

# Did turnpiking improve the quality of roads in England & Wales?-new evidence using Geographic Information System mapping and contemporary reports.

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Infrastructure quality plays an important role in determining communications and trade. This paper studies turnpike trusts in industrialising England and investigates when and where they improved the quality of roads. It re-examines data sources, including the text in Acts of Parliament, Reports of Parliamentary Committees, returns from an 1838 turnpike survey as well as an under-exploited source, the comments made by regular road users in their diaries. GIS is used to handle the large amounts of data and give a spatial display of information. We conclude that in the first half of the 18<sup>th</sup> century the repairing of the ancient highways by turnpike trusts slowly rectified some sections of main roads that had become ruinous under Parish management. During the second part of the 18<sup>th</sup> century trusts brought many more sections of road up to a quality that contemporaries judged better than the older roads. In the 1790s investment in existing turnpikes failed to keep up with increasing traffic so by the early 1800s roads around London in particular, had deteriorated. This stimulated a fresh wave of rapid improvement in road construction by turnpike trusts guided by professional road surveyors, particularly McAdam. During this period many miles of totally new road were made to these new standards, along better alignments than the those of the ancient highways. The culmination in this wave of improvement was evidenced in the generally high rating of road quality on turnpikes in 1838.

## 1. Introduction

Roads are vital, both politically and economically, for the functioning of a state. Periods of change expose deficiencies in existing infrastructure and if roads become poor or inappropriate it hinders both social interactions and the economy. Adapting a nation's roads to meet changing need is a dynamic process but the beginning of the industrial revolution in England marked a particularly large shift as an island state transitioned from a localised domestic economy to a manufacturing economy with an increasingly **centralised political structure**. Inland travel beyond a parish evolved from a political privilege for the elite to a broader necessity for the expansion of trade and commerce for the many and leisure pursuits for the successful few. This transition coincided with the appearance of new forms of wheeled transport which were potentially superior to the Medieval saddle, pack horse or cart. A novel administrative mechanism, the turnpike or toll road, was central to implementing substantial change on the nation's highways during this period. In this paper we explore the degree to which turnpikes realised their ambition to improve the quality of main roads. This meant re-purposing an existing infrastructure to satisfy the changing needs of both freight and passenger traffic over more than a century, prior to the creation of the railway network.

In the early 18<sup>th</sup> century, roads were maintained by civil authorities, the parishes and townships, using property taxes and compulsory work by the parishioners, often referred to as Statute Labour. Each parish might have many miles of road with little differentiation other than the nomination of a few miles as a Post Road. Dissatisfaction with this system led to Acts of Parliament creating so-called turnpike trusts which

took responsibility for a stretch of main road that ran through several parishes. More than 1100<sup>1</sup> of these locally run, non-profit organisations were created in England and Wales between 1663 and 1836. Although, even at their peak, turnpikes made up little more than a sixth of the public highway mileage, these were the long-distance routes used for inter-urban and inter-regional travel. Trusts were given powers to take a portion of parish Statute Labour to concentrate on these major highways. More importantly, they had powers to levy tolls on the users of these roads to cover maintenance and to mortgage future tolls to finance improvements to the road.

Each turnpike trust was organised and run at a local level, but took responsibility for part of a national infrastructure. Their progress in improving an existing, though deficient road network, illustrates both the benefits and deficiencies of a system that relied upon local, unpaid management for the public good, with very light oversight from central government. Turnpiking coincided in part with the creation of the new canal network by private enterprise, and later the even larger private rail network. Thus, measuring improvement by turnpiking may inform comparison of quite different transport infrastructure policies. Our aim in this paper is to establish when and where there were observable quality improvements that could be attributed to the turnpike trusts in England and Wales and how changing needs affected this.

There is a long literature examining this issue, including some venerable scholars<sup>2</sup>. These earlier studies have shown that there were many bad roads in the late 17<sup>th</sup> century England. During the 18<sup>th</sup> century there were plenty of complaints about highways and some of these were certainly turnpikes. At the peak of the turnpike era there were still some complaints about road quality, particularly given the burden of tolls imposed. However, the key question is whether there was a meaningful improvement to the usable road network as a result of turnpiking, not whether every individual road was made perfect. The successful turnpiking of only one of the several roads between towns was sufficient to improve traffic flow and the economics of inland transport.

In order to gauge improvement, we need to know the condition of a particular road before a turnpike trust took responsibility. A second measurement using similar criteria several years after turnpiking is then needed to determine any change in quality. Both are particularly difficult since no systematic surveys of the road network were made before or after turnpike trusts were created. The first comprehensive and substantive survey was not until 1838, when trusts reported road quality to a Parliamentary Commission. This survey was touched on by Pawson (1977) but contains much detailed financial, quality and spatial information which give a solid reference point.

We have also made extensive use of personal diaries and travel commentaries to track changes in road quality over time. This anecdotal information on roads has previously only been used selectively to reinforce conclusions from other sources. Although comments made in diaries are inevitably subjective, lack consistency and are both geographically and temporally fragmented, large numbers of entries from similar sources have been used elsewhere to build a composite view of a subject, one example being child labour (Humphries 2010). We have incorporated all comments, positive and negative into an assessment framework and then drawn conclusions on changes in road quality along comparable sections of road. This information has then been related to the roads recorded in the Parliamentary Commission enquiries in

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<sup>1</sup> Figure quoted by Webb (1913), though existing trusts, merged and fragmented over the decades so around 1600 named trusts appear in the records

<sup>2</sup> Webbs (1913), Jackman (1916), Pawson (1977)

1820 and 1838. The processing and comparison of these data involves large amounts of spatial and commentary information. Analysing this has been possible by using a Geographic Information System (GIS) for digital mapping with linked databases to systematise the information on the journeys, quality and the roads involved.

We show that the quality of most main roads in England improved significantly between when turnpiking began in first half of the 18<sup>th</sup> century and 1838, when the network was near its peak. Importantly, we have shown that improvement was not linear, nor simply the result of one revolutionary change and that judgements of road quality must take account of the dynamic nature of the traffic and the expectations of the travellers. We will present evidence that there were two periods of improvement in turnpike road quality.

The first was a long phase of relatively slow change that ran from the turnpiking of the busiest roads in the early 18<sup>th</sup> century to the turnpiking of the main cross road that created a network by 1790. During the initial years we deduce that the trusts applied the best traditional methods of road repair to rectify the worst barriers to safe travel and improve maintenance. From the late 1760s the pace of improvement increased, creating a better network. It was now that beneficial changes were observed by road users on most, but not on all turnpikes. However, by the 1790s investment in roads stagnated while traffic still increased. Some roads, particularly around London, probably deteriorated and failed to meet the higher expectations of travellers in the latest wheeled vehicles.

The second wave of improvement of the turnpikes began after the Napoleonic Wars. Improvements were more substantial and took place over a much shorter period than in the first phase. Not only were existing turnpikes further improved but many miles of totally new road were made to higher standards, along better alignments than the ancient highways. It was the culmination of all these improvements that was evidenced in the generally high quality rating of turnpikes in 1838. Nevertheless, there remained a mosaic of roads with differing quality; turnpike improvements did not elevate every main road up to a high standard but did create a network that was better than that previously managed by the parishes.

Our findings relate to a broader literature on the relative importance of public and private investment in infrastructure to drive growth in an important industrial sector. Overall, it provides a working example of how a patchwork of local, civic bodies can respond to changing needs for a national resource with little direct Government involvement.

## **2. The Existing Literature**

In their respected work on *The Kings Highway*, the Webbs observed that the Statute Labour system was fundamentally incapable of “improving” the highways. The parish was not empowered to change a bridleway to cartway or pack & prime way to carriage road and local taxpayers would resist increase in parish rates to do this (Webbs 1913 p58/61). They argued that pressure for improvement came from new road users, who travelled through parishes in wheeled vehicles between prosperous urban areas. Until the late 17<sup>th</sup> century almost all travel was on foot; people walking or riding a horse, goods on pack-animals and livestock plodding. These road users “on feet” preferred natural soil highways, so long as they were not foundrous. The new users on wheels needed a firm roadway, wider than the eight-foot standard of parish roads or the three-foot wide causeways. The turnpike trust provided the mechanism for improvements. However, using mainly Parliamentary documents, the Webbs concluded that the early turnpike trusts were at best inefficient and at worst corrupt, employing new resources badly. They found examples of

improvements from the early 18<sup>th</sup> century and although the thought these limited, concluded that “*the mileage of usable road was greatly extended by the 18<sup>th</sup> century turnpike trusts*” and “*no considerable improvement in the highways of England would have taken place for ... the first three quarters of the 18<sup>th</sup> century*” without turnpikes (p146). They were more fulsome in recognising the improvements made under the better management of trusts in the 19<sup>th</sup> century.

Detailed analysis of changes in road quality has generally fallen into two categories. On one hand scholars have looked for documentary evidence of complaints or praise before and after turnpiking. The alternative approach has been to infer changes in quality from other measurable outcomes such as speed or frequency of coach services. The first depends on sources that are incomplete and subjective, the second, though apparently quantitative, carries uncertainty from uncontrolled variables. The direct approach was used by Jackman (1916) who presented a large body of legal and anecdotal commentary to show that before turnpiking, highways in the 17<sup>th</sup> century were poor, and good roads were rare. Heavily loaded, wheeled vehicles were damaging the highways and legislation was needed to limit their loads. The narrative remained similar for the period after turnpiking in the 18<sup>th</sup> century when there was evidence of bad turnpikes, petty corruption and mismanagement in diaries, court documents and papers. The few commentaries praising turnpikes were discounted as politically motivated or outweighed by critical comments during the mid-18<sup>th</sup> century. Jackman was more confident that the turnpikes improved road quality in the early 19<sup>th</sup> century through the work of civil engineers like McAdam.

Pawson (1977) examined in detail an alternative source, the Minute and Account Books of a representative sample of turnpike trusts. Trusts began to spend money on the roads immediately after they were created and although some expenditure was for simple repairs with gravel, as early 1717 roads were being widened. Some surveyors, particularly in Yorkshire, were using good methods of road construction by the mid-18<sup>th</sup> century but overall, this was limited in extent. Pawson’s more balanced re-examination of contemporary commentaries concluded that there had been improvements after the mid-18<sup>th</sup> century and that, although evidence was scarce, there was “*no reason to believe that similar improvements were not made on the smaller turnpike network before 1750*”. The indirect approach was also used to infer from newspaper advertisements, that coach services were not seasonally affected after 1770 (i.e., worse in winter). Pawson too found considerable evidence for improvement by the systematic road building and better management advocated by McAdam and gives examples of road networks improved by the construction of new turnpikes in the late 18<sup>th</sup> and early 19<sup>th</sup> centuries.

Bogart looked at a broader set of financial data to show the scale of increased expenditure on turnpike roads, and the magnitude of expenditure by turnpikes compared with Parish Roads (Bogart 2005a). A second study used a new dataset on land carriage rates from which it was inferred that road quality improved enough to offset the cost of tolls (2005b). In addition, property values rose in parishes through which turnpikes ran (Bogart 2009), again implying that improved functionality of the road network was having a strong beneficial effect on the economy of an area. A more recent study discussed the financing of trusts and the growth of debt in the 1820s to fund improvement (Bogart 2018).

Guldi (2012) endorsed the published evidence of progressive improvement in road quality with turnpiking and linked periods of improvement to Government investment, both indirect and direct. Guldi attributed the early period of improvement to the diffusion of ideas on road building developed by the Military engineers in Scotland prior to 1750. Later, in the 1820s it was driven by direct Government funding of

Parliamentary Road to improve links between London and the other national capitals of Edinburgh and Dublin, for political reasons.

There have been several studies measuring turnpike road spending and, related to this, the volume of public services carrying freight and passengers along main roads through the 18<sup>th</sup> and early 19<sup>th</sup> centuries<sup>3</sup>. The broad consensus is that road traffic by public carriers and stagecoaches increased substantially in the late eighteenth century. The most thorough examination of the indirect method of inferring improvement has been by Gerhold (2018) who concluded that since the speed of coach services did not change much until the 1760s, it was unlikely that there had been any significant change in road quality under the turnpike trusts prior to this. Gerhold further suggests that the increase in speeds after 1760 was primarily the result of better vehicle design and better management practices among carriers and coach masters.

### 3. Road Quality and Improvement

Road quality gauges the fitness for purpose of the highway used by travellers to their destination and back. The type and number of travellers, their means of transport and expectations based on experience, change and evolve over time. Quality is essentially subjective and during the period considered here there was no quantitative measurement of road characteristics, no systematic assessment of overall quality and no agreed standard of what constituted an adequate road. We can be confident that it was inherently easier to maintain a road across some soils (clay was bad), some topography (steep hills were bad, flood plains and river crossings were hazardous) and where the volume and weight of traffic were low. Thus, not all roads would need the same input to make them adequate but, all else being equal, more traffic meant more damage and a lower quality road. Similarly, the technical skill and commitment of the road makers and menders would directly affect how effectively materials were used. Charging tolls on traffic increased the resources applied to the road and a well-designed toll structure could offset the negative impact of certain vehicles by higher charges. Nevertheless, low volumes of traffic on a toll road would adversely affect the funds that were applied to road improvement. Consequently, it was not inevitable that turnpiking would lead to improvement in road quality or that a good quality road was necessarily an improved road.

Pre-turnpike roads were used predominantly by riders and packhorses, and quality depended on avoiding wet or confined areas and having a surface that was easy on the hooves of horses. Natural, unmade roads, particularly along ridgeways, could often provide this. On turnpiked the users demanded a road wide enough for two wheeled vehicles to pass, a road that would not sink or form deep ruts under the weight of a wheel and a smooth hard surface on which a vehicle could maintain a steady pace without jolts or steep inclines. Furthermore, travellers in vehicles generally went further and faster and so expected a network that interconnected urban hubs. Turnpikes managed the improvement of roads from the lower requirements of the early 18<sup>th</sup> century to the these technically more demanding 19<sup>th</sup> century expectations.

To study how successful turnpikes were, we will first examine the text of the initial turnpike Acts for evidence of road quality before turnpiking and Continuation Acts for evidence of initial work on the turnpikes. Next, we will analyse the results of the national survey of turnpike quality in 1838 at the end of the period as a benchmark. An analysis of travel diary comments between these fixed points will then be used to judge road quality before turnpiking and in the second part of the 18<sup>th</sup> century. The Parliamentary

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<sup>3</sup> Albert (1972), Pawson (1977), Bogart (2005a, 2005b), Gerhold (1998, 2005, 2014), Rosevear et al (2019)

Report on Highways of 1820 will provide information on the quality in the early 19<sup>th</sup> century. Finally, mapping of turnpike roads will show where new turnpike roads were built in the 19<sup>th</sup> century.

#### 4. Evidence of pre-turnpike quality from Acts of Parliament

The Parliamentary Acts setting up turnpike trusts were part of consistent process that was applied across the country. Turnpike Acts had an established structure – the first part stated the purpose of the Act (to turnpike the road between A and B), the second gave the reason for needing these powers, the third was an appeal for powers to remedy the problems and the fourth provided details of how the trust would operate (tolls, administration etc.). The application for an Act went through scrutiny by a Parliamentary Committee and witnesses were called to contest or prove claims made in the application. Consequently, unsubstantiated assertions were unlikely to appear in the published Act.

In this section, the wording of the second and third part of 149 Turnpike Acts from across England were analysed to assess how the old predecessor roads were described in the preamble to the Act. These Acts date from 1695 to 1767 and were each the initial Act for a particular trust. The sample was determined by availability of printed copies but the core set represents 50% of the mileage of roads turnpiked between 1695 and 1750. The sample of Acts is representative of the main classes of turnpike from single road trusts along the Post Roads, to radial hubs such as Hereford, the principal roads close to London as well as provincial towns such as Lancaster. The distribution of the sample roads relative to the full turnpike network of 1750 is shown in Figure 1.

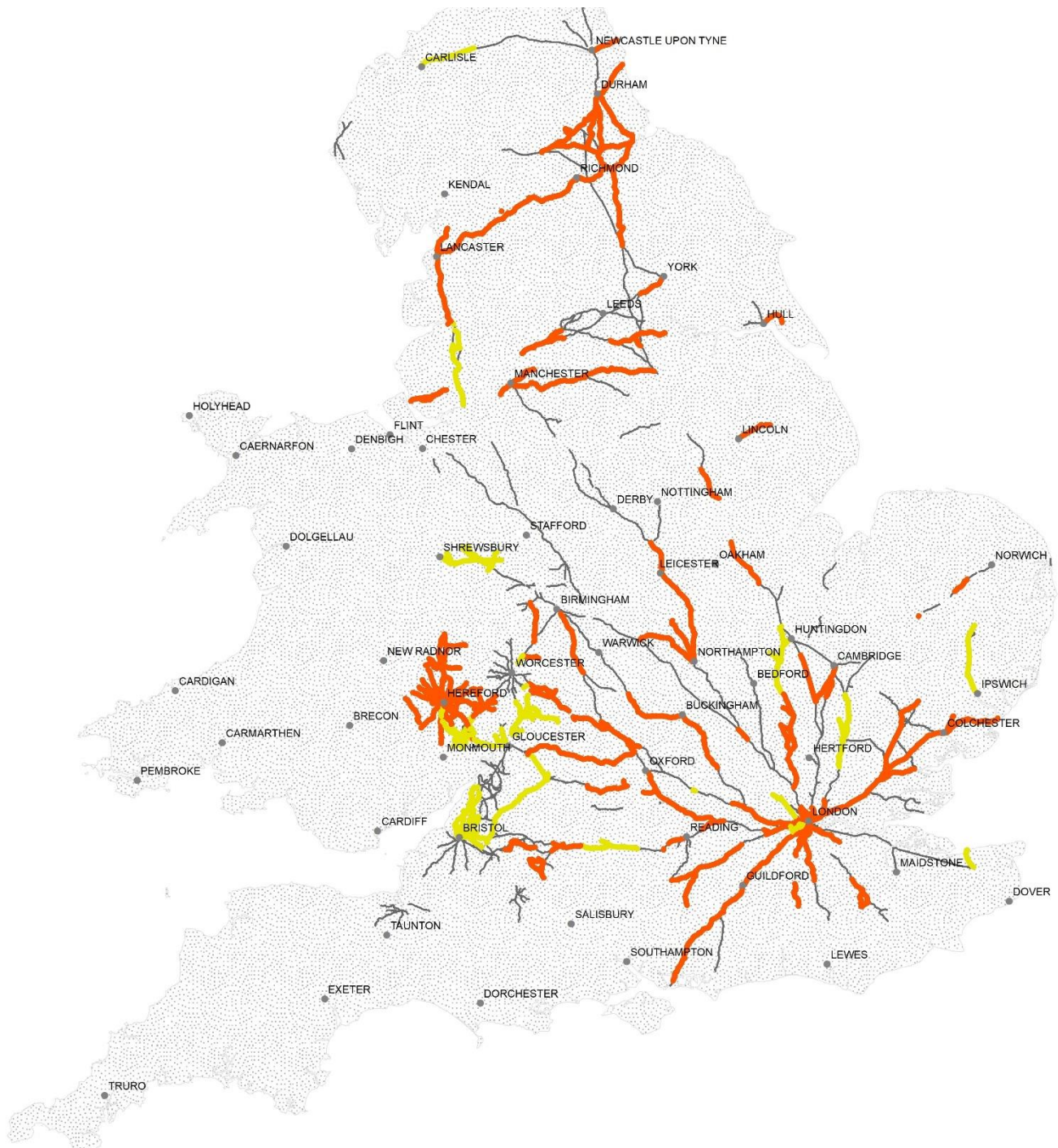
Key terms in the text have been used to construct a “most common reason” statement which would appear at the beginning of a turnpike act. Below we use bold lettering and parentheses to demonstrate how many of the 149 Acts included the term.

“...by reason of the **many heavy carriages** (77) frequently passing through and the nature of the *soil* (41), the said highway is become so very **ruinous** (129), **bad** (70) and **fouderous** (9), that it is **dangerous** (115) to all travellers passing through the said road and is so **deep** (37) and in parts **narrow** (50) and incommodious (19), that it is almost **impassable** (55), especially in the **winter season** (105), and causes delay (5) to travellers so goods and merchandizes cannot be sold (5) at the proper places ..... no stone gravel or other **materials** (8) fitting for the mending thereof to be had but at great distance from the said respective places

Although these descriptions are at their fullest in the earliest Acts, the key phrases relating to heavy carriages using the road and parts of the road being dangerous and impassable in the winter persist into the Acts passed in the 1760s. Most Acts state that the road quality was poor with words such as ruinous, deep or bad appearing in all Acts. In no case were the applicants seeking powers to maintain or repair an existing road that was adequate throughout. The two categories of initial Act are differentiated as those that were dangerous and those simply ruinous in Figure 1.

#### **Figure 1; Roads turnpiked before 1750 showing road quality reported in the selected Initial Acts.**

*Roads that were described in initial turnpike Act as dangerous as thick red line; those described as only bad or ruinous as thick yellow; all other turnpikes as thin line.*



This textual analysis of initial turnpike Acts reveals that the majority dealt with the worst roads, those deemed so bad that they were “dangerous”. These were common on the busy radial roads around London. Long stretches of the worst roads also ran to east of the Pennines from Yorkshire to Northumberland. Those judged just to be “bad” were more common in the west, along the Bristol to Shrewsbury axis of Severn Valley and northeast of London towards East Anglia.

All the Acts reviewed here adopted existing highways; they were not new roads (except the Carlisle Military Road). They were variously described as ‘Ancient Highways’, ‘Post Road to London’ or the ancient accustomed road and were the roads used by through traffic. Generally, Acts were carefully worded not to claim that the full length of the road was in a very bad condition, or at least not all the time. Most qualified the “impassable” description with “especially in the winter season” or when “rainy”; sometimes the point

was emphasised by stating that even horse riders could not pass. It was also made clear that only “parts” of the road may be dangerous. Some notorious black spots were described, such as the steep gradient above Petersfield on the Portsmouth road, the crossing of the river valley north of Baldock on the Great North Road and at the Hockcliffe junction in Bedfordshire. In each case, many miles adjoining these places were turnpiked though the worst problems were confined to a few individual parishes.

Just over half of acts in our sample, 77 of 149, imply that an increase in the heavy carriages and great loads had caused deterioration in the road and so led to the need for the turnpike. For instance, the Sheet Bridge Act of 1710 mentions goods carried to the naval dockyard at Portsmouth. The wording of these initial Acts shows that some of these Highways had been in a very bad and ruinous state for years prior to turnpiking; on the Great North Road the increase in traffic occurred following the Union with Scotland (1707). The preambles suggest that prior to the increase in heavy traffic, roads had not regularly been ruinous; i.e., that the parishes had kept up with maintenance. We can speculate that the map of all roads that were turnpiked before 1750 (all in Figure 1) also shows where the volume of heavy wheeled traffic was growing in the first half of the 18<sup>th</sup> century. This was not solely London-centric as implied by studies of early coach and carrier services. It was this broad spread of roads, unified only by the traffic they carried which were to be the focus of “improvement” by these turnpike trusts.

## 5. Evidence of turnpike improvement from Acts of Parliament

Trusts routinely applied for Continuation Acts to extend their powers beyond the time limit of the initial Act. Powers granted under a Turnpike Act normally expired after 21 years but the trusts could be terminated if the road was brought back into good repair and all debts had been paid off. Almost every trust sought a Continuation Act to renew their initial powers. We have analysed the text of 112 Continuation Acts passed between 1708 and 1789 (two thirds of these after 1740) to find what these say about the work completed under the initial Act. The “most common phraseology” for the introduction to these Continuation Acts is paraphrased as;

“the previous Act will expire at ..... the trustees have used the monies raised by the tolls to repair the road ... the trusts have borrowed a considerable sum of money and applied this to repairing the road ... progress has been made but the road is not sufficiently repaired, or the road has been made ruinous again by the heavy carriages which do not contribute sufficient in tolls....unless fresh powers are given the trustees cannot repay the debts already incurred and the road cannot be effectively repaired as required in the initial Act. “

In 100 of 112 continuation Acts, the trust had borrowed money to repair the road. The remaining debt was stated in a third of cases; this ranged from £400 for the Bath Trust in 1738 to £13,600 in 1778 for the Botley Trust<sup>4</sup>. Four Trusts had debts of £6,000 or more, including the Catterick Bridge & Durham trust which blamed damage by the carriage of coal and lime for tearing the road. There were 20 trust with debts of £2,000 or more and for 11 trusts the debt was equivalent to more than £200/mile of road<sup>5</sup>. Only one trust, Harlow Bush, stated that it had repaid all loans but still could not maintain the road. From this we conclude that most trusts used the facility to borrow “considerable” sums to augment the money raised from tolls in order to repair and amend their roads. In several cases, the expenditure per mile was at least

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<sup>4</sup> This trust had built a causeway across the Thames floodplain west of Oxford

<sup>5</sup> Pawson (1977, p213) found that the average debt stated in Continuation Acts for 29 pre-1750 trusts was £1,850, which tends to obscure the wide spread we found.

an order of magnitude greater than that of the parishes (a loan of £200/m applied over a short period, equated to 20 years expenditure at the £10/mile/year which Bogart (2015) found typical of parish Highways).

The Continuation Acts reveal that the trusts had not fully achieved their initial objective of repairing and amending all the road. Explanations included underestimating the cost of materials brought from a distance, or the increase in heavy traffic carriages with “exorbitant weights”, particularly those either exempt or paying a low toll (e.g., carrying coal in Yorkshire). However, and importantly, the relative absence of the key phrases on the very bad condition of the road pointed to significant repair work at least. In only four of 112 cases was the existing road referred to as still dangerous to travellers. In 12 cases a new section of road was added to the Act; for 10 of these the addition to be turnpiked was described as ruinous and dangerous.

It is clear from this textual analysis that Trusts did apply new resources to the repairing and maintaining the roads. The wording of Continuation Acts suggests that by the end of the initial Act the turnpike trusts, and MPs writing the bills, believed there had been significant improvements to the dangerously bad and almost impassable ancient highways turnpiked in the early and mid-18<sup>th</sup> century. The need for a continuation implies that the trusts struggled with the magnitude of the task they had taken on and with the true cost of significant improvements. Later we will return to the theme of what trusts accomplished by the late 18<sup>th</sup> century, but we should first establish a firm end point by examining evidence in the earliest comprehensive survey of turnpike roads in 1838.

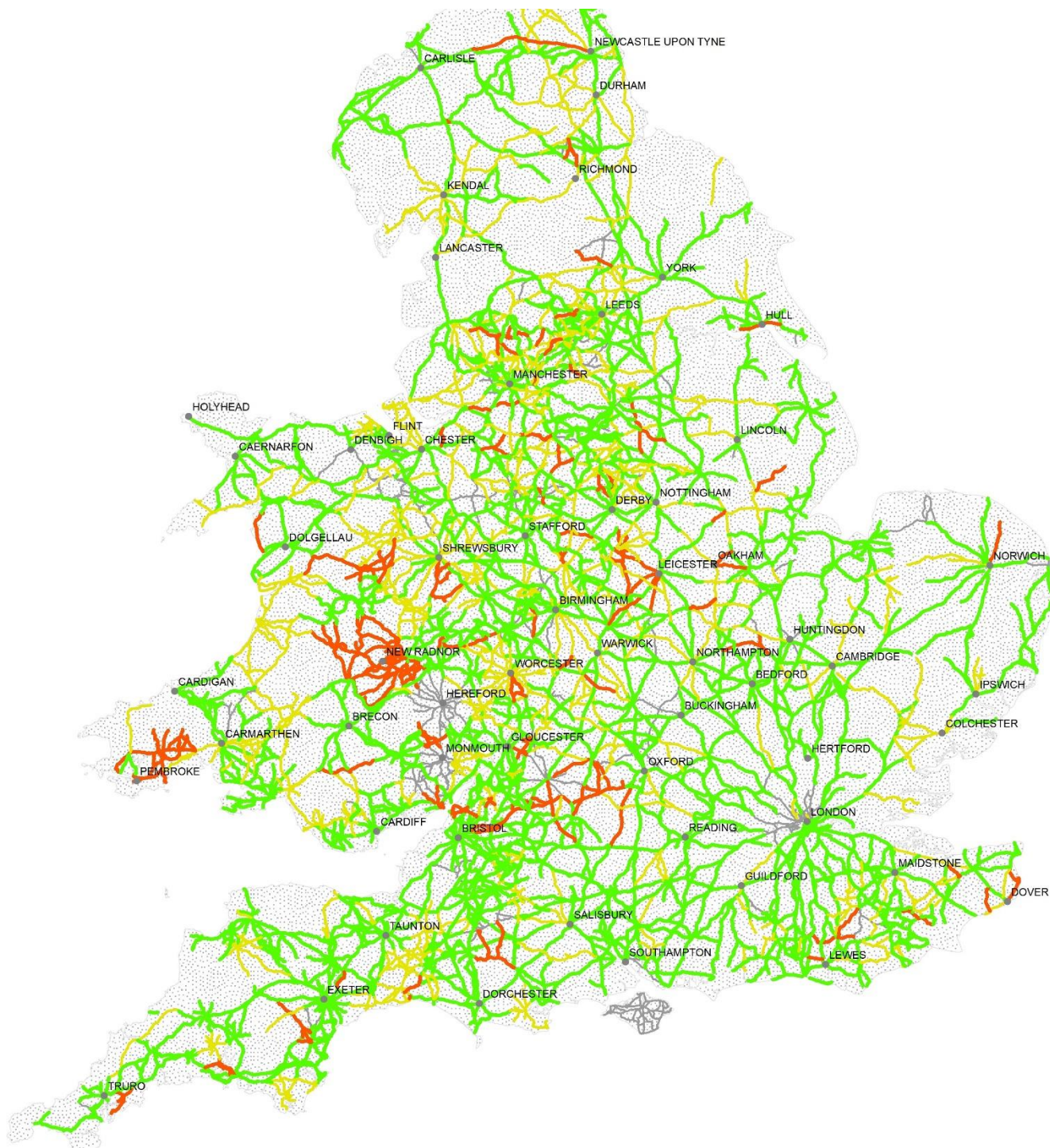
## **6. Documentary evidence of road quality at the peak of turnpiking**

The State of the Roads Report, (PP1840), was an assessment in a common format for almost all turnpike trusts in 1838. It required trusts, among other things, to self-assess the quality of their roads. Although this survey was like asking students to mark their own exam papers, as with the preambles to Acts, the respondents were open to public scrutiny and in general the results appear plausible and consistent with evidence presented later. We devised a scoring system for phrases to rank the quality of the roads in the 1838 survey and the comments made by diarists in the later sections of this article. This assigned a numerical value describing the state of the road from 1 to 6 (very bad, bad, not good, adequate, good to very good - phraseology amplified in Appendix 1). Only a small proportion of trusts did not respond (score 0).

The data show that in 1838 over 60% of turnpike roads were characterised as “Good” or “Very good” and a relatively small number of turnpike roads, 13%, were classified as “Bad” or “very bad”. The remainder, 27% were “Not Good” or “Adequate”.

Figure 1 maps the quality score for the turnpike roads of 1838; the six numerical standards have been simplified to an overall assessment of poor, middling or good to emphasise the main differences.

*Figure 2; Turnpike Road Quality scores from 1838 survey of turnpike trust*



Notes: Poor – score 1 or 2 – thick red line; middling – score 3 or 4 – yellow line; Good – score 5 or 6 thick green line; not reported thin grey line

Some geographic patterns stand out. A large proportion of the roads in the east of England had a good quality score (green line), and a dense band of good roads ran from Exeter, through Bristol and Birmingham to York. Clusters of good roads led to the fashionable holiday resorts along the south coast from Torquay, to Brighton and Hastings. Several good turnpike routes connected the major urban centres of the industrial north, such as Manchester, Leeds and Newcastle with each other and through the industrial Midlands to London. The turnpikes with the lowest scores (red lines) were more common to the

NW of a line from Dorset to Lincolnshire and were in hilly areas such as the Cotswold Hills and Downs west of Oxford or mountainous regions of mid Wales.

The very best roads included almost the full length of the Post Roads radiating out of London and the larger provincial towns. The majority of the poor turnpikes were subsidiary cross roads. In most of these cases, there were alternative, better quality turnpikes in the network linking the towns on these roads. For instance, the poor-quality Military Road between Carlisle and Newcastle was duplicated by a better, less austere, route through the towns of Hexham and Corbridge. The poor quality Besselsleigh turnpike to the southwest from Oxford was paralleled by the good road southwards to Newbury and the poor Hull to Ferriby road by the good road from Hull to Kirk Ella. There were exceptions in some mining areas, such as NW of Leicester and in the high Pennine hills to the west of Sheffield and Halifax where a large proportion of traffic was probably carrying heavy goods. We have linked turnpike roads in the 1838 report with the turnpike acts analysed in the previous section. The majority of the turnpikes judged bad at the time of their first Act were found to have good quality scores by 1838; 81 of these 143 turnpikes were judged good (score 5 or 6), only 7 judged bad (score 1 or 2).

The map shows there was some differentiation in the improvement achieved by trusts. The turnpikes covering the busiest main roads, particularly Post Roads and coach routes, had been improved to a high standard, almost irrespective of the inherent difficulties of soil and topography. Turnpikes in areas of low population density or heavy dependence on minerals transport had not achieved such consistent improvement. In some areas where several potential routes between hubs had been turnpiked, only one had been substantially improved suggesting local resources (and probably traffic) had been drawn selectively to the best route, leaving others to stagnate and become irrelevant in the national network.

## 7. Road Quality observations in 18<sup>th</sup> century Travel Diaries

The comments made in personal travel diaries bridge the gap in information on road quality between the start of turnpiking and the national survey in 1838. The details of journeys made by diarists between the 1680s to 1830s had already been mapped in a GIS linked database as part of a wider study on Transportation<sup>6</sup>. The most probable path of each journey was plotted using the spatial information in the diary entry (e.g., start, end, intermediate towns or features) applied to a set of digital maps derived from 18<sup>th</sup> and 19<sup>th</sup> century paper maps<sup>7</sup>. Journeys made by other diarists between the same destinations at a similar time were used to resolve ambiguities. Where a diarist made a comment on the state of the road, this section of the polyline was copied into a “road quality” shape file. This contained fields for the qualitative description of road (e.g., excellent to execrably bad) and a further field to give a numerical score based on an expanded version of the standard terminology used earlier for the Turnpike Acts (see Appendix 1).

Although only a small fraction of diary entries related to journeys and only a small number of these had comments on the state of the roads, we have found sufficient (1390 individual sections of road), to give a quantitative assessment of change. Most of these sections were less than 20 miles long (the average length was 7 miles) and there were comments from different years on several of the busiest roads. The data was

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<sup>6</sup> [The Cambridge Group for the History of Population and Social Structure » Transport;](http://www.cam.ac.uk/research/projects/transport)  
[www.cam.ac.uk/research/projects/transport](http://www.cam.ac.uk/research/projects/transport)

<sup>7</sup> Sources include turnpike roads in each decade, Itineraries from Cary and Patterson’s Road Books, stage coach routes from London & Provincial directories, Cary’s national road map (ca 1826), Rocque’s national map (ca 1740), and Ogilby’s Roads. See Rosevear et al 2019 for details.

grouped into 4 time periods, Era 1 before 1720 (before extensive turnpiking), Era 2 from 1720 to 1765 (initial turnpiking), Era 3 1765 to 1800 (when turnpikes formed a network) and Era 4 (the mature phase). Table 1 lists the diarists, the period for which they provided information, the distance on which they made comments and the proportion of their total recorded travels for which comments were made.

*Table 1; Diaries from which specific road quality comments were taken for England & Wales in each era*

Diarist	Distance with comments pre-1720 (miles)	Distance with comments 1720-1765 (miles)	Distance with comments 1765-1800 (miles)	Distance with comments after 1800 (miles)	Total miles of journeys recorded in diary	% journey miles with comments
Agnes Witts			1396		9593	15%
Anne Lister				145	3389	4%
Arthur Young			2308		2436	97%
Benjamin Silliman				101	1663	6%
Celia Fiennes	1696				5354	32%
Chas Hatchett			759		1587	48%
Daniel C Webb				92	2568	4%
Daniel Defoe #		145				
Edmund Butcher				82	549	15%
gentleman			181		247	73%
J Hanway		72			229	31%
Jabez M Fisher		13	352		4178	9%
John Byng			1127		6130	18%
John Courtney		67			6424	1%
John Skinner			75		623	12%
Joseph Taylor	214				895	24%
La Rochefoucauld			651		4475	15%
Lord Harley		306			2231	14%
Peter Hawker				133	10425	1%
Ralph Thoresby	121				7262	2%
Samuel Curwen			853		4060	21%
Stebbing Shaw			226		1049	21%
Thomas Baskerville	58				1504	4%
Others	120	122	328	263		
Total in each Era	2209	724	8231	818		14%

\* 250,000 miles of travel have been analysed from 40 diaries; only individual diaries with comments on more than 50 miles included here; # Only references to roads >25 miles in length are useful here

The most comment (on > 8,000 miles of road) were made between 1765 and 1800, the period over which the previous sections suggest significant improvements may have taken place. Although particular periods appear dominated by comments of one individual, only those roads also used by other diarists are used in most of the analysis.

It is apparent that the frequency of comments on road quality fell away after 1800, though many journeys were still recorded. Prior to 1800, to English travellers, the state of the road was as important a topic of conversation as the weather. After 1800 it was likely taken for granted that most turnpikes should be adequate or good and only the few exceptionally bad ones were worthy of comment. Hence, we will limit the main use of diary comments to quality changes before 1800.

### *Comparative views of quality by diarists*

In comparing diary comments across several decades, allowance must be made for the changing perspective of the commentator. As was observed in the Gentleman's Magazine of November 1752 "*farmers, inn-keepers and peasants who never travel far from home, may give execrable roads (and tell no lie) the nomination of very safe and good ones*". Fortunately, most diarists were well travelled but their perception of "ruinous" could be influenced by their mode of transport. The pre-1720 (Era 1) observations were made almost without exception by the rider of a saddle horse. Those in Era 3 were mainly made by travellers in a wheeled vehicle. Hence, when Celia Fiennes observed that a road was good, it was good for a horse rider by the norms of 1690. When Agnes Witts comments that a road was very bad, it was very bad in a carriage but may not have been so harshly condemned by mounted travellers. Similarly, if the majority of roads, which were not commented upon, were adequate for travellers in 1690, it is unlikely that they would have been so generously classed in 1790 if no improvements had in fact been made. Importantly, comparison of these two scores on a particular route in different Eras would underestimate the actual improvement made on the turnpike. We know from the initial Acts that the weather affected both the roads and the traveller's experience and could distort comparisons if travel was differently distributed between seasons. In the total diary entries, there was significantly less travel in the winter prior to 1750, and the quality comments were almost exclusively made between the spring and autumn solstices. This does mean that most comparisons will be like for like, but will not measure the effects of winter. The few exceptions such as the La Rochefoucauld brothers and Agnes Witts, who did comment during winter travel, reported a range of qualities from good to bad.

### *Changes in quality of turnpike roads reported by diarists*

Combining all diary comments, we found that up to 1720, 69% of the roads that would later be turnpiked were judged inadequate (score of 1-3). Between 1765 to 1800 when these roads had become turnpikes only 32% of the mileage was judged inadequate. Although this does show an improvement after turnpiking, it is not particularly helpful since these are not direct comparisons on the same sections of road and some journey comments span more than one road. Furthermore, if the absence of comment implies "what one would expect"; in the pre-turnpike era this might be low and after turnpiking quite high. We have therefore focused analysis on those roads for which there were comments at different times and have sampled at fixed points along these so that local changes in quality can be judged.

In the Tables of Appendix 2 we have tabulated the quality data for several main roads for which there is comparable data from different decades. The GIS map was sampled on the outward-bound side of the nominated towns, the date of turnpiking noted and the classified comments on quality recorded for each decade (data in the centre columns). The quality score for the road before turnpiking was recorded on the left [in square brackets] and the score assigned from the 1838 survey on the right. Where the score (or the average of multiple scores in a decade) was 4 or greater (i.e., at least adequate), the entry has been highlighted in grey. Where the average was below 4 the cell is cross-hatched. Town hubs are an important feature of the developing turnpike network and so we have examined several hubs for which the diarists give comparable reports for the radiating roads. Information on one region, the Southwest, has been displayed as a map to illustrate the distribution of the data.

### *Quality changes along Long-distance routes*

Appendix 2, Table 1 deals with seven long distance routes, each of which ran through the jurisdiction of several turnpike trusts. Most of the road on these routes was turnpiked under initial Acts passed before 1750 and so, based on our conclusions about Initial Acts, would have fallen into the "very bad; in urgent

need of improvement" category. Six roads were radials from London to the provinces, though comments for analysis may only begin some distance from the Metropolis. We first discuss the long distance routes (a)-(h), the hubs and region and then make a general assessment of quality change .

The London to Carlisle Road (a) running on the western side of the country through Lancaster had the highest incidence of poor quality scores across the eras. Prior to any turnpiking, the road had particularly bad sections on the scarp face of the Downs near Dunstable in the south while through the mountains north of Kendal; Taylor had to walk his horses down from Shap in 1705. However, by 1770, when all this road was under turnpike trusts, both these sections and sections adjoining them had been improved to score as good. In contrast, the long section between Newcastle under Lyme and Preston was singled out by Arthur Young in 1770 as having "execrable roads". He advised "*all travellers to consider this country as sea, and as soon as they think of driving into the ocean as venturing into such detestable roads. I am told the Derby to Manchester road is good but further is impenetrable*" (Northern Tour Vol.4 p435). Much more of the whole road was classed as good by 1838, particularly the southern section that had been improved by Telford and the road through the mountains also improved in 1820. However, parts of the middle stretch remained barely adequate in 1838.

Sections of the Great North Road (b) running parallel to the Carlisle Road, on the eastern side of the country through York, were judged more than adequate by 1770 and any poor sections were good by the 1790s. Prior to turnpiking, the southern sections, including the two branches through Knebworth/Biggleswade and Royston were described as very bad, but the northern sections were already good, when judged by mounted travellers. The diary evidence here implies that the turnpike trusts on the Great North Road had improved the highway relatively quickly. Jackman (1916) concluded that the poorer parts of this road were improved rapidly and by 1750 were so good that there was pressure to lift the tolls. In 1838 the Great North Road was judged good or excellent throughout. To the south of Alconbury the branch through Biggleswade that included the notorious Baldock Lane, was good and became the preferred route for coaches whereas the older route through Royston had declined to only adequate in quality and carried less traffic (diarist comment).

The impact of turnpiking on the other long-distance routes (c) through (h) were quite variable. Some sections were good by the 1770s but particular sections still causing problems and remaining poor into the 1790s. For instance, on the Worcester Road (c) the route through Southall and High Wycombe to Oxford, turnpiked by 1720 was still judged less than adequate in 1777 and 1790. By contrast, the alternative, lower-level route through Henley was excellent by 1770. By 1838 the balance had swung back to the Wycombe road as the better quality turnpike to Oxford. The section of this road across the Cotswold Hill through Moreton in Marsh never seems to have reached an adequate level. On the Bristol Road (d) through Chippenham, the road across the Thames gravels through Colnbrook had been adequate for horse riders before turnpiking but further west was much worse. Turnpike Trusts had dramatically improved the busy route to the edge of the Thames Valley beyond Reading by the 1780s and improved the very busy western section between Bath and Bristol. Some improvements were apparent by May 1767 when in a letter to the Reading Mercury, Mr Smith said "*the road from London to Reading was excellent and the section between Reading and Newbury had been lately widened in many places at great expense*". The road onwards from Newbury to Marlborough was still very narrow in places and the hill down to Marlborough very steep. Further west the trusts in Wiltshire had not succeeded in tackling problems over the Downs by 1780. The reason might be deduced from the wording of the Continuation Act for the Shepherd's Shord Trust of 1713

which complained of expense “*by reason proper materials for repairing the said highway lie at great distance from the same, which was necessarily increased the said expense beyond that foreseen*”.

Similarly, the Weymouth Road (e) had been improved to Salisbury, but the section over the Dorset Downs was still poor. The Yarmouth Road (f) was generally judged good throughout the period. Finally, the Manchester road (g) that branched from the Carlisle Road at Hockliffe, exhibits a similar pattern to the Great North Road. Prior to turnpiking diarists judged it very badly; the Hockley Lane junction was one of the most notorious black spots. However, by the 1770/80s, this and all other sections were judged as adequate or good; it was this road that Young had been advised to use to reach Lancashire instead of the Newcastle road (road (a)).

Young seems to expect the quality of Cross Roads to be lower than that of the main Post Roads from London. Nevertheless, the quality of one such major cross roads from the Southwest of England to the Midlands (h) was judged by the diarists to have become as good as the majority of London radials by the 1770s. However, two sections were less satisfactory. The road north of Gloucester was not judged good until the 1790s and the road north of Birmingham seems to have been persistently inadequate.

### *Quality changes around specific towns*

Analysis of all the roads running into towns that were turnpike hubs presents a mixed picture (Appendix 2, Table 2). There were hubs where all the comments by diarists were good; for instance, the principal roads into Salisbury were rated highly in the 1770s and all reports on the roads into Derby were good in the period from the 1770s to 1790s. Around the fashionable spa town of Bath, the roads were reported as less than adequate in the 1760s but a decade later were scored good and by the 1790s were generally excellent. Other towns that were mentioned on the long-distance roads were also hubs for good roads. For instance, by 1770 the main roads through Worcester were judged well. In all these places the roads remained good up to 1838.

In contrast, there were other places with persistent problems on which turnpiking seems to have had little impact. For instance, almost all the roads to the established spa town of Tunbridge Wells in Kent were judged poor before turnpiking and were still poor well into the 1790s and below average in 1838. Into the new spa town, Cheltenham, the roads were also bad before turnpiking, though in this case turnpiking was still not complete by the 1790s. However, by 1838 most of the Cheltenham roads had been improved. Some towns illustrate the delay between first turnpiking and first reported improvement in quality. The Northgate turnpike branching off the Cross Road (h above), eastwards from Gloucester, was turnpiked in 1722. It crossed the deep clay ground below the Cotswold scarp and Defoe had said that it was terrible before turnpiking, but claimed it had been improved. Diarists still judged it bad in 1776, more than five decades after the turnpiking, and it only showed substantial improvement after 1796. Almost all roads close to York had been judged adequate prior to turnpiking because the authorities maintained narrow causeways that were suitable for horse riders<sup>8</sup>. However, after turnpiking the roads were still judged by those in vehicles to be adequate and so must have seen some improvement by 1770 and most remained good until 1838.

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<sup>8</sup> The score of 5 for this road before turnpiking relates to the causeway which was a benefit to riders. The implied bad score prior to initial turnpiking relates to the whole road which would have been poor across the moor and unsatisfactory for vehicles along the causeway.

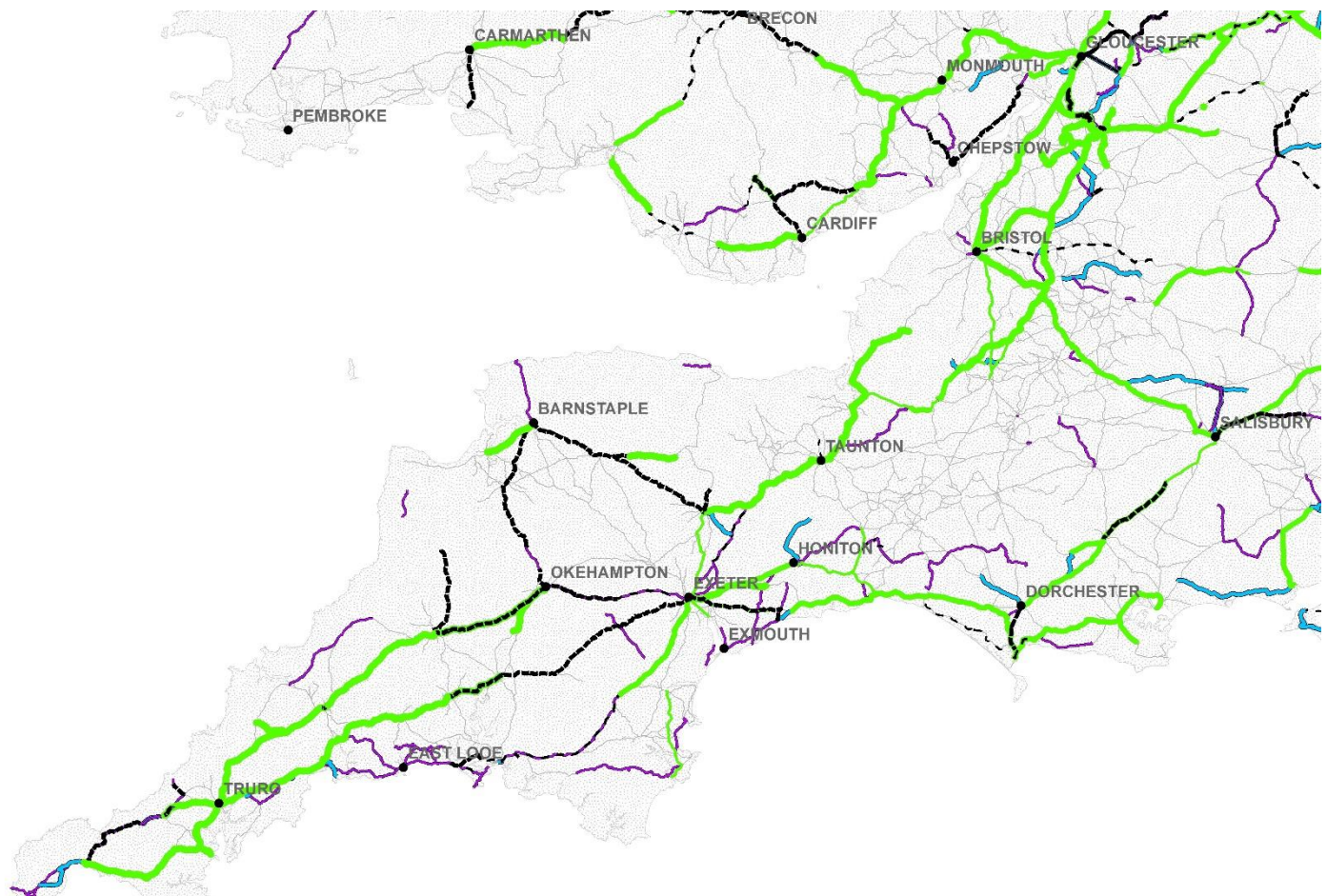
Places such as Birmingham<sup>9</sup> had relatively large radial networks comprising both good and bad turnpikes. Importantly it was sometimes the busiest roads which continued to get a low score. In part this may have been a direct result of the damage from continued growth in the weight of traffic. Although the Cross Road from the southwest into Birmingham discussed above scored well, the busy routes to the southeast from Birmingham towards London scored badly. The Coventry Road was judged very poorly (score 2) and the Stratford Road down towards Oxford only slightly better at score 3.

### *Quality changes in remote areas*

Finally, we will consider road quality in a region not covered in the two previous categories. The roads in Southwest England and South Wales were turnpiked slightly later than in central England, generally the decades after 1755. The topography of these areas was challenging for inland transport with many hills, steep valleys, heaths and moors. There were also extensive areas with sparse populations and proximity to the coast gave travellers other options. In Figure 3 the judgement of diarists is shown in summary over three decades, 1770s to 1790s. At this stage we will only consider those roads that were turnpikes at the time of the comment (green and black lines)

**Figure 3. Road Quality score for roads in South West England and South Wales.**

Broken black lines are turnpike roads at the time rated generally poor (1,2,3); green lines are generally good (score 4,5,6) thin lines are 1770, medium thick 1780, thick 1790. Thin purple lines were not turnpike roads at the time when rated generally poor (1,2,3); edged blue lines are generally good (score 4,5,6) for all dates Thin grey lines are turnpikes in 1790



<sup>9</sup> Not included in the Table since there are insufficient multiple comments on all the roads

About half the mileage of turnpike road was judged generally good by the 1790s but there were still many miles of generally poor quality turnpike. However, the distribution of these is important when considering the network as a whole. By the 1780s the major Post Road through Salisbury and Dorchester to Exeter was good. By the 1790's much of the principal road down the spine of the Southwest peninsular from Gloucester, through Bristol to Exeter and through Cornwall to Truro and Penzance was good<sup>10</sup>. Similarly, the route from Gloucester along the South Wales coast to Swansea was good. The poorer turnpikes were mostly on alternative routes to these destinations such as the road west from Truro through Hayle and the South Wales road to Carmarthen through Brecon. A substantial portion of the poor turnpikes were branches off the main trunk roads to destinations such as Barnstaple and the valleys north of Cardiff. All these were over difficult terrain to small towns. Hence, there is differentiation with routes carrying the most traffic brought up to a good standard and those carrying least traffic judged less good in general. By 1838 (see Figure 3) none of the turnpikes considered here was judged poor, in part as a result of new road construction (e.g., the Hayle Causeway in Cornwall and the new Ilminster Road NE from Honiton).

### *Turnpike improvement based on diary comments*

The diary comments on roads before turnpiking show a similar pattern to that seen in the analysis of Initial Turnpike Acts. In Appendix 2, Table 2, of the 49 pre-turnpike comments on road quality, 41 were classed as inadequate<sup>11</sup> or equivalently only 16% were judged adequate. At the final benchmark, by 1838, 85% of sections for which we have diary comments were judged adequate or better. In 1838, of the 39 sections for which there was a pre-turnpike diarist score 32 had improved and 7 had stayed unchanged (despite more demanding standards)

The diary comments are valuable for assessment of improvement between the two fixed points. On long distance routes, in the period up to the 1770s, 30 of the 57 sections (52%) were scored as adequate; 42 of 57 sections (74%) commented on by 1800 were judged adequate. Overall, this suggests that although up to 1770 some improvements had been made to the turnpikes, some claims of "considerable progress" made in Continuation Acts were exaggerated. Although half of the roads that had been turnpiked early (so were dangerous or bad) were judged adequate by the travellers in the 1770s, progress had either not been made, or had regressed on several. Allowance should be made for the progressive increase in expectation on a road that charged a toll and that roads without comment might still be adequate. The majority of turnpikes did not fully reach an adequate quality until the last two decades of the 18<sup>th</sup> century, though long stretches of individual roads out of London, such as the Great North Road, Yarmouth Road, and Bath Road, had been improved by 1770. The limited evidence suggests that before 1790, improvement was even patchier on the Cross Roads such as the Exeter to Birmingham route. The contrast between the performance of adjoining trusts (e.g., around Newcastle) and parallel roads (e.g., the Great North Road compared with the West Coast Road) implies that geography alone cannot account for differences in the timing of improvements. Management or application of financial resources, access to, or acceptability of better road improvement methods, or the strength of powers granted under their initial Act<sup>12</sup> may have been important factors, and for which more specific research is needed.

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<sup>10</sup> The roads over and around the northern edge of Dartmoor (west of Exeter) were still poor, in winter especially and there is only partial data to show that the turnpike to Plymouth, SW from Exeter was good throughout.

<sup>11</sup> The analysis of initial Acts showed that some sections of even the badly rated turnpikes would be classed as adequate by horse riders

<sup>12</sup> e.g., the Webbs (1913) noted that Lancashire trusts had more limited toll gathering powers

However, we show that most of the industrial or market towns had two good turnpikes, the minimum requirement for creating a network. This would be a critical for road transport to become a positive factor, alongside water transport, in the expansion of manufacturing and commerce during the industrial revolution. As is illustrated in Figure 3, for the Southwest, there was normally at least one good turnpike route between major towns. Significantly the late 18th century traveller was no longer faced with the dense network of poor or mediocre roads that the parishes were obliged to maintain. Resources had been focused on a few improvable main roads, the turnpikes which coalesced by 1750 to create a network that was better than the sum of its parts. Hence although particular roads may have poor sections, the operational road network was far better relative to the pre-turnpike era than the individual figures would suggest.

We should also stress that diarists travel modes and seasonality had changed, indirectly suggesting quality was improving as early as the 1750s. Before turnpiking, travellers predominantly chose to travel on saddle horses, although coaches were available. 86% of the mileage with comments before 1740 was by a horse rider whereas 86% of comments made in the 1760s to the 1780s were from carriage passengers. By the 1790s, only those who wished to ramble away from the main road were choosing to go by saddle horse or on foot. Improved carriage design would obviously have been a factor but these better coaches could not have been used to full effect if roads had not improved from their ruinous pre-turnpike condition. Furthermore, the diarists of the 1770s were rarely prevented from travelling in the winter because of the state of the roads, a factor frequently mentioned in the Initial Acts – the foul weather itself had become the main deterrent to winter travel.

#### *Comparison with roads not turnpiked*

Improvements in the quality of roads have been credited so far to the turnpike trusts but might arguably be due to a general improvement in road making at this period. The diary comments on roads that were not turnpiked provide a useful control group that remained under parish management. Table 2 summarises the judgements made by the diarists on the quality of roads that were not turnpiked at the time of the journey.

*Table 2; Comparison of road quality scores for turnpike and non-turnpike roads*

Diarist	non-turnpike road with comment (miles)	% comment mileage on non-turnpike roads against all comments	% of turnpike mileage judged generally good (score 4,5,6)	% of non-turnpike mileage judged generally good (score 4,5,6)
Celia Fiennes	1668	100%	n/a	28%
Arthur Young	695	30%	58%	22%
John Byng	347	31%	53%	26%
Agnes Witts	208	15%	59%	44%
Jabez M Fisher	152	42%	59%	14%
La Rochefoucauld	132	21%	49%	16%
Ralph Thoresby	120	100%	n/a	6%
Samuel Curwen	75	9%	72%	41%
Chas Hatchett	66	9%	61%	47%
Stebbing Shaw	59	26%	58%	21%
Anne Lister	36	25%	8%	0%
Benjamin Silliman	16	16%	100%	0%

The comments of Celia Fiennes in the 1690s make it clear that not all the pre-turnpike era roads were bad by the travel requirements of the time<sup>13</sup>. After 1760, most comments relate to turnpikes but 22% of the total comment mileage was on non-turnpike roads which were managed by the parishes. Each diarist scored a lower percentage of parish roads as generally good compared with turnpiked roads. The percentage of non-turnpike roads that were generally good was 25% similar to the 28% recorded by Fiennes, whereas on turnpikes it was 60% for all travellers. Hence, despite maintenance on non-turnpike roads being less onerous with lower levels of damaging traffic, the turnpiked roads were judged of substantially better quality by the diarists of the late 18<sup>th</sup> century. This relative difference may have been even greater due to a bias in the places the diarists chose to visit. Arthur Young was searching for good practice in agriculture and incidentally found good roads associated with this; he praised the gentry in parts of North Yorkshire for the good parish roads around Stokesley and Richmond, in part funded by subscription. Agnes Witts and John Byng were on planned tours and so probably avoided the worst road. Hence, their praise was for exceptions worthy of comment or in parishes where road maintenance was relatively easy – the turnpikes had taken the difficult cases.

The comments by diarists allow some comparison of changes that occurred on the parish roads that were turnpiked and those that remained the responsibility of the parish. We identified 247 sections of road for which there were two or more comparable quality comments by diarists in different years. For those that moved from parish to turnpike responsibility before 1800 (52 sections), the average quality score while a parish road was 2.5 and the same sections scored on average 4.0 after turnpiking i.e., the score had improved from not good/bad to adequate after turnpiking. For those highways that remained a parish road between the two dates (37 sections) the average initial score was 2.7 falling to 2.3 by the later date i.e., these already inadequate roads became slightly worse. Hence, on average the transfer from parish to turnpike resulted in a 60% higher quality score whereas roads remaining under parish control declined by 15%; a net increase of 75% in the quality score attributed to turnpiking by 1800. Although these data are from a rather small sample, it does provide further evidence that, even with the greater demands of heavy traffic, turnpiked roads were improving in the 18<sup>th</sup> century while the remaining parish roads were probably becoming slightly worse on average<sup>14</sup>.

As with turnpikes, the quality of parish roads was a mosaic, but in general a parish road was likely to be judged poor compared with a turnpike in similar circumstances. This can be seen in Figure 3; the parish roads around East Looe were consistently judged as poor (in purple, scoring 1 or 2 on four occasions between 1698 and 1793), whereas the adjoining Truro turnpike was good (in green). The road north from Chepstow to Tintern Abbey was persistently bad, scored 1 and 2 in 1776 & 1788, whereas the turnpike road through Monmouth was good. The non-turnpike roads south of Tunbridge Wells were scored as poor on five occasions between 1697 and 1792.

Overall, it seems that the old parish system was less capable than a turnpike trust at maintaining a high quality road even with light traffic. Hence, we conclude that it was turnpiking rather than just better road making in general, that drove improvement in road quality.

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<sup>13</sup> Some sections of good roads were turnpiked along with the bad; for instance, the road between Honiton and Exeter was scored 6 on three occasions before turnpiking and 4, 6, 6 & 5 between 1776 and 1794 after turnpiking.

<sup>14</sup> this might be expected if the better parish roads were selected as turnpike routes

## 8. Road Quality observations after 1800

By the turn of the 19<sup>th</sup> century diarists commented less frequently on road quality (Table 1). Disturbingly, these few comments were more often that a road was bad rather than good, as had been the case from the 1770's to the 1790s. (between 1800 and 1820, 188 miles (13 turnpike sections) were scored as bad (1&2) and only 62 miles (3 sections) as good (5 or 6)). On roads for which there are comparisons over time, diarists reported a poorer quality on the Weymouth Road west of Hounslow in 1810 and on the main road into York in 1821 (Appendix 2), though in the few reports on roads into Manchester, Derby and Taunton they were unchanged. The Webbs (1913 p165) had seen this trend noting that *“with the opening years of the 19<sup>th</sup> century ..... What were then the best-kept turnpikes, ..., come now to be deemed only passable, whilst the condition of the worsor sort of roads is again felt to be an intolerable public nuisance, much as it had been at the close of the 17<sup>th</sup> century. It is plain that a much higher standard is being set”*.

To augment the sparse diary observations of this period, we turned to the reports of two Parliamentary Committees that sat in 1819 and 1823 (PP1821 & PP1823). They took evidence from road users and from those responsible for maintaining roads. The overall conclusion of the first committee was that the general state of the turnpike roads was *“extremely defective but at the same time proper management alone is able to affect the most desirable reformation”*. Such condemnation is at variance with the praise of many diarists for almost three quarters of turnpikes only 30 years earlier.

However, closer examination of the evidence from witnesses does not fully support the extreme view that all roads were bad and gives evidence of a new wave of technical improvements on turnpikes. Mail coaches ran almost exclusively on turnpikes and Mr Johnson, the Post Office Coach Supervisor, said *“that almost all roads might be improved but there are very few instances where I have thought it necessary to intervene except in the neighbourhood of London”*. He added that roads in northern England were very superior in general to those within 100 miles of London. Proprietors who operated mail coaches out of London criticised the condition of roads on the first 50-60 miles of each route. Mr Waterhouse said that *“some roads being laid so high in the middle, it flung the weight too much to one side and led to accidents”*. The labour of his horses was greater near London so that from London to Birmingham required twelve horses to perform the same number of miles as eight between Birmingham and Shrewsbury. Mr Horne said that the Uxbridge road was flat and made solely of gravel but was below the level of the fields and scrapings or drift were piled by the side of the road, retaining water.

We deduce from this that the condemnation of roads as generally bad, used higher quality criteria than applied in the 18<sup>th</sup> century. It was clear that in the neighbourhood of London the roads were in a worse condition than in the provinces. Some roads in the north and west were in fact quite good. Where roads were criticised, the users' comments were often about how easily coaches ran on the road not whether the road was passable at all, or was dangerously narrow or foundrous.

Nevertheless, the witnesses confirmed that a substantial number of roads were poor and that, in an echo of the early 18<sup>th</sup> century, heavy traffic was a big cause of the damage. The toll exemptions unwisely given to broad wheel waggons had increased the number and weight of the heaviest vehicles which damaged road foundations without achieving the consolidation that had been claimed. However, poor management by unskilled surveyors was now a contributing factor. Witnesses spoke of turnpikes that had been judged good by diarists in the 1770 and 1780s as now being bad. The Exeter Road near Egham that had been used without adverse comment by diarists was *“covered with unsifted gravel 8 to 9 inches deep side to side”* and

as a consequence the Mail Coach lost 10 to 20 minutes every night. Mr Bootham said that the Bath Road near Twyford, much praised in the 1760s was “very bad at present”. The previously good road between Dunchurch and Daventry was in a very neglected state, blocked up with banks of drift (road scrapings). On the Old Stratford to Dunchurch road, again judged good by diarists, “*very little improvement has been made... and the roads in a bad condition altogether*”; “*yet the tolls produce over £100/mile/annum!*”. So, complaints were more intense since poor quality was associated with higher tolls and the Committee worried about the accumulated debt of the various trusts. Nevertheless, on turnpikes adjoining some of these bad roads the quality remained high. Abutting the poor Daventry road, the Hockliffe Trust, which included the previously notorious Hockley junction, praised by diarists in the 1780s was much improved.

This evidence points to a failure of local management and leadership in some trust. Whether trustees had become complacent and financially incompetent or whether the scale of the operations had grown too much, is not clear but as witnesses said “*the people they employ upon the roads are not equal to the task and are very much negligent*”. To keep up with the damage caused by heavy vehicles some surveyors were piling more and more dirty gravel into the middle of roads, only to see the gravel pushed sideways, the large stones emerge and large banks of drift rise on the roadside. The surfacing with gravel so praised by Young had, in the hands of unskilled surveyors, become a nightmare for travellers and Turnpike Commissioners. A few surveyors had met the challenge despite rising traffic. Mr Horne said the Dover Road had been made very good in the previous seven years by improved drainage, directed by Mr Collis. Collis had also affected the same improvement on the Brighton Road, reducing hills and making the road good. However, the surveyor most frequently mentioned was McAdam.

Mr McAdam was the chief witness before the Committee. In his opinion “*the state of the roads 20 years ago (i.e., ca 1800) was generally worse than at present*” and by implication improvement was due to his efforts. The McAdam system for road improvement incorporated elements that others had practised but not promulgated (broken stone, gentle curvature of the road profile). His “innovations” were in management, avoiding unnecessary expenses and selecting materials of appropriate quality. The high cost of carriage for new materials was reduced by “lifting” the existing road and sifting out enough hard material to construct a fresh road bed. He championed the skilful sub-surveyors, well remunerated with this as their sole occupation. A procession of witnesses to the second Committee spoke to the transformation of turnpike roads using McAdams system; that this was achieved at no extra expense was remarkable. As one member observed “*Mr McAdam’s system is at variance with the opinion of all engineers, and yet that whenever it has been adopted, it has entirely succeeded*”.

The prospect of better roads at lower cost offered by McAdam attracted a growing number of turnpike trustees who were seeing debts rise but road quality deteriorated under their local surveyors. By the mid 1820s, trusts employing McAdam as General Surveyor, were transforming most of the main coach roads into smooth, firm carriageways that users would judge as good. At the same time, they were actually able to pay off the accumulated debt from earlier mis-management.

## **10. Beyond quality improvement: making new roads**

The turnpike improvements made under McAdam’s management were primarily to existing roads but at the same time an important new trend was emerging; the construction of completely new turnpike roads. From textual analysis of the titles of all turnpike Acts passed in Parliament after 1780, the term “making” i.e., building a totally new stretch of road or “diversion”, increased in frequency. Between 1750 and 1799

there were 57 Acts that mentioned making a new road or making a new extension to an existing turnpike through a Continuation Act. Between 1800 and 1835 the rate of new building rose substantially with a further 280 such Acts. Improvement by making a new road cannot be judged like changes to existing roads; merely having a new road would be significant, having one built to modern standards would have been an enormous improvement.

Using our GIS maps of the whole turnpike network and the list of all turnpike titles we were able to highlight where trusts were empowered to construct new roads or new extensions. By comparing Cary's map of 1825 with the 1st series OS map we identified sections of existing turnpikes where diversions had been made. From this we can show that in 1838, 4,000 miles of new road had been added to the network of ancient roads which had been turnpiked in the 18<sup>th</sup> century (Figure 4). In some instances, the old roads had been disturnpiked and returned to parish management soon after the improvement was completed. In others the old road still had a value in the wider turnpike network and the trust retained responsibility.

#### Figure 4; New sections of road constructed by turnpike trusts prior to 1838

*Thick lines show improvements to older section, major diversions and totally new roads constructed by turnpike trust; grey before 1800, black 1800-38. Thin grey lines are all other turnpike roads in 1838.*

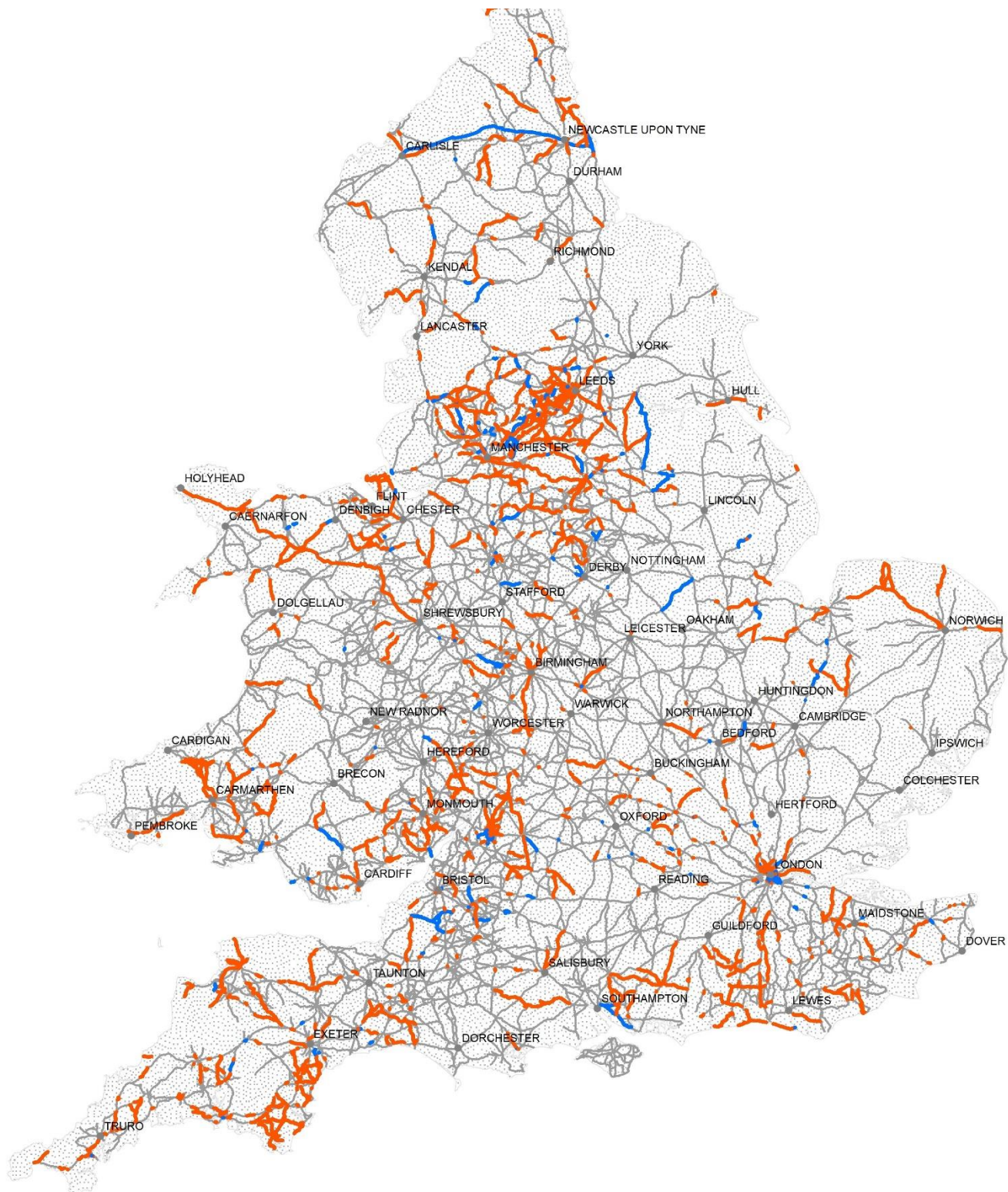


Table 3 summarises the relative changes and transfers between parishes, older turnpikes and new made turnpikes. This highlights the degree to which the new sections replaced older parts of the turnpike with two thirds of the old mileage being returned to the parishes. It further highlights that the new roads were embedded within a larger turnpike network which itself was embedded in a far greater parish network.

**Table 3; Changes in total turnpike mileage relative to parish Highway mileage (based on GIS mapping of all current turnpikes at stated year)**

	1690	1750	1770	1790	1810	1838
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Turnpike total (miles)	17	3,990	15,758	18,062	20,703	22,944
miles of new made turnpike		81	184	319	1,150	3,989
miles of disturnpiked road returned to parish		6	29	217	619	2,627
total miles of parish highway & turnpike roads#	123,727	123,808	123,911	124,046	124,877	127,716
% of total highway that was turnpike	0%	3%	13%	15%	17%	18%

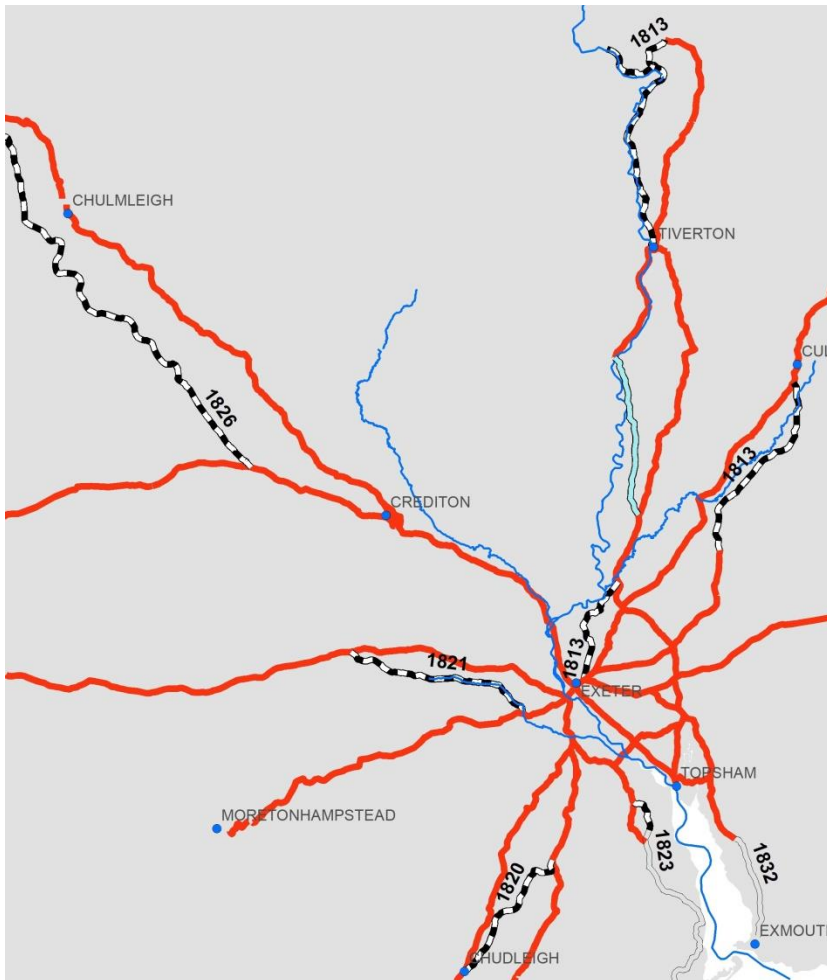
# in Table 11 of PP1840 Appendix for 1838 mileage of non-turnpike highways for wheeled vehicles was estimated as 104,772 miles. Combined mileage estimated assuming that all 1838 parish roads existed in 1690 and the only new roads were built by turnpike trusts so 123,710 miles of parish road in 1690.

These new sections represented 15% of the mileage that had ever been taken under management by a turnpike trust. Only a third of these new roads were built before 1815, the majority being laid during the following two decades up to 1838. Some, such as the Military Road alongside Hadrian’s Wall built in 1750 and the great enterprise of upgrading the Holyhead Road in the early 1820s involved many tens of miles of totally new road and had Government support (Guldi 2012). However, most were local initiatives, debt financed as normal by mortgaging future tolls. They were formed by upgrading and linking ancient lanes with new sections to create several miles of through road built to the latest engineering standards (e.g., Honiton to Ilminster). Some merely inserted a series of short sections, only a few hundred yards long, to circumvent problems such as a narrow, steep, wet or dangerous spot on the existing line (e.g., through Nettlebed woods on the Henley Oxford road). Nevertheless, the completely new made roads were ultimately only as good as the existing turnpikes, which were being improved by better management; in the 1838 survey the proportion of good (65%) and bad (12%) quality mileage for those trusts that had obtained an Act for “making a new road or branch”, was almost the same as the proportion for all turnpikes.

The “step changes” are illustrated by the new works of the Exeter Turnpike Trust, in cooperation with adjoining Trusts (see Figure 5). The ancient ridgeway routes with steep gradients through narrow holloways into the city, had been turnpiked in 1753. These had been adequate for packhorses and riders but were inconvenient for wheeled traffic. Nevertheless, early attempts to construct alternative roads along riverine routes had been rejected as technically impossible (Rosevear 2014). Now, in the early 19th century, better road building techniques were employed to construct Macadamised roads with easy gradients along new alinements, with good drainage in the river valleys or stream gullies. Firstly, in 1813 a new road was built along the Culm valley replacing the steep ridgeway route through Bradninch (remaining debt £7k in 1838), in 1821 a route with an easier gradient was built over Haldon Hill (remaining debt £16k in 1838), and in 1821 the high ridge road through Whitestone was replaced by a smooth route along the Alphin Brook valley to Tedburn (estimated cost £7.5k- Buckingham (1885)). Then in 1826, 20 miles of totally new road traversing the peninsula was built in collaboration with the Barnstaple Trust along the Creedy and into the Taw River valley, supervised by the Macadams (estimated cost £10k, Rosevear 2014). Finally, in 1833 a new approach to Exeter, The New North Road, was constructed in collaboration with the Exeter Improvement Commissioners (estimated cost £7.5k- Buckingham (1885)). All these had dependent links to the original turnpike network but created more direct links within the network over easier ground suited to wheeled vehicles.

Figure 5; New Roads built by the Exeter and Adjoining turnpike trusts after 1810.

Thick lines are ancient highways (several ridgeways) turnpiked in the mid-18<sup>th</sup> century. Hollow lines are newly built roads under powers granted after 1810; dashed hollow lines are new developments coordinated with adjoining trusts.



The greatest concentrations of new made roads were in the industrialised parts of Lancashire and West Yorkshire but there was also substantial new mileage in North and South Wales, the Southwest of England and along the Sussex and Hampshire coast. These were in the manufacturing areas which were generating wealth and the coastal fringe in the south providing recreational and leisure outlets for the newly affluent. To illustrate the relationship between these new roads and the existing turnpike network the industrial area of West Yorkshire is examined in more detail.

Figure 6; New sections of road constructed by turnpike trusts in the area around Manchester and Leeds

Improvements to older section, major diversions and totally new roads constructed by turnpike trusts before 1800 are shown in thick grey lines, those after 1800 in black lines. Thin grey lines are the turnpike roads following the line of main roads existing before turnpiking



The region stretching from West Yorkshire to East Lancashire (primarily between Leeds and Manchester), grew rapidly in economic importance and population during the industrial revolution. In Figure 6 the relatively large number of new-made turnpike roads and improvements to existing turnpikes are shown. A few of these changes occurred in the late 18<sup>th</sup> century but the majority were constructed between 1800 and 1835, with a particularly large mileage running westwards from Leeds and North-eastwards from Manchester. There were several new roads across the Pennines between Halifax, Elland and Huddersfield towards Oldham. One of these paralleled an older road to Austerlands but two others were completely new routes. Further south the Saltersbrook turnpike was improved by many small diversions along the existing line east of Mottram. West of Leeds an extensive new radial web of turnpikes was built, dramatically increasing the road capacity into the expanding industrial centre. Although mileage of new turnpike into Manchester may appear less dramatic, these routes were strategically important, with new, straight roads from Bury, Eccles and Ashton paralleling the older turnpikes on the ancient routes. Gauging the contribution of these new turnpikes to increased road capacity is difficult since the new roads were integrated into the wider network. However, as an example, in 1836 the toll income on the 4 miles of Bury New Road (Act of 1826) was £2,593 whereas the toll income was £2,300 on 6 miles of the older Bury road (Act of 1755) which fed into the new road but also ran alongside it. The toll income of the 4 miles of the new Hulme & Eccles road (Act of 1806) was £1,591 in 1836 whereas it was £1,741 on the 8 miles of the Gilda Brook turnpike, a section of which it duplicated. Clearly a lot of traffic was using the new roads but this did not make the older roads redundant, and they were well maintained and assigned a good score in 1838.

## 11. Investment in Improvement

Financing details of road improvements are revealed in the Tables annexed to Reports by two Parliamentary Committees (PP1821 & PP1840 – the data from 1819 and 1838). The latter, which we have used above, reported the mortgaged debt for each trust and the dates when these loans were taken out. For instance, the 1838 survey recorded that the nine turnpike trusts converging on Leeds (considered in Figure 6) had debts totalling more than £150k incurred since 1800. The longest of these, the 18 miles of the Leeds to Whitehall trust, had an outstanding debt of £65k from a loan in 1806 when it was created and made the new road.

It is clear from Figure 4 that the amount of new road construction varied across the country. The increased debt to finance road building can be gauged by comparison of the Annexes to the reports of 1821<sup>15</sup> and 1840 which span the period when McAdam and Telford were most active. For instance, the average mortgage debt per mile of the turnpikes in Lancashire increased from £590/mile to £1066/mile and in Middlesex the average rose by £290/m to £1750/m. In both Sussex and the West Riding the average rates doubled to £425/m and £738/m respectively. Surprisingly there was more modest growth of no more than 20% in the industrialising areas of the West Midlands, where both Warwickshire and Staffordshire turnpikes had debts of about £250/m by 1838; this was area where canals had become especially important. These contrast with the rural counties of Southern and Eastern England where average rates fell slightly in Norfolk, Suffolk, Hampshire and Wiltshire while rising only slowly in Cambridgeshire, Lincolnshire and the North Riding, all staying between £100 and £200/m. These changes are net amounts based on the rise in debt for road construction minus the repayment of some old debts from toll income, so the actual investment in particular trusts was certainly even greater. Importantly these data illustrate that, unlike the first phase of improvement in the 18<sup>th</sup> century, improvement in the 1820s was targeted within the existing network and only in a few areas of the country. These were in counties where towns were growing rapidly as manufacturing, commerce and recreation expanded. Improvements were less common on roads in rural agricultural areas that lay between the traditional market towns.

In the 1838 survey, trusts were asked to state when the debts had been incurred but most only stated a total figure covering many decades. However, 150 trusts gave the date at which components of the loans were made; these trusts were randomly distributed over counties and time. The total amount raised in each decade is shown in Figure 7. Although these data are subject to the caveat of earlier loans being paid down by 1838, it does show a marked biphasic distribution with a first peak in the 1760/70 period, a second in the 1820s and a marked dip around 1790. To remove the effect of new trusts making big investment in new roads, the data from trusts created before 1810 are also plotted. This too shows the biphasic pattern demonstrating that existing trusts, not just new trusts, were making substantial investment in the 1820s and 1830s. The dip in total investment in the 1790s might be interpreted as showing no further need for improvement and the rate at which turnpike trusts were created did fall during this period. However, existing trusts had continued to borrow in the 1770s, decades after their creation so this dip suggests a more fundamental change. The 1790s was the decade of canal mania and so the dip could reflect a shift in transport investment from land carriage to water carriage. Whatever the dominant factor, there would have been a slowing down in financing of road improvement at the end of the 18<sup>th</sup> century. At the same time, we know that traffic continued to rise (Gerhold 2014, Rosevear et al 2019) and so it is inevitable that wear and tear would degrade the existing road; this would be perceived

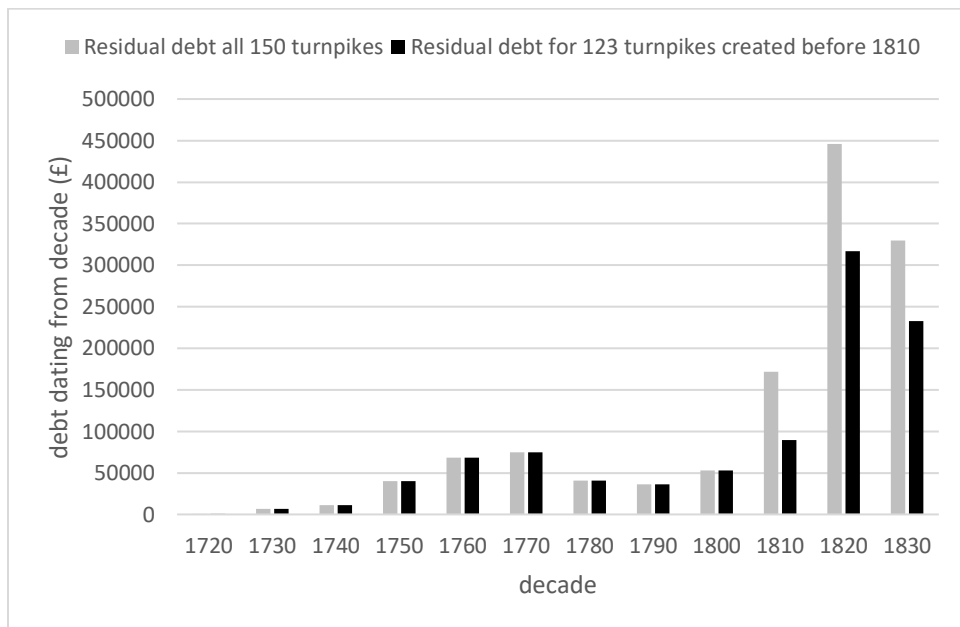
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<sup>15</sup> There was no entry of debt from some trusts in the 1821 report so comparisons are not possible for some counties.

by observers as a decline in road quality. The rapid rise in investment during the decades 1810/20 coincides with the dramatic increase in construction of new turnpike mileage that we saw above. One must assume that any improvement from Macadamising the running surface of existing turnpikes would be at little net cost and is not reflected in these figures.

Figure 7; The decade in which the residual debt for a sample of trusts was incurred, based on 1838 Questionnaire

Data shown for trusts that identified the date or short period over which the original loan was taken out.



This overall pattern of investment was reflected in the improvements made by individual trusts. For instance, the 1838 survey shows that the Stokenchurch trust which managed the London road into Oxford through Wycombe, had outstanding mortgaged debt from two periods; £4.5k from 1758-93 and £9.7k from 1824-34. The earliest of these was for constructing the new diversion through Headington to avoid Shotover Hill, the second to work recommended and supervised by McAdam to build a new road up the scarp face of Stokenchurch hill and straighten sections towards Tetsworth (Rosevear 2003). Combined, these improvements resulted in the quality score increasing from the 2 accorded to Young’s ‘notoriously bad’ comments in 1770 to a quality score of 5 in the 1838 survey.

## 12. Conclusions

Finally, we will draw the outcomes of this study together and relate it to other contemporary observations. Our analysis of improvements made by turnpikes falls into three time periods; one before a road was turnpiked, a second after turnpike trusts took over the ancient roads and a third when the existing turnpikes undertook a new wave of improvement and road construction.

In the decades before turnpiking began, diarists, typically travelling on horseback, judged most highways to be poor (70% of the mileage was scored as inadequate before 1715). All roads were in the care of individual parishes and commentators did not distinguish particular classes of road in their comments nor suggest the main roads were given special treatment. The initial turnpike Acts illustrate that the first sections of road to be turnpiked were in a very poor condition, often dangerously so. The poor state of the main roads was blamed on the growth in heavy traffic, aggravated by the nature of the soil and absence of suitable road making materials in the parish. However, the geographic distribution of the problem was

scattered, with relatively short sections of very bad road preventing travellers easily passing and re-passing a long stretch of highway. The newly created turnpike trust would be responsible for a route that used roads in several parishes and included both good and bad sections. These early turnpikes were likely to mark out the areas where through traffic was at its heaviest. The conditions were worst on the highways radiating from London but were as bad around provincial hubs in parts of West Yorkshire and Durham where heavy industrial and minerals haulage was common. There were ruinous roads in the cloth making areas of the Severn Valley and NE of London where agricultural goods were generally carried. These initial turnpikes were embedded in the much larger network of parish roads and the northern and western extremities of the Great Roads surveyed by Ogilby in 1675 were not turnpiked in this period, suggesting heavy wheeled vehicles were not common here<sup>16</sup>.

The evidence from textual analysis of Continuation Acts, diary comments and turnpike debts point to a long period of slow improvement after a road was turnpiked. Turnpiking increased financial resources that could be applied to roads and facilitated coordination of material resources to deal with the worst problems. However, it brought no fundamentally new methods of road maintenance nor any new supervisory powers for the Justices. There was no strong external driver to maintain the momentum of improvement and few restraints on borrowing to encourage efficient use of funds. In Continuation Acts the trusts claimed that they had made progress rectifying many of the extremely bad parts of their roads. Trusts had borrowed considerable sums, typically £200/m, to fund improvements but had yet to repay most of this debt from their toll income. For some, expenditure had been greater than expected due to the high cost of materials and continued damage from traffic, particularly heavily loaded vehicles that paid a small toll relative to the damage caused. The comments of diarists who used the roads were more severe, suggesting that little improvement in quality was observable before 1770. Nevertheless, to pass Continuation Acts legislators must have had confidence in the trusts, though maybe as the least bad option. Management of the main roads was now by credible individuals more dedicated to road improvement than the parish surveyors. Trustees or Commissioners with wider experience and greater curiosity progressively introduced some of the good practice observed by travellers such as Young. Initially the focus was on repairing and mending the ancient highways that had been neglected by the parishes, bringing them back to a condition common before heavy traffic increased in the late 17<sup>th</sup> century. These improved roads would be no better than the best roads of the past, but in general, most of the turnpiked main roads now reached that quality threshold. Overall, the heavily used roads were slowly being improved, but still within a large, mainly undifferentiated, network that was predominantly managed by the parishes.

Into the 1770s, not only were individual turnpikes progressively improved but many more miles of existing road were turnpiked. These were minor principal roads and the cross roads that had been adequate for horse rides and pack horses but were now frequented by the new class of travellers on wheels. They expected a road wide enough for a chaise not a single horse, smooth enough to avoid jolting them when travelling faster and firm enough for narrow wheels not hooves. If they were to pay a toll, they expected improvement to follow. These travellers came from the class who were also the trustees and Commissioners of the turnpikes and so could influence beneficial improvement on local turnpikes. Comments from travel diaries in the 1770s and 1780s reported a general improvement in observed quality

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<sup>16</sup> This is consistent with area studies such as that by Sheldon (1828) for Devon where wheeled vehicles were said to be almost unknown in Cornwall and West Devon before 1750

on the turnpike roads that had previously been judged to be poor highways. These good roads not only radiated from London, but interconnected the main provincial cities and towns, from Exeter, through Bristol and Birmingham to Manchester, Leeds and Newcastle. County towns such as Derby and Worcester were hubs from which several good quality turnpike roads radiated creating a functioning network of turnpikes that was well differentiated from the maze of parish roads. In Table 3 we showed that between 1750 and 1770 there was a step change in turnpike mileage of 3% to 12% as a percentage of total highway mileage. This probably marks when the turnpikes became a functioning network and made a high level “improvement” that delivered transport benefits. The residual debt of turnpikes showed that many made significant capital investments during the latter parts of this initial phase, particularly after 1750. Steadily increasing traffic on an interconnected system raised expectations of revenue against which loans were mortgaged and low interest rates facilitated borrowing without burdening parish or government.

Fresh gravel turnpike roads suitable for lightly built carriages had been created by upgrading the ancient, narrow, damp lanes on native soil, scattered with rocks and stones. Meanwhile any improvement of parish roads was limited to a few areas with progressive patrons. Trusts varied in their ability and urgency in making improvements and the network was still a mosaic where road quality might differ on stages along a journey. Nevertheless, the comments in diaries suggest that by 1770 the improvements were observable over long stretches of many turnpike roads; on comparable sections where only 16% of roads were judged adequate before turnpiking, 52% were adequate by 1770 and 74% by the 1790s. Others have shown that this was also a period of rapid expansion of the London stage coach services (Gerhold 2017, Rosevear et al 2019). This study demonstrates that the period in which many turnpikes within the network were first observed to be good also coincides with the years when the speed and volume of advertised passenger services increased, though does not provide a firm causal link.

During the 1790s the rate at which existing roads were turnpiked fell but the residual debts suggest investment by the trusts may also have slowed. There are several plausible reasons for this. In the 1790s the interest in canals was high, so investors, engineers and civic leaders were pre-occupied with this as the expanding mode of transport. The adverse financial conditions and high inflation during the Napoleonic Wars may have made access to capital more difficult and uncertainty over future traffic cast doubt on the value of mortgaged tolls. Alongside this, most of the busiest roads were now wider, smoother highways in a functioning network, so local pressure to extend the turnpikes would diminish. However, traffic continued to rise particularly on the arterial roads into London and the cumulative stress on individual turnpikes rose. The decline in quality through wear might be imperceptible and disguised by mindless loading of poor materials onto the old foundations. However, it seems inevitable that on the busiest roads users would eventually notice the deterioration. At the same time tolls were rising to service the large debts with which trusts had burdened themselves. In the absence of any external pressure to control costs or respond to the needs of road users at a regional level, the individual turnpike trusts were no longer an active force for road improvement.

Here, we reach a similar conclusion to earlier work, that there was a surge in road improvement in the post war period. Importantly we are now able to characterise this better. The scale of this phase of improvement would be far greater than in the earlier phase and occurred over a much shorter period, lasting less than 30 years. A catalyst for this second phase was strong criticism from influential government

departments, particularly the Board of Agriculture and The Post Office<sup>17</sup>. Commentators such as Arthur Young in County Reports to the Board had emphasised that poor quality of some rural turnpikes were a restraint on agricultural progress. The Post Office was more assertive. After 1784 they were obliged to operate a fast, reliable service along the turnpikes (Austin 1981). Their mail coaches were a daily test of road quality and they had the management expertise and political power to press for improvement of poor turnpikes under threat of indictment by the local Justices. Initially they could only use threats but by 1815 they were able to offer a potential solution to the turnpikes trusts. McAdam had combined the best existing road construction methods with firm management to demonstrably improve the roads around Bristol. Unbelievably, McAdam had shown that roads could be improved at almost no net cost, maintenance costs could fall and the trust might actually spend less money. The solution of two problems in one, reducing spiralling debt and avoiding indictment for poor roads, had turnpike trusts queuing to employ McAdam and his sons as consultant engineers. A self-sustaining, rapid rise in road improvement by the larger trusts along the post roads began to increase the quality of the existing turnpike networks. It was given further impetus by Government committees such as that which reported in 1820 and diffused to smaller trusts through better trained surveyors. At the same time the Government improved the access to capital for turnpike trusts by making loans through the Public Works Loan Board. Between 1817 and 1832, 101 trusts took out loans ranging from a few hundred pounds to £10k in the case of the Middlesex & Essex, Cheltenham and Blackburn & Preston trusts and £12k for the Wooler & Breamish trust<sup>18</sup> (these four had a quality score of 5 in 1838).

In parallel the Government promoted a new Mail Road to Ireland, needed for political reasons. It directly financed the Commission charged with constructing a new road through North Wales using the best engineering methods managed by Telford. It channelled loans to the turnpikes on the English section of the Holyhead Road so that they could implement Telford's recommendations. However, there were many more places where an existing turnpike was not worthy of improvement or where demand for travel exceeded existing capacity or needed a more direct path. This generated a wave of new turnpike road construction on new alignments, connecting into the existing turnpike network. These avoided steep gradients and created wide highways surfaced with firm, broken stone and sifted gravel that allowed coaches to travel quickly, safely and smoothly. These diversions and new lines ranged in length from a few hundred yards to many tens of miles but cumulatively accounted for almost a sixth of the turnpike mileage and required substantial investment as evidence by the residual debt in 1838. This new construction was a major factor in the better overall quality of the nation's road network that was recorded in 1838. However, it was equally important that it was within a larger network of existing turnpikes with a refreshed, well-maintained Macadamised surface.

The roads selected for turnpiking were increasingly differentiated from the majority of highways that remained under parish management and improved only slowly. The relatively poor quality of the parish roads observed by diarists, emphasises that turnpiking was the main factor in achieving road improvement in most areas. Prior to 1750 the turnpike mileage was still relatively small and improvements were not dramatic but probably halted a serious decline on important roads within the parish highway network. During the late 18<sup>th</sup> century more parish roads were selected locally and re-purposed as turnpikes, improved and connected to create a network for inter-urban and inter-regional travel. All this was

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<sup>17</sup> The Webbs (1913) deal with this in great detail

<sup>18</sup> Data from source X processed by (Dan)

achieved by local management without any visible government involvement other than empowering the trusts and some ineffectual attempts to legislate on the design of wheeled vehicles. After 1820 substantial improvements were made over a much larger turnpike network. Many miles of new road were built to a high standard to serve areas where economic growth had increased demand for efficient road travel. The scale of the investment was large, with some new roads requiring loan financing of more than £10k. This sequential improvement in road quality coincided with a progressive improvement in the management of the roads and the skills of those involved. It was the combination of improved technology and more able management that meant turnpike trusts achieved greater improvement in roads than alternative authorities might have done. To paraphrase Parnell in 1833 (quoted by Pawson) "If rates had been used to finance main roads it would fail because land owners would prefer bad roads and low rates to good ones and high rates. If in the hands of government, it would fail because Parliament would never vote a million and a half pounds each year for main roads".

By the 1810s, there was more direct intervention by government, including the better access to capital through the Public Works Loan Board and directly through the Commission which selected the route and constructed the Holyhead Road. However, the 1819 Committee recommended leaving management with the turnpike commissioners rather than any Government Department, though they did favour some consolidation, particularly around London. Unlike Guldi (2012) we do not see Government involvement as fundamental to the improvement of the main road network of England and Wales. An important external pressure on trusts did come at the operational level from the Post Office which had a national perspective of where road improvement was most needed. However, the vast majority of the selection of routes and their improvement were achieved by the locally run turnpike trusts. This inevitably meant that some turnpikes were allowed to languish in favour of alternative routes as tastes and industries changed and other roads were improved. Through local control, investment was concentrated on those roads that were needed, at least regionally. The need for the Holyhead Road highlights the disadvantage of this system so far as nationally strategic route was concerned. The failure of some trusts to keep up with traffic in the early 1800s had highlighted the weakness of fragmented, relatively small trusts, which had limited management expertise and lacked vision in the face of changes. After 1820 and more insistently in 1838 a new era of closer scrutiny by Government emerged. This was more concerned with finance and consolidation rather than road improvement and was prominent during the later decline of the turnpikes as railways expanded.

The decentralised character of the turnpike system had been a channel through which the Improvement Culture of the 18<sup>th</sup> century elite could function to the benefit of an area beyond that of one parish. The conscientious efforts of a small number of trustees raised finance and provided continuity of management through renewal of their powers. Their dependence on toll income made turnpikes responsive to the changing needs of road users for inter-urban travel. The amateurish, short-sighted and discontinuous nature of the parish system could not have become aware and implemented improved methods of road construction on the scale of the turnpikes and in practice could not build new roads to meet changing needs. The parish road system remained appropriate for domestic industry and access to local markets but not for the growing emphasis on long distance travel and transport of goods. The focus of the turnpikes on a main road network set the pattern of concentrating resources on a few roads fit for use by heavy traffic. In this respect the most important "improvement" was the creation of network that comprised the minimum number of good roads to meet demand.

Creating a turnpike trust did not necessarily result in an improvement in road quality and growth in road transport. However, through incremental improvements in the trusts themselves, their ability to raise capital and application of appropriate technology they improved those roads that travellers most needed.

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## APPENDIX 1;

### Table; Data entry criteria used to interpret 1838 Questionnaire and diarist comments.

#### **Classifications 1 to 6 for road quality-worst to best-common synonyms listed after each main category**

1, **Very bad or dangerous**; worst, terrible, execrably bad; insufferably bad; unsuitable for carriages; very steep extremely hazardous; had to walk horses; tide covers sands, hazardous ford.

2; **Bad**; rough; dirty lane; large stones; very dirty & narrow; full of ruts; very dirty; very stony; rough for coaches; too bad to use the postchaise; under indictment; rough, hard & uneasy; deep & unpleasant.

3. **not good**; sandy hard going; hilly and uneven; sandy steep and heavy; dirty stony; narrow; Summer Road only; indifferent, winding, uneasy, no very good way, mountainous, hard hilly, overhung

4; **adequate**, pleasant road; tolerable; not best, not very ill, rather sandy; uneven hilly but free from ruts or stones; tolerable; good at this season {was terrible was insufferable--- implies improved), in repair, indifferent good.

5. **Good**; level & pleasant hard as garden gravel; delightfully pleasant; fine road; like a gravel walk; clean road; fine road; very level; delightful road level hard straight pleasant paved pebbles; very agreeable.

6. **Very good**, most excellent turnpike; well-pitched,

Notes; mud and clay very bad; sandy implies it is not firm-deep and sandy very bad since wheels and hooves sink in. Firm, level gravel is ideal; if only bad in winter average the score. Where several different sections are described an average score is used.

**APPENDIX 2;**

**Table 1; Reported road quality scores along seven routes through England, before and after turnpiking**

The year that particular road was turnpiked in round brackets, scores in date order in any box; square brackets indicate a score before turnpiking; A indicates an Act before 1750 so likely score of 1 or 2. Cells crosshatched where score is below 4 and grey where above 4.

(a) TO CARLISLE	pre 1720	To 1760s	1770s	1780s	1790s	1838
Whetstone (1711)	A	5	6			6
Dunstable (1710)	[1] A		5	4		6
Coventry (1723)	[3]	A		2		5
Lichfield (1728)	[3,4]	A	4		6	3
Newcastle (1753)		A	1	2		5
Warrington (1726/53)		A	1			3
Ashton (1727)	3	A	1			3
Preston (1750)	[3]	A	1			5
Lancaster (1753)	[2]		('70 1) ( '75 4)			5
Kendal (1753)	[1]		5			5
Penrith (1753)	[3]	[4]	6			5

(b) GREAT NORTH RD	pre 1720	To 1760s	1770s	1780s	1790s	1838
v Royston (1710)	[1] A				5	3
v Knebthw' (1725)	A [2]		6			6
v Bigglesw' (1724)	[1] A				5	5
Newark (1766/76)	[2]		6		6	5,6
Doncaster (1740)	[4,3]	A			6,5	5
Tadcaster (1744)	[2]	A	5			5
York (1744/53)	[5]	A			6	5
Durham (1746)	[4]	A	4			6
Newcastle (1746)		A	3	3	5	5

(c) TO WORCESTER	pre 1720	To 1760s	1770s	1780s	1790s	1838
v Southall (1715)	A	4	2	5		0
v Stokench' (1718)	A	3	1			5
v Henley (1735)		A	6			3
Oxford (1729)		A	3	6		5,6
Enstone (1729)		A	5	4		6
Moreton (1725)	[3]	A	2			3
Evesham (1757)			6		5	5

(d) TO BRISTOL	pre 1720	To 1760s	1770s	1780s	1790s	1838
Brentford (1716)	A [5]	6	6			0
Colnbrook (1726)	A	6	6			5
Maidenhead (1717)	A	6	5			5
Reading (1714)	[2] A	5		6		5
Newbury (1725)		A, 2		6		5
Marlboro (1725)		A	5	6		6
Chippenham (1726)		A		3		5
v Bath (1707)	A	3	5		4	5

(e) TO WEYMOUTH	pre 1720	To 1760s	1770s	1780s	1790s	1838
Hounslow (1716)	[5] A	A	3		**	0
Egham (1727)	[2,2]	A	3			6
Bagshot (1727)	[3,2]	A	6			6
Andover (1755)				3,4		5
Salisbury (1756)			5			5
Blandford (1756)				4,4		5
Dorchester (1760)			1	3	3	6

\*\* in 1810 score 1; in 1816 score 2

(f) TO YARMOUTH	pre 1720	To 1760s	1770s	1780s	1790s	1838
Romford (1721)		A, 5	4			5
Chelmsford (1695)	A	5	4			5

Ipswich (1711)	A, 3					5
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score before turnpiking; A indicates an Act before 1750 so likely score of 1 or 2.

(g) TO MANCHESTER	pre 1720	To 1760s	1770s	1780s	1790s	1838
Hockliffe (1728)	[1] A		5	4,3		6
Stoke Gold' (1722)	[1]	A				5
Leicester (1725)	[3]	A		5		5
Derby (1737)		A	4,5			5
Whalley Br (1724)		A	4		5	*

\* new road score 5

(h) EXETER TO LICHFIELD	pre 1720	To 1760s	1770s	1780s	1790s	1838
Exeter (1753)	[3,1] A		6			*
Taunton (1729/58)	[2]	A			5,5	5
Bridgwater (1758)	A		4		4	5
Bristol (1727)		A	5		5	5
Gloucester (1756)			2	2	5	5
Worcester (1768)			6,5		5,5	5
Birmingham (1728)		A	3,3,5	3	2	3

\* new road score 5

**Table 2; Reported road quality scores at hub towns in England, before and after turnpiking.**

Date that particular road turnpiked in round brackets, scores in date order in any box; square brackets indicate a

	pre 1720	To 1760s	1770s	1780s	1790s	1838
Tunbridge W (1709) (1766) (1766)	[3,3]A				3,2,2 2	5 3 2
Cheltenham (1792) (1824) (1756) (1824)				[2,1] [4] 2	[2] 3,2,2	3 5 5 5
Gloucester (1722) (1725) (1769) (1756) 1756 above	[2,1]4 [3]	A 3 A	1,2 2	1, 2 6,6,6 2	3,5 4 5	2 5 5 5
Bath (1707) (1707) (1752) (1783)	[3] A A [5]	3	5 5	2,4,4 4	4 6,6	5 5 3 6
York (1765) (1744) (1753) (1749) (1753)	[5] [4,2,5] [4] [1] 5	[2] A A	6,6 5		6 6	5 5 6 5
Salisbury (1753) (1760) (1756) (1832) (1756)		6 [2] [2] [3]	3 5 5 5	5 3,4	5,4 3	5 3 5 5 5
Derby (1737) (1756) (1758)		A	4,5	6	5	5 6 6

Alan Rosevear; March 2021 fresh revision plus;

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