The Railway Age

At the beginning of the nineteenth century Europeans were still using the basic forms of transport provided by past civilisations. For the most part locomotion depended upon human muscle, the beasts of burden, and the wind-fueled sail. In many countries large areas remained unexplored, while even in Britain, with its fairly well developed surface communications, travel was slow, arduous and expensive. The main forms of transportation consisted of river and canal navigation, coastal shipping and horse-drawn transport, together with more primitive forms of conveyance.

The nineteenth century transformed the transport and communications system out of all recognition. The spectacular developments in rail transport and steam shipping, and the laying of a network of cables on land and sea did much to reduce the 'tyranny of distance', both within and between countries and continents. By the eve of the First World War Europeans had built a vast network of railways around the world. They had girdled the earth with cables, while the traditional sailing ship dependent on wind power had been replaced by the steam powered vessel.

Britain takes the lead

Given her technical skills, capital resources and advanced state of industrial development, it is not surprising that Britain led the way in the new transport developments. The real beginnings of the railway age are usually dated around 1825-30 when George Stephenson demonstrated his improved locomotive, and the first substantial railway to run entirely on steam, the Liverpool and Manchester, was opened in 1830.

Britain's basic rail network was completed very quickly. Much of the early development was concentrated in sharp bursts of activity in the investment manias of the later 1830s, the later 1840s and the first half of the 1860s. The route mileage in existence increased from a mere 400 in 1836, to 1,500 in 1840, and to over 5,000 a decade later. By then a large part of the country had already been connected with trunk and secondary lines and only south-west England, Wales and the north of Scotland remained virtually untouched. The third phase, culminating in the boom of 1862-5, saw the addition of nearly 9,000 route miles, which included many duplicate feeder and branch lines as well as the construction of railways in neglected parts of the country. The London underground was also begun.

Completing the system

The really dramatic phase of railway building was over by 1870 when the route network amounted to 15,500 miles; two-thirds of the final total of 23,400. Yet much remained to be done in the half-century down to 1914. Although there were only a few major extensions, there were some quite spectacular engineering feats including the Great Western's Severn Tunnel in 1886 and the Tay and Forth Bridges in 1887 and 1890. However, most of the new route mileage went to fill in the gaps of the system. It largely consisted of branch and local lines and cross-country links, many of which served as feeders to the mainline system. Numerous small companies also sprang up to cater for the needs of particular localities, many of which were eventually absorbed by the larger undertakings.

Concentration of control was one of the marked features of the later period. Even by the early 1870s many smaller companies had been absorbed, leaving about 100 major concerns; less than one-third of these controlled the bulk of the route mileage. By 1906 233 of the 351 companies existing in 1881 had lost their separate identity, most of them having been absorbed by the larger undertakings. At the end of the period there remained just over 100 companies, 15 of which accounted for some 84 per cent of the mileage. The magnitude of the concentration movement can be seen from the fact that the companies in existence in 1914 were the combined product of more than 1,100 separately authorised undertakings.

Increasing size and scale did not necessarily result in greater efficiency of operation. In fact, in the later period productivity and cost ratios tended to deteriorate. This was partly because of the companies' reluctance to innovate or to adopt improved methods of working, but it also reflected the fact that many of the later extensions were located in thin traffic areas. Another relevant factor was that many new service 'frills' were being added to attract new customers.

Impact on the economy and society

Recent research has sought to downgrade the role of the railway-, in the economic development of some advanced countries. Nevertheless, it is difficult to visualise the scale of nineteenth century development without them. Indeed, governments readily acknowledged their importance, both on strategic and economic grounds, and not only assisted their construction in various ways but in most cases, (the major exceptions being the USA and the UK) they eventually became the owners of their railway systems. Even in free-enterprise Britain the state played a significant role in regulating the activities of the private companies, including control of their charging procedures.

Almost from the very beginning of the railway age Parliament attempted to limit the powers and activities of the railway companies. Apart from the private Acts of Incorporation which conferred separate powers on each company, numerous committees of inquiry of both Houses of Parliament were set up to investigate various aspects of railway management, while many general Acts were passed to regulate their affairs. Some of these investigations led to fresh legislation which attempted to circumscribe the powers and limit the freedom of the rail companies. By 1914 the railways had become the most regulated form of economic activity with over 200 general acts having been passed to control them. Parliament's main concern was to protect the interest of the railway users from monopolistic tendencies on the part of the large companies.

Their strategic role was perhaps most evident in Europe during the First World War, but in the nineteenth century their main contribution was an economic one. If recent work has tended to modify the exaggerated claims of earlier writers on the railways' contribution to economic growth, few would deny their significance in this context. Their impact was probably greater than any other single innovation, though obviously it varied from country to country. We know that Britain's early industrialisation was achieved without the help of the railways so that many of the pre-existing patterns of settlement and industrial location were simply reinforced by the new form of transport. One scholar has gone so far as to argue that, 'many of the changes which have traditionally been ascribed to the railways - coalfield industrial concentration, regional agricultural specialisation, the destruction of small markets, suburban growth and the development of resorts - were already in motion in the eighteenth century, encouraged by the modernisation of road transport and public highways' [8].

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On the other hand, when they did arrive, the railways opened up vast new opportunities. It is difficult to conceive any alternative form of transport that would have moved the vast volumes of freight and passengers which the railways conveyed in the nineteenth century. (See Table 1). Certainly, this would not have been at the same speeds and degree of regularity. Even as early as the 1840s, with speeds in excess of 35mph compared with the 10mph maximum by coach, the railways had effectively shrunk the country’s geographical space to between one-third and one-fifth of its former scale. (See Figure 1).

Thus, fast trains could do the journey from London to Norwich in four and a half hours as against twelve hours by coach or to Liverpool and Manchester in seven hours compared with thirty or more by road. Even greater differences emerged when rail speeds doubled on average in the course of the next half century. By the 1880s it was possible to go from London to Edinburgh in about 10 hours whereas the journey had taken more than 69 hours in the heyday of the coaching era. Moreover, the cost by rail proved to be very much cheaper than by alternative modes, even more so when the time savings are taken into account. On average the cost of transportation by land was more than halved during the course of the nineteenth century.

### Table 1: Growth of Railway Traffic in Great Britain

<table>
<thead>
<tr>
<th>Year</th>
<th>Passengers</th>
<th>Freight</th>
</tr>
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<tbody>
<tr>
<td>1842</td>
<td>24.7</td>
<td>5.5</td>
</tr>
<tr>
<td>1850</td>
<td>72.9</td>
<td>38.0</td>
</tr>
<tr>
<td>1860</td>
<td>163.4</td>
<td>89.9</td>
</tr>
<tr>
<td>1870</td>
<td>322.3</td>
<td>166.5</td>
</tr>
<tr>
<td>1880</td>
<td>596.6</td>
<td>231.7</td>
</tr>
<tr>
<td>1890</td>
<td>796.3</td>
<td>298.8</td>
</tr>
<tr>
<td>1900</td>
<td>1114.6</td>
<td>419.8</td>
</tr>
<tr>
<td>1912</td>
<td>1265.2</td>
<td>513.6</td>
</tr>
</tbody>
</table>

Alternative modes of transport were by no means totally eclipsed with the coming of the railways. Canals and railways, it is true, went into decline, with many of the canals being taken over by the railway companies. Coastal shipping, in contrast, remained resilient throughout the nineteenth century and, on some sea routes - notably along the East Coast - it proved to be a serious competitor to the railways. In fact, when measured in ton-miles, coastal shipping performed more work than the railways and canals combined, because of the much greater length of the haul by sea. [21] Long-distance road transport was badly hit, but short-haul operations received a new lease of life, through the provision of feeder services to railheads.

### Economic consequences

How crucial were the railways to the Victorian economy? This is a frequently debated question, but one which still lacks a def initive answer. This is partly because the research task is so great that many avenues still remain imperfectly explored. Research work during the last two decades has done much to improve our knowledge of the quantitative side. On the social implications, and the social costs, of the railways much still remains to be done.

(i) **Investment demand**: The first approach is basically an eclectic analysis of the impact of railway investment and the inter-industry linkages flowing from them. By 1870 the railway companies had raised some £170 million of capital. Much of this investment was concentrated in the boom years of construction activity with cyclical peaks in the later 1830s, 1847 and 1865-6. In the first of these, railway investment accounted for about 2 per cent of national income, and 67 per cent in 1847, or over half of total domestic investment. During the 1850s its importance declined only to rise again in the first half of the 1860s to around 2.5 per cent of national income, or about one third of total domestic investment.

These are not insubstantial figures, but it should be remembered that the maximum impact tended to be confined to a relatively short span of time. This is borne out by the orders for materials and equipment such as iron, coal, timber, bricks and engineering products, all of which tended to be heavily concentrated around the peak years of activity. The latter half of the 1840s was clearly the dominant period for orders, when one-third or more of pig iron production found its way into the railways directly or indirectly, as did 7-8 per cent of coal output, 20-30 per cent of brick production and 20 per cent of the consumption of output of iron engineering products. At the peak of the construction phase about 4 per cent of the male labour force was employed on building railways.

Thus if the railways did dominate the investment scene it was only for a relatively short space of time. They continued, of course, to be large consumers of materials and employers of labour throughout the nineteenth century and they still accounted for about 10 per cent of all investment at the end of the period. By then however, they had ceased to be a really significant force in the economy.

(ii) **Social savings**: A second approach involves an attempt to provide a more precise measurement of the contribution of the railways to the economy. Following the pioneering work of American scholars, Gary Hawke attempted a counter-factual analysis of the social savings derived from the railways in England and Wales for the year 1865. [5] His chief objective was to determine how far the economy depended on railways, or to what extent the national income of that year could have been attained without the presence of railways. The social savings calculation therefore attempts to measure the difference between the actual costs of shipping goods and passengers by rail in the year in question and the alternative cost of freighting the same traffic by alter- native modes in a hypothetical non-rail environment. In other words this calculation is similar to the more familiar cost-benefit exercise of ten used in modern studies: for example, building a new road by closing a railway line, but it is done after the event rather than before. Had the latter been applied to railway investment at the time the alternative use of resources would have had to be considered. Additionally, Hawke also considered the linkages from railways to other sectors of the economy to see if these rendered further gains beyond those picked up in the social savings calculations.

Let us look first at the main results. Substituting canals for freight, and coaches for passengers, Hawke estimated for England and Wales rail savings of just over 4 per cent of national income for freight. That for passenger transport was estimated at between 2.6 and 71 per cent, depending on the assumptions made about the quality and comfort of travel by alternative mode. Overall he favoured an upper-bound estimate of 22 per cent for total social savings, which he regarded as significant statistically. He attempted to pick up externalities in his calculations. By this he meant gains which might be available to the economy as a whole even though they could not be charged for by the railway companies. Hawke thus made a detailed investigation into the possible indirect repercussions on other industries, on the labour force, technology and productivity, as well as the influence of railway pricing policy. However, he found little need to make much additional allowance for these so that, in the absence of the railways, the loss to the national income would not have been much greater than 11 per cent.

Since publication the results and methods of analysis have been subject to intensive debate and criticism. The findings have been compared with the results of similar exercises for other countries [7] despite the fact that few of the studies are directly comparable because of a bewildering mix of methods, conclusions and interpretations. [10] They have also been used by different scholars to confirm or refute the central role of the railways in Victorian Britain. Often this is a matter of personal judgement, but one crude pointer to illustrate their significance is to compare them with one of the largest sectors in the Victorian economy, that of building and construction. This sector never accounted for more than 4 per cent of national income and the economy-wide linkages scarcely exceeded those of the railways.

The findings may be difficult to interpret or compare, but what of the results themselves? Do they stand up to detailed scrutiny? Without reworking all the data or testing the assumptions, it is impossible to reject the findings out of hand. Nevertheless, there are several points which give grounds for concern.

There is the question of what might have happened to alternative modes of transport in a non-rail situation. Hawke does not, for example, hypothesise what might have transpired in a world without railways, as Fogel did for the United States. We can reasonably assume that alternative transport modes would not have remained static. More resources would no doubt have been devoted to improving waterways, coastal shipping and road transport. Feasible extensions to...
existing networks and improvements in efficiency could have resulted in falling costs and therefore offset some of the gains from the railways. This is less fanciful than it might appear at first sight. For example, by the early 1830s steam carriages had been developed to the point where they offered one of the cheapest and quickest forms of travel over shorter distances. Had the railways not appeared, it is conceivable that even greater improvements in road transport would have subsequently transpired. One may reflect that a century later the electric car was aborted by the supremacy of the internal combustion engine.

Doubts may be raised about the data used in the analysis. Much is derived from fragmentary scraps of evidence or by extrapolation from single ‘authoritative’ estimates, which makes it less than robust for the purpose in hand. In the case of freight traffic, for example, cost figures of only two canals are considered; the Leeds and Liverpool, and the Kennet & Avon, and these range from 0.12d to 0.6d per ton mile, from which a composite figure of 0.4d per ton mile is derived. It is assumed that costs remained constant throughout time and for all commodities so that for each year the cost multiplier is the same for all traffic. Only canal transport is considered as an alternative to rail, but some freight went by road and sea where costs varied considerably compared with those of the canals.

Similar problems arise in the cost calculations for passenger traffic. Again the cost data for coach travel are based on very selected evidence. Two sources only are used, those of Lardner and the Royal Commission on Railways of 1867. The former equated first-class rail with inside coach travel, and second and third class with outside coach travel, but the relevant rates are not specified in detail. The Royal Commission equated first class rail with ‘posting’ at a cost of 2s per mile, second class with inside coach travel, and the rest with outside coach travel at 4d and 2½d per mile respectively. Apart from the crudeness of the data employed, it is questionable whether the corresponding classes between rail and coach are correctly specified. It may be argued that all forms of rail travel were superior in speed and comfort to any by road. In addition, no allowance is made for productive time savings by rail which would raise the upper-bound estimates for social savings.

Intangible factors

While the railways may never be the same again since the advent of the counterfactual historians, critics may take heart from the agnostic view of one recent writer. He argues that, ‘to look for the relationship between railways and economic growth requires a consideration of many factors which defy precise measurement such as the influence of the railways on engineering techniques and civil engineering, their impact on the capital market as mobilisers of savings on a vast scale, giving rise to dispersed share ownership and provincial stock exchanges, their influence on business organisation, management techniques and enterprise, their management of large scale labour forces, the development of professional services and skills and a host of other intangibles. It is true that he did consider several externalities but was rather dismissive of their impact possibly because of the difficulties involved in measurement.

Concentration on the purely economic side does less than justice to the enormous influence the railways had on society as a whole. In terms of mobility and choice they added a new dimension to everyday life. They broke down regional and local barriers, they transformed the means of literary as well as physical communication, and they provided many people with their first taste of travel over distance. Suburban commuting and seaside jaunts may not have originated with the railways, but both were given an enormous boost by their advent through special concessionary fares. [9] Travel was no longer the preserve of the wealthy as it had been in the coaching era. Similarly, the marketing of agricultural produce and perishables, especially meat, fish, milk and vegetables, was transformed out of all recognition, while the structure and pattern of retailing changed significantly. Yet not all change was always for the better. The railways had both positive and negative aspects. They accelerated the decline of many village handicraft industries and local trades, local fairs and markets ceased to have the same significance as the sphere of influence of the cities widened, while new patterns of retailing emerged which threatened the livelihood of the small proprietor. H.G. Wells, in his Experiment in Autobiography (1937), recalled how his father’s china shop at Bromley was undermined by the suburban railways which made it easier for customers to shop in London and for the larger London stores to compete with local traders. Even worse, it seems, the seaside towns were fast losing their respectability. As early as 1845 one local historian lamented the fact that the railway had robbed Scarborough of its ‘genteel exclusiveness and brought a new host of invaders who are the inhabitants of murky and densely populated cities seeking to restore their sickly frames to health and vigour by frequent immersions in the sea.

All in all, very few activities or interests were left untouched by the age of steam. For this reason, as Fogel points out in the American context, ‘No evaluation of the impact of railroads on development can be complete without a consideration of the cultural, political, military and social consequences of such an innovation.’ [3] Despite his reevaluation of the economic impact of American railroads, he still believes that nineteenth century advances in transportation technology deserve the title ‘transportation revolution’. Indeed, until the arrival of motor transport no other innovation had such a pervasive influence on economy and society. But as with that later innovation, the railways too had their darker side; nowhere was this more obvious than on the urban landscape and the configuration of cities.

Cities and social costs

The popular image is of the railway-created or railway-dominated town: Shildon, Crewe, Swindon and Wolverton as important junctions and railway workshops: Barrow-in-Furness and Middlesbrough

Aldcroft, Refresh 13 (Autumn 1991)
which were nothing until the railway came: the many seaides towns which breathed new life when they secured rail links with the hinterland. For the most part, the railways brought benefits to the local inhabitants with only limited violation of the physical landscape. But in the major cities it was quite a different matter. Here the railways had a destructive role as well as a creative one.

The railways had a greater influence on the configuration of Victorian cities than any other form of economic activity. Their land-use requirements were sufficiently large as to cause serious upheaval and social disruption to the inner zones of the older cities. Kellett has estimated that between 5 and 9 per cent of the central zone land area of London, Birmingham, Liverpool, Manchester and Glasgow was acquired for use by the railways. [6]

In the process of building their urban networks, the railway companies virtually dissected many of Britain’s major cities, resulting in severe social costs for those unfortunate enough to get in their way. For obvious reasons the railways took the line of least resistance when planning their routes and locating their terminals and thus concentrated on the populous working-class residential areas. The inhabitants were poor and powerless and had neither the ability nor the resources to secure redress. At best they might manage to lay claim to derisory compensation for eviction. Until 1874 the companies had no obligation to provide alternative accommodation for tenants of houses destroyed, and even then they usually managed to flout the law. Estimates for Glasgow and London suggest that the numbers of residents displaced following the demolition of property by the railways were in the region of 20,000 and 120,000 respectively. For the country as a whole, the total may well be in the region of half a million, when the tally for all cities and towns is complete.

Where did they all go? Certainly not to the more salubrious suburbs. They had neither the time nor the money to take advantage of such opportunities since many depended on casual labour in the city centres. Virtually their only refuge was to decant into nearby twlight zones created by the railways, thereby exacerbating the problems of overcrowding in the adjacent districts of the inner city areas.

Thus, if the railways removed at one go some of the worst slum properties in the city centres, they also helped to create new slum zones in the overspill areas through which they passed. Prospects for betterment were minimal given the abject poverty of the inhabitants. Moreover, because of the configuration of the railway network, residents in these areas were often trapped within their confines, lacking ready access to amenities and communication with the centre. Thus in Agar Town and Somers Town in North London, in Manchester’s Ancoats, Birmingham’s Saltley, Glasgow’s South Laurieston and Liverpool’s South Scotland and Vauxhall wards, residents were huddled together in cramped and drab quarters hemmed in by industrial premises and the approach lines to the railway termini. Each one in its turn became a derelict slum area, where residential betterment were minimal given the abject poverty of the inhabitants.

Cities also faced another big problem with the coming of the railways, namely vastly increased street traffic and congestion. Not all non-rail transport shared the fate of the canals and long-distance coaching services. For the railway generated an enormous amount of urban traffic as the main city termini became the chief focal points for cab and omnibus traffic as well as delivery and collection points for goods vehicles. Without such feeder services the railways could not have functioned properly and in every major city there was a marked increase in street traffic following the arrival of the railways. In Glasgow, for example, the number of cab stands rose five-fold in the two decades after the opening of the passenger terminals, while in London the number of hackney carriages and omnibuses more than doubled in the 1830s and 1840s. The problem steadily increased during the nineteenth century as rail traffic expanded. Though the volume of street traffic may appear small compared with contemporary standards, one has to remember that much of it was concentrated in urban areas that were far from conducive to ease of movement. Moreover, horse-drawn vehicles, because of their length, bulk and unpredictable nature of the traction power, required far more space for manoeuvre than motorised equivalents, so that their capacity for causing congestion was far greater. They were also great polluters of the streets. It is ironic that at this time the motor vehicle was heralded as the saviour of the city’s traffic problems.[1]

Railways may not have been crucial to Britain’s early industrialisation but they were certainly of more than marginal significance in the mid-Victorian economy. The railway age was far more than one of economic numbers however. Railways transformed the whole fabric of society and very little was left untouched by their advent. The qualitative aspects of their influence may be difficult to measure but this does not mean that they are of less importance. Nor should one forget the costs involved when making up the historical balance sheet: if the majority of people stood to gain from the railways, there was a hapless minority who suffered immiseration.

References


