the History of Psychiatry, 1991).
- Clarke, John Michell, *Hysteria and Neurasthenia* (London & New York: John Lane/The Bodley Head., 1905).
- Clouston, Thomas Smith, *Clinical Lectures on Mental Disease* (London: J. & A. Churchill, 1883).
- Freud, Sigmund, *The Standard Edition of the Complete Psychological Works of Sigmund Freud*, trans. and ed. James Strachey (24 vols., London: Hogarth Press/Institute of Psychoanalysis, 1955).
- Gowers, William R., *A Manual of Diseases of the Nervous System* (2 vols., 1886; 2nd edn., London: J. & A. Churchill, 1892).

- Jordan, John Furneaux, *Surgical Inquiries: a Presidential Address, Delivered at the Annual Meeting of the Birmingham and Midland Counties Branch of the British Medical Association, June 24th, 1873* (London: J. & A. Churchill, 1873).
- Surgical Enquiries: Including the Hastings Essay on Shock, the Treatment of Surgical Inflammations, and Numerous Clinical Lectures* (London: J. & A. Churchill, 1880).
- Lancet, *The Influence of Railway Travelling on Public Health* (London: The Lancet, 1862).
- Laycock, Thomas, *A Treatise on the Nervous Diseases of Women; Comprising an Inquiry into the Nature, Causes, and Treatment of Spinal and Hysterical Disorders* (London: Longman, Orme, Brown, Green, & Longmans, 1840).
- Mayo, Herbert, *Outlines of Human Pathology* (London: Henry Renshaw, 1835).
- New Sydenham Society, *The New Sydenham Society's Lexicon of Medicine and the Allied Sciences* (5 vols., London: New Sydenham Society, 1899-1910).
- Page, Herbert W., *Clinical Lectures on Surgical Subjects* (London: Cassell, 1897).
- Savill, Thomas D., *Clinical Lectures on Neurasthenia* (1899; 2nd edn., London: Henry J. Glaiser, 1902).
- Skey, Frederic Carpenter, *Hysteria* (London: Longmans, Green, Reader, & Dyer, 1867).
- Tuke, Daniel Hack, *Illustrations of the Influence of the Mind upon the Body in Health and Disease, Designed to Elucidate the Action of the Imagination* (London: J. & A. Churchill, 1872).
- A Dictionary of Psychological Medicine* (2 vols., London: J. & A. Churchill, 1892).
- Williamson, R. T., *Diseases of the Spinal Cord* (London: Oxford University Press/Hodder & Stoughton, 1908).

Periodical articles

- Anon., 'Railway travelling and its effects on health', *Association Medical Journal*, vol. 4, no. CLX, new series (26 Jan. 1856), p. 72.
- Hird, Francis, 'On some affections of the spine simulating organic disease', *Association Medical Journal*, vol. 2, no. C, new series (1 Dec. 1854), p. 1079.
- 'The influence of railway travelling on public health: report of the commission', *The Lancet* (1862), 4 Jan., pp. 15-21; 11 Jan., pp. 48-53; 18 Jan., pp. 79-83; 25 Jan., pp. 107-10; 1 Feb., pp. 130-2; 8 Feb., pp. 155-8; 1 Mar., pp. 231-6; 8 Mar., pp. 258-60.
- 'The influence of railway travelling', Centenary Number, *The Lancet* (6 Oct. 1923), pp. 721-3.

V. Works concerned with railways

Books

- Anon., *Horse-power Applied to Railways at Higher Rates of Speed than by Ordinary Draught* (London: John Ollivier, 1844).
- *The Principal Causes of Railway Accidents with Proposed Remedies, by a Railway Servant of Fifteen Years' Experience* (Edinburgh: MacLaren & MacNiven, &c., 1873).
- *Railroad Eclogues* (London: William Pickering, 1846).
- *The Railway Meeting. A Satire. Dedicated to the Pillaged and Plundered Shareholders of Great Britain. By a Lancashire Victim* (London: Arthur Hall, Virtue, & Co., 1856).
- *Railway Readings* (Oxford: J. Vincent, 1847).
- *Railway Reform; its Expediency and Practicability Considered* (London: Pelham Richardson, 1844).
- *The Railway Traveller's Handy Book of Hints, Suggestions, and Advice, Before the Journey, During the Journey, and After the Journey* (London: Lockwood & Co., 1862).
- *Railways: their Uses and Management* (London: Pelham Richardson, 1842).
- *Ruminations on Railways. No. II. The Railway Board of Trade* (London: John Weale, 1845).
- Booth, Henry, *An Account of the Liverpool and Manchester Railway* (Liverpool: Wales & Baines, 1830).
- [under pseud. 'A Shareholder'], *The Case of the Railways Considered, Especially with Reference to Railway Accidents, and the Operation of Lord Campbell's Act* (London: W. H. Smith & Son/Liverpool: Baines & Herbert, 1852).
- *A Letter to the Right Hon. Lord Campbell, on the 9 & 10 Victoria, Cap. 93. Being an Act for Compensating the Families of Persons Killed by Accidents. — (26 August 1846) Showing the Injustice of the Measure and the Propriety of Immediate Repeal* (London: John Chapman, 1854).
- Cooke, William Fothergill, *Telegraphic Railways; or, the Single Way Recommended by Safety, Economy and Efficiency, under the Safeguard and Control of the Electric Telegraph: with Particular Reference to Railway Communication with Scotland, and to Irish Railways* (London: Simpkin, Marshall, & Co., 1842).
- Findlay, Sir George, *The Working and Management of an English Railway* (London: Whittaker & Co., 1889).
- Foxwell, E. E., *English Express Trains: Two Papers* (London: Edward Stanford, 1884).
- Foxwell, E. E. & T. C. Farrer, *Express Trains English and Foreign* (London: Smith, Elder & Co., 1889).
- Francis, John, *A History of the English Railway; its Social Relations and Revelations. 1820-1845* (2 vols., London: Longman, Brown, Green, & Longmans, 1851).

- Greenhow, C. H., *An Exposition of the Dangers and Deficiencies of the Present Mode of Railway Construction, with Suggestions for its Improvement* (London: John Weale, 1846).
- Jeans, J. S., *Railway Problems: an Inquiry into the Economic Conditions of Railway Working in Different Countries* (London: Longmans, Green & Co., 1887).
- Lardner, Dionysius, *Railway Economy: a Treatise on the New Art of Transport, its Management, Prospects, and Relations* (London: Taylor, Walton, & Maberly, 1850).
- Massey, William John, *Massey's Railway Satirist* (London: George Philips, 1867).
- Peters, William, *Railway Dangers; and How to Avoid Them* (London: Effingham Wilson, 1853).
- Reynolds, Michael, *Engine Driving Life: Stirring Adventures and Incidents in the Lives of Locomotive Engine-Drivers* (1881; 2nd edn., London: Crosby, Lockwood & Son, 1889).
- Ritchie, Robert, *Railways: their Rise, Progress, and Construction: With Remarks upon Railway Accidents, and Proposals for their Prevention* (London: Longmans, Brown, Green, & Longmans, 1846).
- 'A Signalman', *A Voice from the Signal-box: or, Railway Accidents and their Causes* (London: Longmans, Green & Co., 1874).
- Smiles, Samuel, *Lives of the Engineers, with an Account of their Principal Works, comprising also a History of Inland Communication in Britain* (3 vols., London: John Murray, 1862).
- Stretton, Clement E., *A Few Remarks on Railway Accidents, their Cause and Prevention* (1881; 3rd edn., London: Simpkin, Marshall & Co./Leicester: J. & T. Spencer, 1882).
- Safe Railway Working, a Popular Treatise on Railway Accidents, their Cause and Prevention: with a Description of Modern Appliances and Systems* (1887; 3rd, revised & enlarged edn., London, Crosby, Lockwood & Son, 1893).
- Williams, F. S., *Our Iron Roads* (2 vols., 1876; 3rd edn., 1883; repr. Woking: Gresham Books, 1981).
- Wilson, H. Rayner, *The Safety of British Railways or Railway Accidents: how Caused and how Prevented* (London: D. S. King & Son, 1909).
- Railway Accidents: Legislation and Statistics 1825 to 1924* (London: Rayner Wilson, 1925).

Periodical articles

- Anon., 'Railway accidents', *Quarterly Review*, vol. 145, no. 289 (1878), pp. 166-89.
- 'A caution to railway directors', *Saturday Review*, vol. 14, no. 355 (16 Aug. 1862), pp. 180-1.
- 'Railway literature and the demi-monde', *Saturday Review*, vol. 14, no. 372 (13 Dec. 1862), pp. 719-20.
- 'Railway murders', *Saturday Review*, vol. 16, no. 407 (15 Aug. 1863), pp. 205-6.

- ‘Railway imprisonment’, *Saturday Review*, vol. 18, no. 455 (16 July 1864), pp. 72-3.
- ‘Other dangers of the rail’, *Saturday Review*, vol. 18, no. 456 (23 July 1864), pp. 106-7.
- ‘Railway slaughter’, *Saturday Review*, vol. 18, no. 478 (24 Dec. 1864), pp. 766-7.
- ‘The railways’, *Saturday Review*, vol. 19, no. 503 (17 June 1865), pp. 724-5.
- ‘The railway accident season’, *Saturday Review*, vol. 22, no. 566 (1 Sept. 1866), pp. 265-6.
- ‘The railway calamity’, *Saturday Review*, vol. 26, no. 670 (29 Aug. 1868), pp. 281-2.
- ‘Groans of the railway’, *Saturday Review*, vol. 29, no. 744 (29 Jan. 1870), pp. 139-40.
- ‘Recent railway accidents’, *Saturday Review*, vol. 30, no. 789 (10 Dec. 1870), pp. 748-9.
- ‘Railway profits and railway slaughter’, *Saturday Review*, vol. 32, no. 827 (2 Sept. 1871), pp. 303-4.
- ‘Railway reform’, *Saturday Review*, vol. 33, no. 861 (27 Apr. 1872), pp. 532-3.
- ‘Railway disasters’, *Saturday Review*, vol. 34, no. 887 (26 Oct. 1872), pp. 519-20.
- ‘The railway point of view’, *Saturday Review*, vol. 36, no. 933 (13 Sept. 1873), pp. 333-5.
- ‘The railways again’, *Saturday Review*, vol. 36, no. 936 (4 Oct 1873), pp. 429-30.
- ‘The Midland accident’, *Saturday Review*, vol. 54, no. 1410 (4 Nov. 1882), p. 596.
- ‘The murder of Mr. Briggs’, *The Spectator*, vol. 37, no. 1881 (16 July 1864), p. 818.
- Bradbury, Edward, ‘Pictures in trains’, *Magazine of Art*, vol. 3 (1880), pp. 107-11.
- Dodd, George, ‘The metropolis and the railways’, *Fortnightly Review*, vol. IV (1866), pp. 359-68.
- Fowler, John, ‘Railway accidents’, *Nineteenth Century*, vol. I, no. IV (June 1877), pp. 646-64.
- Harkness, Margaret E., ‘Railway labour’, *Nineteenth Century*, vol. XIII, no. LXIX (Nov. 1882), pp. 721-32.
- Phillips, Edwin, ‘The internal working of railways’, *Fortnightly Review*, vol XV (n.s.) (1874), pp. 371-84.

VI. Other works

Fiction and poetry

- Braddon, Mary Elizabeth, *Lady Audley’s Secret* (1862; Oxford: Oxford University Press, 1987).
- John Marchmont’s Legacy* (3 vols., London: Tinsley Brothers, 1863).

- Henry Dunbar: the Story of an Outcast* (3 vols., London: John Maxwell & Co., 1864).
- Browning, Elizabeth Barrett, *Aurora Leigh* (1857; Oxford: Oxford University Press, 1993).
- Butler, Samuel, *Erewhon* (1872; Harmondsworth: Penguin, 1970, repr. 1985).
- Collins, Edward James Mortimer, *Who is the Heir?* (3 vols, London: John Maxwell & Co., 1865).
- The Vivian Romance* (3 vols., London: John Maxwell & Co., 1870).
- Collins, Wilkie, *The Woman in White* (1860; Oxford: Oxford University Press, 1973).
- No Name* (1862; Oxford: Oxford University Press, 1986).
- Costello, Dudley, *The Millionaire of Mincing Lane* (London: G. Routledge & Co., 1858).
- Davidson, John, *The Poems of John Davidson*, ed. Andrew Turnbull (2 vols., Edinburgh & London: Scottish Academic Press, 1973).
- Dickens, Charles, *Dombey and Son* (1848; Harmondsworth: Penguin, 1971).
- Hard Times* (1854; Oxford: Oxford University Press, 1989).
- The Nine Christmas Numbers of All The Year Round* (London: Chapman & Hall, c. 1870).
- Master Humphrey's Clock and A Child's History of England* (London: Oxford University Press, 1958).
- Selected Shorter Fiction*, ed. Deborah A. Thomas (Harmondsworth: Penguin, 1976).
- Disraeli, Benjamin, *Sybil, or The Two Nations* (1845; Oxford: Oxford University Press, 1981).
- Harwood, John Berwick [published anonymously], *Lord Ulswater* (3 vols., London: Richard Bentley, 1867).
- Herbert, George, *Gerald Fitzgerald* (3 vols., London: T. C. Newby, 1858).
- Jefferies, Richard, *After London, or Wild England* (1885; Oxford: Oxford University Press, 1980).
- Leith, Mary Charlotte J. [published anonymously], *Mark Dennis; or, The Engine-Driver. A Tale of the Railway* (London: Rivingtons, 1859).
- Manning, Anne [published anonymously], *Town and Forest* (London: Richard Bentley, 1860).
- Peacock, Thomas Love, *Headlong Hall and Gryll Grange* (Oxford: Oxford University Press, 1987).
- Rossetti, Dante Gabriel, *The Works of Dante Gabriel Rossetti*, ed. with preface and notes by W. M. Rossetti (London: Ellis, 1911).
- Tennyson, Arthur, *The Poems of Tennyson*, ed. Christopher Ricks (3 vols., 1969; 2nd edn., London: Longman, 1987).
- Verne, Jules, *Twenty Thousand Leagues Under the Seas*, trans. William Butcher (1869; Oxford: Oxford University Press, 1998).

Non-fiction

- Arnold, Matthew, *The Complete Prose Works of Matthew Arnold* (11 vols., Ann Arbor, Mich.: University of Michigan Press, 1960-77).
- Blakely, John, *The Theology of Inventions: or, Manifestations of Deity in the Works of Art* (Glasgow: William Collins, 1855).
- Borrow, George, *Wild Wales: its People, Language, and Scenery* (3 vols., London: John Murray, 1862).
- Carlyle, Thomas, *Works of Thomas Carlyle* (30 vols., London: Chapman & Hall, 1896-9).
- Kilvert, Francis, *Kilvert's Diary 1870-1879: Selections from the Diary of the Rev. Francis Kilvert*, ed. William Plomer (Harmondsworth: Penguin, 1977).
- Martineau, Harriet, *Guide to the English Lakes* (London: John Murray, 1855).
- Morris, William, *The Collected Letters of William Morris*, ed. Norman Kelvin (3 vols., Princeton, N.J.: Princeton University Press, 1984-7).
- Nordau, Max, *Degeneration*, English trans. of the 4th German edn., 1892 (London: Heinemann, 1895).
- Peel, Robert, *A Correct Report of the Speeches Delivered by the Right Honourable Sir Robert Peel, Bart., M.P., on his Inauguration into the Office of Lord Rector of the University of Glasgow, January 11. 1837* (London: John Murray, 1837).
- Playne, Caroline E., *The Neuroses of the Nations* (London: George Allen & Unwin, 1925).
- *The Pre-War Mind in Britain: an Historical Review* (London: George Allen & Unwin, 1928).
- Potter, T. R., *The History and Antiquities of the Ancient Town of Leicester* (London: Hamilton, Adams & Co., 1842).
- Ruskin, John, *The Works of John Ruskin*, ed. E. T. Cook & A. Wedderburn (39 vols., London: George Allen, 1903-12).
- Smith, Charles Manby, *The Little World of London* (London: John Murray, 1857).
- Somerville, Alexander, *The Autobiography of a Working Man* (1848; London: Macgibbon & Kee, 1967).
- Talon, Thomas Knox, *The Tay Bridge Disaster: was it Accident or Judgment? A Sermon Preached in St. Vincent Chapel, Edinburgh, on Sunday, 11th January 1880* (Edinburgh: David Douglas, 1880).
- Thackeray, William Makepeace, *The Oxford Thackeray* (18 vols., Oxford: Oxford University Press, n.d. [c. 1908]).
- Walford, Cornelius, *The Insurance Cyclopædia* (3 vols., London: Charles & Edwin Layton, 1871-4).
- Wells, H. G., *Anticipations of the Reactions of Mechanical and Scientific Progress upon Human Life and Thought* (London: Chapman & Hall, 1902).

Periodical articles

- Allbutt, Clifford, 'Nervous diseases and modern life', *Contemporary Review*, vol. LXVII (Feb. 1895), pp. 210-31.
- Mansel, H. L., 'Sensation novels', *Quarterly Review*, vol. 113 (1863), pp. 481-514.
- Reclus, Elisée, 'The evolution of cities', *Contemporary Review*, vol. LXVII (Feb. 1895), pp. 246-64.

B. SECONDARY SOURCES

I. Medicine and medical history

Books

- Berrios, German & Hugh Freeman (eds.), *150 Years of British Psychiatry, 1841-1991* (London: Gaskell/Royal College of Psychiatrists, 1991).
- Berrios, German & Roy Porter, *A History of Clinical Psychiatry* (London: Athlone Press, 1995).
- Bynum, W. F., Roy Porter & Michael Shepherd, *The Anatomy of Madness: Essays in the History of Psychiatry* (2 vols., London: Tavistock Publications, 1985).
- Carlson, E. T., 'George M. Beard and neurasthenia', in E. R. Wallace & L. C. Pressley (eds.), *Essays in the History of Psychiatry* (Columbia, S. C.: William S. Hall Psychiatric Institute, 1980).
- Clarke, E. & Stephen Jacyna, *Nineteenth-century Origins of Neuroscientific Concepts* (Los Angeles & Berkeley, Calif.: University of California Press, 1987).
- Drinka, George F., *The Birth of Neurosis: Myth, Malady and the Victorians* (New York: Simon & Schuster, 1984).
- Fischer-Homberger, Esther, *Die traumatische Neurose: vom somatischen zum sozialen Leiden* (Vienna: Hans Huber, 1975).
- French, Roger & Andrew Wear (eds.), *British Medicine in an Age of Reform* (London: Routledge, 1991).
- Gelder, Michael, Dennis Gath, Richard Mayou & Philip Cohen, *Oxford Textbook of Psychiatry* (Oxford: Oxford University Press, 1983; 3rd edn. 1996).
- Goetz, Christopher G., Michel Bonduelle & Toby Gelfand, *Charcot: Constructing Neurology* (Oxford: Oxford University Press, 1995).
- Gosling, Francis G., *Before Freud: Neurasthenia and the American Medical Community, 1870-1910* (Urbana & Chicago, Ill.: University of Illinois Press, 1987).
- Harris, Ruth, *Murders and Madness: Medicine, Law and Society in the fin-de-siècle* (Oxford: Oxford University Press, 1989).

- Libbrecht, Katrein, *Hysterical Psychosis: a Historical Survey* (New Brunswick, N. J. & London: Transaction, 1995).
- Micale, Mark S., *Discovering the History of Psychiatry* (Oxford: Oxford University Press, 1994).
- *Approaching Hysteria: Disease and its Interpretations* (Princeton, N. J.: Princeton University Press, 1995).
- Oppenheim, Janet, *'Shattered Nerves': Doctors, Patients, and Depression in Victorian England* (New York & Oxford: Oxford University Press, 1991).
- Piñero, José M. Lopez, *Historical Origins of the Concept of Neurosis* (Cambridge: Cambridge University Press, 1987).
- Scully, Andrew, *Social Order/Mental Disorder: Anglo-American Psychiatry in Historical Perspective* (Berkeley & Los Angeles, Calif.: University of California Press, 1989).
- Trimble, Michael, *Post-traumatic Neurosis: from Railway Spine to Whiplash* (Chichester: John Wiley, 1981).
- Wallace, E. R. & L. C. Pressley, (eds.), *Essays in the History of Psychiatry* (Columbia, S.C.: William S. Hall Psychiatric Institute, 1980).
- Warner, John Harley, 'The idea of science in English medicine: the "decline of science" and the rhetoric of reform, 1815-45', in Roger French & Andrew Wear (eds.), *British Medicine in an Age of Reform* (London: Routledge, 1991), pp. 136-84.
- Wear, Andrew (ed.), *Medicine in Society: Historical Essays* (Cambridge University Press, 1992).
- Weindling, Paul (ed.), *The Social History of Occupational Health* (Beckenham: Croom Helm, 1985).

Periodicals

- Bogacz, Ted, 'War neurosis and cultural change in England, 1914-22: the work of the War Office committee of enquiry into "shell-shock"', *Journal of Contemporary History*, vol. 24, no. 2 (April 1989), pp. 227-56.
- Caplan, Eric Michael, 'Trains, brains, and sprains: Railway Spine and the origins of psychoneuroses', *Bulletin of the History of Medicine*, vol. 69, no. 3 (Fall 1995), pp. 387-419.
- Fischer-Homberger, Esther, 'Railway Spine und traumatische Neurose — Seel und Rückenmark', *Gesnerus*, vol. 27 (1975), pp. 96-111.
- Gelfand, T., 'Charcot's response to Freud's rebellion', *Journal of the History of Ideas*, vol. 50, no. 3 (1989), pp. 269-82.
- Harrington, Ralph, 'The neuroses of the railway', *History Today*, vol. 44, no. 7 (July 1994), pp. 15-21.
- 'The "Railway Spine" diagnosis and Victorian responses to PTSD', *Journal of Psychosomatic Research*, vol. 40, no. 1 (Jan. 1996), pp. 11-14.

- Levin, Kenneth, 'Freud's paper "On Male Hysteria" and the conflict between anatomical and physiological models', *Bulletin of the History of Medicine*, vol. 48, no. 3 (Fall, 1974), pp. 377-97.
- Micale, Mark S., 'Charcot and the idea of hysteria in the male: gender, mental science and medical diagnosis in late nineteenth-century France', *Medical History*, vol. 34, no. 4 (1990), pp. 363-411.
- 'Charcot and les névroses traumatiques: scientific and historical reflections', *Journal of the History of the Neurosciences*, vol. 4, no. 2 (June 1995), pp. 101-19.
- Rosenberg, Charles E., 'Body and mind in nineteenth-century medicine: some clinical origins of the neurosis construct', *Bulletin of the History of Medicine*, vol. 63 (1989), pp. 185-97.
- Whorton, James C., 'The hygiene of the wheel: an episode in Victorian sanitary science', *Bulletin of the History of Medicine*, vol. 52 (1978), pp. 61-88.

Unpublished theses

- Clark, Michael J., *'The Data of Alienism': Evolutionary Neurology, Physiological Psychology, and the Reconstruction of British Psychiatric Theory, c.1850-c.1900* (Oxford University: unpublished D.Phil. thesis, 1982).
- Senior, John D., *Rationalising Electrotherapy in Neurology, 1860-1920* (Oxford University: unpublished D.Phil. thesis, 1994).

II. Railways and railway history

Books

- Alderman, Geoffrey, *The Railway Interest* (Leicester: Leicester University Press, 1973).
- Bagwell, Phillip S., *The Transport Revolution since 1770* (London: Batsford, 1977).
- Bailey, Brian, *George Hudson: the Rise and Fall of the Railway King* (Stroud: Alan Sutton, 1995).
- Biddle, G., *Great Railway Stations of Britain: their Architecture and Development* (Newton Abbot: David & Charles, 1986).
- Bobrick, Benson, *Labyrinths of Iron: a History of the World's Subways* (New York: Newsweek Books, 1981).
- Bonavia, M. R., *The Channel Tunnel Story* (Newton Abbot: David & Charles, 1987).
- Briggs, Asa, 'The imaginative response of the Victorians to new technology: the case of the railways', in Chris Wrigley & John Shepherd (eds.), *On the Move: Essays in Labour and Transport History Presented to Philip Bagwell* (London & Rio Grande: The Hambledon Press, 1991).
- Burton, Anthony, *The Railway Builders* (London: John Murray, 1992).
- Clinker, C. R., *Railway History in Acts of Parliament* (Weston-super-Mare: Avon-Anglia Publications, 1984).

- Coleman, Terry, *The Railway Navvies: a History of the Men who made the Railways* (London: Pelican, 1968).
- Daniels, Stephen, 'Images of the railway in nineteenth century paintings and prints', in *Train Spotting: Images of the Railway in Art* (Nottingham: Nottingham Castle Museum, 1985).
- Darby, Michael, *Early Railway Prints* (London: HMSO, 1974).
- Dethier, Jean (ed.), *All Stations: a Journey through 150 Years of Railway History* (London: Thames & Hudson, 1981).
- Dow, George, *Great Central* (3 vols., London: Locomotive Publishing Co., 1959).
- Drummond, Diane K., *Crewe: Railway Town, Company and People 1840-1914* (Aldershot: Scolar Press, 1995).
- Dyos, H. J. & D. H. Aldcroft, *British Transport: an Economic Survey from the Seventeenth Century to the Twentieth* (Leicester: Leicester University Press, 1969).
- Ellis, C. Hamilton, *British Railway History* (2 vols., London: George Allen & Unwin, 1954-9).
- Railway carriages in the British Isles from 1870 to 1914* (London: George Allen & Unwin, 1965).
- Frank Ferneyhough, *Liverpool and Manchester Railway 1830-1980* (London: Robert Hale, 1980).
- Freeman, Michael J. & D. H. Aldcroft (eds.), *Transport in Victorian Britain* (Manchester: Manchester University Press, 1988).
- Goodman, Jonathan (ed.), *The Railway Murders* (London: Allison & Busby, 1984).
- Haining, Peter (ed.), *Murder on the Railways* (London: Orion Books, 1996).
- Jordan, Arthur & Elisabeth, *Away for the Day: the Railway Excursion in Britain, 1830 to the Present Day* (Kettering: Silver Link, 1991).
- Kellett, John R., *Railways and Victorian Cities* (London: Routledge, 1979).
- Kennedy, Ludovic (ed.), *A Book of Railway Journeys* (London: Collins, 1980).
- Kostal, R. W., *Law and English Railway Capitalism 1825-1875* (Oxford: Oxford University Press, 1994).
- Kingsford, P. W., *Victorian Railwaymen: the Emergence and Growth of Railway Labour 1830-1870* (London: Frank Cass, 1970).
- Lambourne, Lionel, 'Railways in caricature and illustration', in *Train Spotting: Images of the Railway in Art* (Nottingham: Nottingham Castle Museum, 1985).
- McKenna, Frank, *The Railway Workers 1840-1970* (London: Faber & Faber, 1980).
- Meeks, Carroll L. V., *The Railroad Station: an Architectural History* (New Haven, Conn. & London: Yale University Press, 1956).
- Nock, O. S., *Historic Railway Disasters* (1966; 4th edn., revised by B. K. Cooper, Shepperton: Ian Allan, 1992).
- Ottley, George, *A Bibliography of British Railway History* (1965; 2nd edn., London: HMSO, 1983, supplement 1988).

- Parris, Henry, *Government and the Railways in Nineteenth-century Britain* (London: Routledge, & Toronto: University of Toronto Press, 1965).
- Perkin, Harold, *The Age of the Railway* (London: Granada, 1970).
- Perkins, John, *The Tay Bridge Disaster* (Dundee: City of Dundee District Council, 1975).
- Reed, M. C., *Investment in Railways in Britain 1820-1844: a Study in the Development of the Capital Market* (Oxford: Oxford University Press, 1975).
- Richards, Jeffrey, 'The role of the railways', in Michael Wheeler (ed.), *Ruskin and Environment: the Storm-Cloud of the Nineteenth Century* (Manchester & New York: Manchester University Press, 1995).
- Richards, Jeffrey & John MacKenzie, *The Railway Station: a Social History* (Oxford: Oxford University Press, 1986).
- Rolt, L. T. C., *Red for Danger: a History of Railway Accidents and Railway Safety* (1955; 3rd edn., Newton Abbot: David & Charles, 1976).
- Isambard Kingdom Brunel: a Biography* (1957; pbk. edn., Harmondsworth: Penguin, 1989).
- George and Robert Stephenson: a Railway Revolution* (1960; pbk. edn., Harmondsworth: Penguin, 1989).
- The Making of a Railway: the Building of the Great Central* (1971; repr., Stroud: Sutton, 1997).
- Scelles, Christiane, *Gares: Ateliers du Voyage 1837-1937* (Paris: R.E.M.P.ART., 1993).
- Semmens, Peter, *Railway Disasters of the World: Principal Passenger Train Accidents of the Twentieth Century* (Sparkford: Patrick Stephens, 1994).
- Schivelbusch, Wolfgang, *The Railway Journey: the Industrialization of Time and Space in the Nineteenth Century* (1977; pbk. edn., Leamington Spa: Berg, 1986).
- Simmons, Jack, *The Railways of Britain* (1961; 4th edn., London: Macmillan, 1986).
- St Pancras Station* (London: Allen & Unwin, 1968).
- The Railway in Town and Country 1830-1914* (Newton Abbot: David & Charles, 1986).
- The Victorian Railway* (London: Thames & Hudson, 1991).
- Railways: an Anthology* (London: Collins, 1991).
- The Express Train and Other Railway Studies* (Nairn: Thomas & Lochar, 1995).
- Smith, D. N., *The Railway and its Passengers: a Social History* (Newton Abbot: David & Charles, 1988).
- Stewart, Michael, *The Railway Passengers Assurance Company, with Particular Reference to its Insurance Tickets* (Transport Ticket Society [no place of publication given], 1985).
- Swinfen, David, *The Fall of the Tay Bridge* (Edinburgh: Mercat Press, 1994).
- Thomas, David St John, *The Country Railway* (1976; pbk. edn., Harmondsworth: Penguin, 1979).

Train Spotting: Images of the Railway in Art, catalogue of 1985 Nottingham Festival Exhibition (Nottingham: Nottingham Castle Museum, 1985).

Vanns, Michael A., *Signalling in the Age of Steam* (Shepperton: Ian Allan, 1995).

Vaughan, Adrian, *Great Western architecture* (Sparkford: Oxford Publishing Company, 1977).

—*Isambard Kingdom Brunel: Engineering Knight-Errant* (London: John Murray, 1991).

Periodical articles

H. J. Dyos, 'Railways and housing in Victorian London', *Journal of Transport History*, vol. 2 (1955-6), pp. 11-21, 90-100.

—'Some social costs of railway building in London', *Journal of Transport History*, vol. 3 (1957-8), pp. 23-31.

Fischer-Homberger, Esther, 'Die Büsche der Pandora: Der mythische Hintergrund der Eisenbahnkrankheiten des 19ter Jahrhunderts', *Sudhoffs Archiv*, 56 (September 1971), pp. 297-317.

Lewis, R. A., 'Edwin Chadwick and the railway labourers', *Economic History Review*, 2nd series, vol. 3 (1950-1), pp. 107-18.

Simmons, Jack, 'For and against the locomotive', *Journal of Transport History*, vol. 2 (1955-6), pp. 144-51.

Slepnev, Igor, 'The Trans-Siberian Railway', *History Today*, vol. 46, no. 11 (Nov. 1996), pp. 37-9.

Sykes, Richard, et al, 'Steam attraction: railways in Britain's national heritage', *Journal of Transport History*, 3rd ser., vol. 18, no. 2 (September 1997), pp. 156-75.

Unpublished theses

Joss, J. M., *The Impact of the Coming of the Railway on Early Victorian Literature* (Liverpool University: unpublished M.Phil. thesis, 1989).

III. Other works

Books

Altick, Richard D., *The Presence of the Present: Topics of the Day in the Victorian Novel* (Columbus, Ohio: Ohio State University Press, 1991).

Bagwell, P. S., 'The decline of rural isolation', in G. E. Mingay (ed.), *The Victorian Countryside* (2 vols., London: Routledge, 1981).

Barkun, Michael, *Disaster and the Millennium* (New Haven & London: Yale University Press, 1974).

Bartrip, P. W. J. & S. B. Burman, *The Wounded Soldiers of Industry: Industrial Compensation Policy, 1833-1897* (Oxford: Oxford University Press, 1983).

- Bartrip, Peter, 'The rise and decline of workmen's compensation', in Paul Weindling (ed.), *The Social History of Occupational Health* (Beckenham: Croom Helm, 1985).
- Blackbourn, David & Geoff Eley, *The Peculiarities of German History* (Oxford: Oxford University Press, 1984).
- Bourke, Joanna, *Dismembering the Male: Men's Bodies, Britain and the Great War* (London: Reaktion Books, 1996).
- Briggs, Asa, *The Power of Steam: an Illustrated History of the World's Steam Age* (Bristol: Book Promotions, 1982).
- Iron Bridge to Crystal Palace: Impact and Images of the Industrial Revolution* (London: Thames & Hudson, 1979).
- Victorian Things* (1988; pbk. edn., London: Penguin, 1990).
- Brightfield, Myron F., *Victorian England in its Novels (1840-1870)* (3 vols., Los Angeles, Calif.: University of California Library, 1968).
- Brooks, Michael W., *John Ruskin and Victorian Architecture* (London: Thames & Hudson, 1989).
- Burnett, John, *Plenty and Want: a Social History of Diet in England from 1815 to the Present Day* (London: Scolar Press, 1966; rev. edn., 1979).
- Buzard, James, *The Beaten Track* (Oxford: Oxford University Press, 1993).
- Carey, John, *The Intellectuals and the Masses: Pride and Prejudice among the Literary Intelligentsia, 1880-1939* (London: Faber & Faber, 1992).
- Casteras, Susan, *Images of Victorian Womanhood in English Art* (Rutherford, N.J.: Farleigh Dickinson University Press, 1987).
- Chamberlin, J. E. & S. L. Gilman (eds.), *Degeneration: the Dark Side of Progress* (New York: Columbia University Press, 1985).
- Chesney, Kellow, *The Victorian Underworld* (1970; London: Pelican, 1973).
- Cohen, Michael, *Sisters: Relation and Rescue in Nineteenth-Century British Novels and Paintings* (London & Toronto: Associated University Presses, 1995).
- Cooter, Roger & Bill Luckin (eds.), *Accidents in History: Injuries, Fatalities and Social Relations* (Amsterdam: Rodopi, forthcoming 1997).
- Cowling, Mary, *The Artist as Anthropologist: the Representation of Type and Character in Victorian Art* (Cambridge: Cambridge University Press, 1989).
- Daniels, Stephen, *Fields of Vision: Landscape Imagery and National Identity in England and the United States* (Cambridge: Polity Press, 1993).
- Dinsdale, W. A., *History of Accident Insurance in Great Britain* (London: Stone & Cox, 1954).
- Epstein, James & Dorothy Thompson (eds.), *The Chartist Experience: Studies in Working-Class Radicalism and Culture, 1830-1860* (Basingstoke: Macmillan, 1982).
- Fawkes, Richard, *Dion Boucicault: A Biography* (London: Quartet, 1979).
- Figlio, Karl, 'What is an accident?', in Paul Weindling (ed.), *The Social History of Occupational Health* (Beckenham: Croom Helm, 1985).

- Friedberg, Anne, *Window Shopping: Cinema and the Postmodern* (Berkeley & Los Angeles, Calif., & Oxford: University of California Press, 1993).
- Gage, John, *Turner: Rain, Steam and Speed* (London: Allen Lane, 1972).
- Turner: 'A Wonderful Range of Mind' (New Haven, Conn., & London: Yale University Press, 1987).
- Gay, Peter, *The Bourgeois Experience: Victoria to Freud* (2 vols., New York & Oxford: Oxford University Press, 1986).
- John Gloag, *Victorian Comfort: a Social History of Design from 1830-1900* (London: Macmillan, 1961).
- Gordon, J. E., *Structures: or Why Things Don't Fall Down* (Harmondsworth: Penguin, 1978).
- Graham-Dixon, Andrew, *A History of British Art* (London: BBC Books, 1996).
- Hardman, Malcolm, *Ruskin and Bradford: an Experiment in Victorian Cultural History* (Manchester: Manchester University Press, 1986).
- Hassard, John (ed.), *The Sociology of Time* (Basingstoke: Macmillan, 1990).
- Helmstadter, Richard J. & Bernard Lightman (eds.), *Victorian Faith in Crisis: Essays on Continuity and Change in Nineteenth-century Religious Belief* (Basingstoke: Macmillan, 1990).
- Hobsbawm, E. J., *The Age of Empire 1875-1914* (London: Weidenfeld & Nicolson, 1987).
- Jarvis, Adrian, *Samuel Smiles and the Construction of Victorian Values* (Stroud: Alan Sutton, 1997).
- Jennings, Humphrey, *Pandaemonium: the Coming of the Machine as seen by Contemporary Observers*, ed. Mary-Lou Jennings & Charles Madge (London: André Deutsch, 1975).
- Jones, Gareth Stedman, *Outcast London* (Oxford, Oxford University Press, 1971).
- Kocka, Wolfgang & Allen Mitchell (eds.), *Bourgeois Society in Nineteenth-Century Europe* (Oxford & Providence, R.I.: Berg, 1993).
- Marvin, Carolyn, *When Old Technologies were New: Thinking about Electric Communication in the Late Nineteenth Century* (New York & Oxford: Oxford University Press, 1988).
- Marx, Leo, *The Machine in the Garden: Technology and the Pastoral Ideal in America* (New York: Oxford University Press, 1964).
- Mather, F. C., *Public Order in the Age of the Chartists* (London: Macmillan, 1966).
- Miller, D. A., *The Novel and the Police* (Berkeley & Los Angeles, Calif.: University of California Press, 1988).
- Mingay, G. E. (ed.), *The Victorian Countryside* (2 vols., London: Routledge, 1981).
- Mitchell, B. R., *British Historical Statistics* (Cambridge: Cambridge University Press, 1988).
- Moore, James R., 'Theodicy and society: the crisis of the intelligentsia', in Richard J. Helmstadter & Bernard Lightman (eds.), *Victorian Faith in Crisis: Essays on Continuity and Change in Nineteenth-century Religious Belief* (Basingstoke: Macmillan, 1990).

- Mumford, Lewis, *Technics and Civilization* (London: Routledge, 1934).
 — *The Myth of the Machine: Technics and Human Development* (London: Secker & Warburg, 1967).
- Neal, Wendy, *With Disastrous Consequences: London Disasters 1830-1917* (Enfield Lock: Hisarlik, 1992).
- Newsome, David, *The Victorian World Picture* (London: John Murray, 1997).
- Olsen, Donald J., *The Growth of Victorian London* (1976; pbk. edn., London: Peregrine, 1979).
- Overy, Richard J., 'The wheels and wings of progress', in Roy Porter & Mikulas Teich (eds.), *Fin de Siècle and its Legacy* (Cambridge: Cambridge University Press, 1990).
- Pearson, Geoffrey, *Hooligan: a History of Respectable Fears* (London: Macmillan, 1983).
- Pick, Daniel, *Faces of Degeneration: a European Disorder, c. 1848-1918* (Cambridge: Cambridge University Press, 1989).
 — *War Machine: the Rationalisation of Slaughter in the Modern Age* (New Haven, Conn. & London: Yale University Press, 1993).
- Poovey, Mary, *Making a Social Body: British Cultural Formation, 1830-1864* (Chicago, Ill.: University of Chicago Press, 1995).
- Porter, Roy & Mikulas Teich (eds.), *Fin de Siècle and its Legacy* (Cambridge: Cambridge University Press, 1990).
- Rabinbach, Anson, *The Human Motor: Energy, Fatigue, and the Origins of Modernity* (New York: Basic Books, 1990).
- Rawcliffe, J. M., 'Bromley: Kentish market town to London suburb, 1841-81', in F. M. L. Thompson (ed.), *The Rise of Suburbia* (Leicester: Leicester University Press, 1982).
- Sachs, Wolfgang, *For Love of the Automobile* (1984; Eng. trans. Berkeley & Los Angeles, Calif.: University of California Press, 1992).
- Seltzer, Mark, *Bodies and Machines* (New York & London: Routledge, 1992).
- Sloan, John, *George Gissing: the Cultural Challenge* (Basingstoke: Macmillan, 1989).
 — *John Davidson, First of the Moderns: a Literary Biography* (Oxford: Oxford University Press, 1995).
- Smith, Crosbie & M. Norton Wise, *Energy and Empire: a Biographical Study of Lord Kelvin* (Cambridge: Cambridge University Press, 1989).
- Sternberger, Dolf, *Panorama of the Nineteenth Century*, trans. Joachim Neugroschel (1955; repr. Oxford: Blackwell, 1977).
- Sussman, Herbert L., *Victorians and the Machine: the Literary Response to Technology* (Cambridge, Mass.: Harvard University Press, 1968).
- Swenarton, Mark, *Artisans and Architects: the Ruskinian Tradition in Architectural Thought* (Basingstoke: Macmillan, 1989).
- Thompson, F. M. L. (ed.), *The Rise of Suburbia* (Leicester: Leicester University Press, 1982).

- Thrift, Nigel, 'The making of capitalist time consciousness', in John Hassard (ed.), *The Sociology of Time* (Basingstoke: Macmillan, 1990).
- Tichi, Cecilia, *Shifting Gears: Technology, Literature, Culture in Modernist America* (Chapel Hill, N.C.: University of North Carolina Press, 1987).
- Treuhertz, Julian, *Victorian Painting* (London: Thames & Hudson, 1993).
- Walton, John K., *The English Seaside Resort: a Social History 1750-1914* (Leicester: Leicester University Press, 1983).
- Weiner, Martin J., *Reconstructing the Criminal: Culture, Law and Policy in England, 1830-1914* (Cambridge: Cambridge University Press, 1990).
- Wells, H. G., *Experiment in Autobiography* (2 vols., London: Gollancz, 1934).
- Wheeler, Michael (ed.), *Ruskin and Environment: the Storm-Cloud of the Nineteenth Century* (Manchester & New York: Manchester University Press, 1995).
- Williams, Rosalind, *Notes on the Underground: an Essay on Technology, Society, and the Imagination* (Cambridge, Mass.: MIT Press, 1990).
- Wilton, Andrew, *J. M. W. Turner: his Art and Life* (Secaucus, N.J.: Poplar Books, 1979).
- Winter, James, *London's Teeming Streets* (London: Routledge, 1993).
- Wrigley, Chris & John Shepherd, *On the Move: Essays in Labour and Transport History Presented to Philip Bagwell* (London & Rio Grande: The Hambledon Press, 1991).

Periodical articles

- Altick, Richard D., 'Varieties of readers' response: the case of *Dombey and Son*', *The Yearbook of English Studies*, vol. 10 (1980), pp. 70-94.
- Baron, L., 'Noise and degeneration: Theodor Lessing's crusade for quiet', *Journal of Contemporary History*, vol. 17, no. 1 (1982), pp. 165-78.
- Baumgarten, Murray, 'Railway/reading/time: *Dombey and Son* and the industrial world', *Dickens Studies Annual*, vol. 19 (1990), pp. 65-89.
- McCoubney, John, 'Time's railway: Turner and the Great Western', *Turner Studies*, vol. 6 (1986), pp. 33-7.
- Sicher, Efraim, 'Acts of enclosure: the moral landscape of Dickens' *Hard Times*', *Dickens Studies Annual*, vol. 24 (1993), pp. 195-216.