Future Demand
The motor car and the construction of a new world
November 2014
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Geoff Dudley

November 2014

An article prepared for the New Zealand Ministry of Transport as part of its Future Demand project.

This paper is presented not as policy, but with a view to inform and stimulate wider debate.
Introduction

The rapid development of the motor car in the early years of the Twentieth Century depended not only on technological developments, but also on perceptions about the value of personal mobility. This dual track enabled it to move from a niche as a ‘horseless carriage’ to a mass-produced vehicle that could fulfil the individual travel needs of all sections of society. As the popularity of the car increased, so the triple interlocking systems of vehicle manufacture, public use, and infrastructure construction achieved great economic and political power and influence. This meant governments generally framed issues in terms of the value of individual mobility and the economic interests of the motor industries. Over time, through the evolution of patterns of mobility, the motor car reshaped society in terms of promoting longer commuter distances and the associated growth of suburbs. Fulfilment of the dream of personal and flexible mobility allowed consumers to overlook disadvantages such as safety issues and road congestion; but by the 1950s, particularly in urban areas, these problems were becoming more politically salient. From the 1960s, it was not so much that the benefits of personal mobility were seriously challenged or undermined, but that people came to understand that the dream sold in the earlier years of the century had fractured, and could not be restored in its original form.

The fulfilment of individual needs

In the first half of the twentieth century, the motor car moved far beyond attaining a position as the dominant transport technology, to pervade all aspects of society. In doing so, it had profound economic, industrial, social, political, environmental and spatial impacts. Thus by meeting a wide variety of human needs, it shaped behaviour to such a degree it changed not only the physical environment in a major way, but also people’s perceptions and expectations of what was feasible in this new world of mobility. At the heart of the phenomenal success of the car was therefore the crucial connection made between a piece of transport technology and the potential new flexibility and freedom it offered to the average individual. As Lyons comments, the motor car enabled an individual a potent element of independence in terms of locations they could reach and the times they chose to do so. Such independence and the accessibility it afforded had great prospect for opportunity in economic and social terms (Lyons, 2014, 3). The powerful effects of this new individual mobility were so great that even when the disadvantages of the car became apparent, such as safety concerns and problems of road congestion, they were generally perceived as the unfortunate price that had to be paid for the great advantages bestowed by the car, rather than a reason to fundamentally restrict and regulate car use and ownership.

Yet at the beginning of the twentieth century, the radical impact of the motor car would have seemed inconceivable to most sections of society. Barely recognisable when compared with the mass-market vehicle it was to become within a period of a few years, it appeared an obscure and limited niche (Geels et al, 2012, 335–73) form of transport, restricted to a small band of enthusiasts who were generally drawn from the better off sections of society. Its depiction as ‘the horseless carriage’ illustrated both its apparent technological limitations and the perception that, as a means of mobility, it represented a pale imitation of the animal that had dominated road transport for centuries.
Consequently, how could this slow and cumbersome vehicle challenge the technology of the rail industry which had developed so rapidly and revolutionised travel and perceptions of time and distance in the Nineteenth Century?

Thus the phenomenal development of the motor car represents one of the most dramatic illustrations of the fact that we can never assume a future characterised by linear and incremental change. Radical discontinuities do occur and sweep through society with an apparently unstoppable force that irrevocably changes the world we have known. In this context, it is nevertheless also important to note the basic concept of a powered vehicle was far from a new one. For example, the first steam-powered vehicle was constructed in the eighteenth century. It was the development of the petrol fuelled internal combustion engine that provided the vital technological breakthrough and gave the vehicle a power and flexibility that offered scope for further development. Even then, it was not certain the internal combustion engine would triumph over steam or electric power. However, once a few visionary individuals, most notably Henry Ford, spotted the commercial potential of the internal combustion engine and first designed and manufactured a mass-market motor car in the early years of the Twentieth Century, it was able to emerge from the ‘horseless carriage’ niche and be seen for the first time as a modern form of transport with huge potential.

Significantly, in the early years, the development of the car resulted from international cross-learning processes between Western Europe, where the modern car was first developed (principally in Germany), and the United States, which first exploited its commercial potential, and so became the first country where the phenomenon of mass car ownership produced a new way of life. Nevertheless, although the car developed in distinctive ways within different national cultures and physical environments, the mutual learning processes across national boundaries helped to stimulate and reinforce the rapid spread of the vehicle. Cross national learning processes can therefore be powerful instruments of change, where new ideas can be carried forward in one place and then transferred and developed further in other locations.

Similarly, over time the mutually reinforcing systems of car manufacture, the development of mass ownership and the supply and infrastructure industries supporting them, such as fuel, vehicle maintenance and roads, became enormously powerful economic forces in terms of employment, use of resources and a source of tax revenues. In turn, this gave the spectrum of motor industries influential political power in that, although governments might seek to regulate the industry, they had little choice but to accommodate it and so generally promote the further development of the ‘golden’ connection between the motor car and the desire of the individual for a means of personal and flexible mobility.

The next section will outline how the motor car first began to escape from its ‘horseless carriage’ niche. The following sections then briefly describe the early development of vehicle mass production, followed by the evolution of the hugely economically and politically powerful motoring industries; their ability to overcome obstacles over time; and their influence in shaping urban society.
The concluding section briefly examines the 1963 report in Britain *Traffic in Towns*, in the context of its symbolic role as a dividing line between overwhelmingly positive perceptions of the new world created by the car and a growing awareness of its disadvantages.

**The initial escape from the ‘horseless carriage’ niche**

Viewed in retrospect, there might appear a sense of inevitability about the development of the modern motor car, yet it depended crucially on a complex interrelationship between technological, economic, social and political factors. There were many obstacles to be overcome, which involved not only vehicle technology itself, but also public perceptions concerning mobility and the most efficient means of travel. For example, a basic problem was that the development of rail meant that few people had experience of inter-urban road travel, and by the second half of the Nineteenth Century, the public highways had largely fallen into disuse. The dominance of rail also entailed a communal travelling experience, so that few could appreciate the concept of individual and flexible mobility. In this context, the development of the bicycle as a popular mode of transport in the 1880s represented a watershed. Fitted with pneumatic tyres, for the first time since the rise of the railways the roads were crowded with through traffic, and for perhaps the first time ever, the idea was born of travelling by road for pleasure (Plowden, 1973, 6).

The popularity of the bicycle therefore paved the way for fresh modes and perceptions of travel, but at this time the evolution of mechanised road transport was in a confused state, with steam, electric, gas and petrol powered vehicles all being developed. It was steam power that had the longest lineage, and as early as 1769 the Frenchman Nicolas Cugnot produced the first mechanically powered automobile. Weighing two tonnes and apparently capable of running at two miles per hour, in 1771 it unfortunately crashed and demolished a wall and its development was discontinued (Parissien, 2013, 4).

In the end, it was the railways that would be the chief beneficiaries of developments in steam power. The public suspicion about the safety of steam powered road vehicles is illustrated in the case of Britain where the Highways and Locomotives Act of 1878 stated that any mechanical vehicle using the public roads should be preceded by a man on foot and should go no faster than four miles per hour. In the event, the repeal of this Act in 1896 was an early indicator that perceptions were shifting about the potential for mechanised road travel (Plowden, 1973, 3).

The chief cause for these shifting perceptions arose from the development of the petrol powered four-stroke internal combustion engine. The first petrol powered internal combustion engine was produced in 1859 by the Belgian Etienne Lenoir, but the crucial breakthrough came in 1885 when the German engineer Karl Benz produced the first petrol powered motor vehicle. Perhaps just as crucially in terms of public perception, in 1888, Benz’ wife Bertha took the vehicle on the first long-distance car trip, a 65 mile journey from Mannheim to Pforzheim. Interest in the vehicle grew and in 1894 Benz sold 136 of his Model 3s (Parissien, 2013, 3).
Complementing the work of Benz, in 1890, Gottlieb Daimler and Wilhelm Maybach founded a company in Germany, Daimler-Motoren-Gesellschaft (DMG), to build and sell petrol engines. In 1898, a Daimler car used the first ever four-cylinder petrol engine (Parissien, 2013, 5–6). The growth of Daimler therefore indicated that, for the first time, the motor car was beginning to emerge from its hitherto obscure niche. However, it would be in the United States where it would free itself fully from its ‘horseless carriage’ image. As Wells argues, most early commentators on horseless carriages fell into one of two broad groups, the ‘horse-minded’ who compared motor vehicles specifically to horses and the ‘mobility-minded’ who compared them to all other forms of transportation (Wells, 2007, 500).

It would be the victory of the ‘mobility-minded’, through developments in vehicle design, that would make the breakthrough to the modern era of motor car domination. In this context, and ironically in view of later awareness of its true environmental impacts, it is important to note that, in replacing the horse and the dirt it left on the streets, the motor car was initially seen as bringing great environmental and health benefits in ‘cleaning up’ cities and towns. At the time, therefore, it was the ability of the petrol engine to combine speed with fuel availability that gave it a decisive advantage over steam and electricity. In the case of the former, steam power could never match petrol for speed, while the availability of power points to recharge batteries inhibited the development of electric vehicles. A further irony here is that, in the Twenty-First century, when electric vehicles are coming back into fashion, chiefly for environmental reasons, the limited availability of charging points combined with their restricted range between charging, remain key problems in inhibiting their ability to truly challenge petrol power.

**Henry Ford and the making of the modern world**

Although the development of the modern motor car depended on a wide range of factors over space and time, the role of one individual, Henry Ford, cannot be overestimated as one of the principal agents in the creation of the modern Twentieth Century world. In manufacturing his Model T on a hitherto undreamed of scale by means of the assembly line, and making it available to a mass market at a reasonable price, Ford finally transformed the motor car from its ‘horseless carriage’ niche and sold the dream of individual and flexible mobility to all sections of society. As Geels and Kemp note, views and perceptions about the ‘horseless carriage’ gradually changed when people gained more technical and user experience. Consequently, from a ‘fit’ with the horse-based engine, cars were moving towards ‘stretch,’ that is, articulating their own technical and user principles. Thus where early cars were usually driven by a chauffeur and used for entertainment and leisure purposes, the Model T as a new technical form brought about more utilitarian types of use, initially by farmers, doctors and taxi drivers, followed by suburban residents who began using cars for commuting (Geels and Kemp, 2012, 63).

The key to Henry Ford’s revolutionary success resided in his vision that a relatively lightweight vehicle could provide powerful horsepower at a reasonable price. As he noted in 1906, the vehicle needed to be in every way an automobile and not a toy, and most important of all, one that would not be a wrecker of tyres and a spoiler of the owner’s disposition (quoted in Wells, 2007, 518). He achieved
these aims with the Model T, which first appeared in 1908. The Model T was smaller than many of the cars available at the time, but it was manufactured in a lightweight but durable steel that gave it a combined reliability, speed and flexibility that no other vehicles could match. It was therefore popular with not only American farmers, but also those wanting a vehicle for long distance leisure driving. By 1914, the Model T had captured 45.6 percent of the US market for new passenger vehicles. By successfully applying a one-size-fits-all approach to a machine that had previously been defined by its variety, it had accomplished something no other motor vehicle design had hitherto accomplished (Wells, 2007, 521–2). Sales were also boosted by reductions in price, so that in 1912, the Model T’s price, which had started out at $825, fell to just $575. This meant that, for the first time, a car cost less than the average annual wage (Parissien, 2013, 14).

From 1914, Ford began to produce the Model T on the first modern moving assembly line, which boosted production and sales even more. As Parissien notes, this mass production spelled the end of the primacy of the skilled worker in the automobile industry. Ford enthusiastically adopted modern time-and-motion techniques. Workers were well paid but had to conform to the disciplines of the assembly line (Parissien, 2013, 16–17). It is therefore important to emphasise that the success of the Model T not only encompassed its impacts on the consumer. By the 1920s, the vehicle manufacturing industry was becoming a major force in the economy in terms of employment and wealth creation. The enormous power, both economically and politically, of the interconnecting motor car systems, was beginning to be felt. In the United States, this was perhaps most evident in Detroit being designated the first ‘motor city’ because of its rapid development as a centre of motor manufacture.

The innovative manufacturing techniques developed in the United States placed that country far ahead in terms of exploiting new markets, but by the 1920s other countries were beginning to learn from the US experience and set about meeting the increasing demand for cars. For example, in Britain in 1921, the Austin Motor Company introduced its Austin Seven. In many ways the British equivalent of the Model T, production of the Austin Seven grew rapidly in the 1920s as new models were introduced and prices fell accordingly. As real incomes grew during the 1930s, these small but efficient cars became more widely available to different sections of society, so that by the outbreak of the Second World War in 1939, over three million mechanically propelled vehicles were in use in Britain compared with just over 330,000 in 1919 (Dyos and Aldcroft, 1974, 358). Nevertheless, the continued US dominance is indicated in that in 1950 the US made 75 per cent of the world’s cars, with most of these staying at home. Car ownership in the US rose from 45 million in 1949 to 119 million in 1972. In this context, Table 1 indicates the growth of vehicle ownership rates in the United States per 1000 of the population since 1900. It illustrates how ownership grew rapidly in the early days of the Model T between 1910 and 1920, but also in the three decades after the end of World War Two in 1945. As Parissien comments, by the 1950s, everyone wanted a car and motoring seemed to offer limitless possibilities and few drawbacks (Parissien, 2013, 186–7).
Table 1 (from Davis et al. 2011, Tables 3.3 and 3.5).

<table>
<thead>
<tr>
<th>Year</th>
<th>Vehicles per 1000 people</th>
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<tbody>
<tr>
<td>1900</td>
<td>0.11</td>
<td>1940</td>
<td>245.63</td>
<td>1980</td>
<td>710.71</td>
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<tr>
<td>1905</td>
<td>0.94</td>
<td>1945</td>
<td>221.80</td>
<td>1990</td>
<td>773.40</td>
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<tr>
<td>1910</td>
<td>5.07</td>
<td>1950</td>
<td>323.71</td>
<td>2000</td>
<td>800.30</td>
</tr>
<tr>
<td>1920</td>
<td>86.78</td>
<td>1960</td>
<td>410.37</td>
<td>2007</td>
<td>843.57</td>
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<tr>
<td>1930</td>
<td>217.34</td>
<td>1970</td>
<td>545.35</td>
<td>2009</td>
<td>828.04</td>
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</tbody>
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Similarly, Table 2 illustrates how worldwide vehicle registrations more than quadrupled between 1960 and 1990, although this percentage rate of growth has tended to slow since 2000.

Table 2 (from Davis et al. 2011, Tables 3.1 and 3.2, and Davis et al. 2012, Tables 3.2 and 3.3).

<table>
<thead>
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<tbody>
<tr>
<td>Car registrations (1)</td>
<td>98,305</td>
<td>193,479</td>
<td>320,390</td>
<td>444,900</td>
<td>548,558</td>
<td>617,914</td>
<td>684,570</td>
<td>707,764</td>
</tr>
<tr>
<td>Truck and bus registrations</td>
<td>28,583</td>
<td>52,899</td>
<td>90,592</td>
<td>138,082</td>
<td>203,272</td>
<td>245,798</td>
<td>295,115</td>
<td>307,497</td>
</tr>
<tr>
<td>World total</td>
<td>126,888</td>
<td>246,378</td>
<td>410,982</td>
<td>582,982</td>
<td>751,830</td>
<td>863,712</td>
<td>979,685</td>
<td>1,015,261</td>
</tr>
</tbody>
</table>

Note (1) Car registrations do not include US light trucks (SUVs, minivan and pickups) that are used for personal travel. These vehicles are accounted for among trucks.
Overcoming obstacles and the consolidation of the motor industries

Although to the 1950s car owner it might have appeared that motoring had few drawbacks, as we noted earlier, to a significant extent this reflected both the perceptions of the driver to overlook disadvantages in the light of the attractions of personal mobility, and the ability of the gathering power of the motor industries to wield political influence and minimise regulatory controls. For example, from the early days of the motor car, there was significant public concern about safety issues and the number of road casualties. As Plowden describes in the case of Britain, by the 1920s the basic need was to control the increasingly ubiquitous and fast moving vehicle and to limit the damage that it caused, whether to person or to amenity. This problem had several aspects, such as the control of speed, noise or vehicle lighting. There was also the further question of how to protect individuals against the consequences of motor cars, for instance by insuring them against injury (Plowden, 1973, 117).

In Britain the 1903 Motor Car Act had set a speed limit for vehicles of 20 miles per hour, but by the 1920s this was completely outdated, with almost all vehicles capable of speeds above 50mph. The result was that the limit was enforced only irregularly. There was increasing public concern that the car was literally running out of control and that more realistic speed limits needed to be introduced and enforced more rigorously. These concerns heightened as road deaths rose from 4,886 in 1926 to 7,300 in 1934 (Plowden, 1973, 119).

Yet successive governments appeared extremely reluctant to legislate and upset the growing and increasingly powerful motoring organisations such as the Automobile Association and the Royal Automobile Club, which were campaigning vigorously for the speed limit to be abolished altogether. In 1928, Lord Cecil introduced his own Road Vehicle Regulations Bill aimed specifically at reducing road casualties and included proposals for differential speed limits for each class of vehicle. However, Cecil received little support for his proposals from the government. He later declared himself amazed at the number of pro-motor associations which had given evidence against the Bill to a Select Committee, all saying, in his words, pretty much the same thing: “Whatever you do, don’t touch the motor trade...It is far more important that we should make our money than that people should be safe” (quoted in Plowden, 1973, 141). In the event, the motoring organisations won the day and the 1930 Road Traffic Act abolished the speed limit. However, in 1935, in response to the rising numbers of road deaths, a 30 mph limit was introduced in built up areas where it was considered appropriate. It was only thirty years later, in 1965, that a general speed limit of 70 mph was introduced.

The case of Britain and speed limits illustrates the ability of motoring interests to frame issues in a manner that emphasises the importance of individual mobility. It was not that these interests could guarantee to win every battle, as issues of vehicle and driver safety and regulation could not indefinitely be overlooked by governments, but over long periods of time they could be confident that the huge potential political power of mass car ownership would carry crucial influence. This is also illustrated importantly in the case of roads, which inevitably complemented the issue of the growth in
car ownership. As noted earlier, in the Nineteenth Century the roads fell into disuse, so that from the early days of the Twentieth Century there was concern in both Europe and the US about the durability of the roads to carry the new vehicles and therefore how their reconstruction (and the construction of new roads) would be financed.

In Britain, the initial solution was to create a Road Board in 1910 that would distribute motor taxation revenues for road maintenance and improvements. However, this apparent triumph for motor interests proved ineffective and little of the revenue was actually spent on roads. The Road Board was wound up in 1920, and even worse for the motoring groups, from 1926 the Road Fund was appropriated for general expenditure (Hamer, 1987, 31). For the next thirty years, motoring and construction interests lobbied regularly for a significant increase in roads expenditure, but with little success. It was only in the late 1950s, as a post-war consumer boom was gaining momentum, that government made a major commitment to commence construction of a motorway network, funded by the taxpayer (Dudley and Richardson, 2000, 82–110).

Other countries in Europe were well ahead of Britain in major road construction. In particular, in Italy from the early 1920s, plans were put into practice to build major roads, called autostrade, exclusively for use by motor vehicles. The first of these, 80 kilometres of road in the Milan area, was opened in 1924. Over the next decade seven more autostrade were constructed, financed by state subsidised companies. The motorway idea was taken up by the Nazi government in Germany in the 1930s, particularly as a means of reducing unemployment. By 1939, some 3,200km of autobahnen were in use with 2,000km under construction and a further 3,300km planned (Charlesworth, 1984, 12–13). The German government was anxious to develop a motor car to match the rapid development of the autobahnen. In 1938, Chancellor Adolf Hitler unveiled the first production ‘people’s car,’ the Volkswagen, at the Berlin Motor Show. Even before that, car ownership in Germany doubled between 1934 and 1938 (Parissien, 2013, 116–24).

In Nazi Germany, the link between mass car ownership and road construction was particularly stark. It is perhaps not surprising that in the United States, the home of mass car production, the link with major roads expansion developed more incrementally. Nevertheless, from 1913, work had begun on what was to become the east-west Route 66. By 1924, the first cross-national road, the Lincoln Highway, was largely complete. Nevertheless, it was 1944 before the federal government passed a Highways Act to promote a federally funded network of superhighways. Highway construction increased significantly in the years following World War Two and was further stimulated in 1956 with the commencement of interstate highways funded from taxes on gasoline. Significantly, President Eisenhower told the American people that there was no choice but to embark on such an ambitious road building programme if Americans wished to keep their nation great (Parissien, 2013, 191).
Shaping society and the urban transport question

It was inevitably in urban areas that the new world of mass mobility would come up against basic restrictions of space to accommodate all these vehicles. This process tended to have a momentum of its own, for as car ownership increased, it allowed people to live further from their work in the expanding suburban areas. However, in turn this inevitably made people more dependent on their cars for commuting. This growing tide of vehicles somehow had to be accommodated on urban streets generally not designed for such numbers. Over time, therefore, there was a tendency for work and recreation developments to take place on the periphery of urban areas, where there was more room to accommodate the car. Perhaps inevitably, these developments were first evident in the United States, where mass car ownership had great impacts on the way of life. Thus Parissien describes how, between 1945 and 1954, nine million Americans moved to the suburbs and by 1976, more Americans lived in suburbs than in downtown or rural areas. Consequently, the first planned out-of-town shopping centre opened in 1949, and by 1980, there were over twenty thousand major suburban shopping centres across the US (Parissien, 2013, 189).

At least in the US the generally modern design of cities and the space available made it easier to accommodate the car through such developments as urban motorways; but in older urban areas the problems were more acute. For example, in Britain from the early 1950s, there was growing concern about the impact of the growth in traffic on towns and cities, although the urgency with which the problem was treated was not helped by significant underestimates about the numbers of vehicles. Thus in 1954, official forecasts anticipated a 75 per cent increase in traffic over the forthcoming twenty years. However, by 1962, only eight years later, this number had been reached already (Starkie, 1982, 11). These under estimates tended to produce responses that sought to buy time by incremental changes.

One ‘solution’ was seen as the removal of the many tram systems that ran in Britain’s cities, so that from being ubiquitous, virtually all of the trams had disappeared by the early 1960s. The removal of trams and tram-lines had the effect of freeing up space for the motor car, but indicated the basic official perception that the future lay with the individual mobility provided by the car and not with the previously dominant public transport modes of rail, trams and buses. As Yago argues, after World War Two most urban analysts greeted highway transportation as a solution to urban congestion. Increasingly, mass transit was considered marginal to urban travel and limited to older, densely populated cities. Accordingly, policy decisions limited subsidisation to transit in favour of the construction of highways (Yago, 1984, 1). Ironically, as traffic congestion and its environmental impacts worsened in the later years of the Twentieth Century, so light rail systems came back into fashion as one of the solutions and were reintroduced in a number of British cities.

In the 1950s and 1960s, however, the need to find ways of accommodating the rapid growth in car ownership was seen as paramount. In some cities by the late 1950s, the issue was becoming urgent. For example, in London there was a long-standing problem with obstructions caused by parked cars. By Christmas 1958, the capital’s roads came close to fulfilling the notion of ‘grinding to a halt’ (Starkie, 1982, 18). Parking meters had been introduced in London earlier in the year, but by 1960 traffic
wardens had been added, together with more comprehensive traffic management that included more one-way systems and clearways that imposed waiting and loading restrictions (Starkie, 1982, 25).

**Buchanan and the motor car dilemma**

The 1960s marked a crucial turning point in government and public perceptions concerning the motor car. Hitherto, despite controversies over issues such as safety, the rapid growth in vehicle ownership and the associated motor industries was generally judged as a great benefit to society in terms of creating individual mobility and generating wealth. From the 1960s, it was not so much these benefits themselves were seriously challenged or undermined, but people came increasingly to understand that the dream sold in the earlier years of the century also had a definite downside, particularly on issues such as congestion and environmental impacts. The character of this turning point is particularly well illustrated and symbolised by the publication in Britain in 1963 of the report *Traffic in Towns* by Professor Colin Buchanan.

As we have seen, by the early 1960s, traffic congestion in London was reaching crisis levels and the government became concerned that the situation was becoming out of control with few effective solutions in sight. Consequently, it appointed Buchanan to lead a study on ‘the long term development of roads and traffic in urban areas and their influence on the urban environment.’ In his Report, Buchanan concluded that the conflict between traffic and the richness of urban life could be greatly reduced by attention to the design of compact towns and cities, particularly the careful arrangement and disposition of buildings and activities to enable the motor vehicle to be used to its best advantage. Nevertheless, Buchanan acknowledged that the necessary redesign of towns and cities would be highly expensive and that in many places there would be definite limits to the amount of traffic that could be accommodated (Buchanan, 1963). As Starkie comments, although the Report advocated the preparation of transport plans, it did not attempt to say at what level of traffic the choice should be made, nor did it make positive recommendations as to the level of expenditure that should be incurred (Starkie, 1982, 36–7).

*Traffic in Towns* became an instant best seller and Buchanan himself attained the status of international celebrity as an academic and consultant on urban planning and traffic management. His Report clearly struck a chord with the public and it could be said that its implications still resonate at the present time. As Wistrich comments, although the Buchanan Report was widely interpreted as advocating new road building in towns, and policies based on such advocacy were subsequently frequently rejected, its real importance rests on its underlying assumptions and the problems it poses. The report accepts the maximum possible use of the motor vehicle, poses possible solutions to its movement in towns and asks what price the citizens are prepared to pay for greater or lesser freedom of car movement. That dilemma has still to be resolved, but the validity of the questions remains (Wistrich, 1983, 69).

There is inevitably significant variation, therefore, in the degree to which the car has come to dominate the urban landscape. For example, whereas in the United States there has been a strong historical culture to tailor cities, towns and their suburbs to car use, several European cities, perhaps
by necessity, have been more resistant to motor vehicle intrusion. These include, for example, cities such as Amsterdam, Copenhagen, Berlin, Madrid and Lisbon, where population density and street design has allowed local shops and services to remain accessible. When combined with plentiful public transport such as tram services and/or higher than average levels of cycling, car use is not perceived as essential to maintain a desired degree of personal mobility. Significantly in modern times, particularly in the light of the introduction of car-free cities such as Freiburg in Germany, even in the United States there is an emerging debate about the possibilities there for similar developments. However, there is also an awareness of how deeply the car culture pervades society. For example, Crawford argues that the lack of any car-free cities in North America is due mainly to a failure of imagination; as Americans are so used to driving everywhere, the mere thought of being without a car is terrifying (Crawford, 2009). Thus the new world instigated a century ago by the development of the modern motor car continues to exert a great hold over public perceptions of the ideal of personal mobility.
References


