

Horse traction in Victorian London

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Work horses have not received the attention they deserve in studies of transport history. Nor did contemporary descriptions of life pay much attention to them, for, like the cars that line the streets today, they were too ubiquitous and too much a part of everyday experience to be worth writing about. Traffic congestion, the loud clatter of horseshoes and iron-rimmed wheels and the smell of manure did attract occasional mention, but most references to horses in newspapers and other periodicals related to *saddle* horses. This article is concerned with the economics of *harness* horses, what they were used for, how numerous they were and how much they cost to buy and to maintain.

To the economist, and to most owners of the period, such horses were simply depreciable capital goods, used in fairly fixed proportions with stables, vehicles, harness, labour and provender (i.e. fodder and bedding) to transport goods and people and, incidentally, to produce manure.¹ They had certain special characteristics, however. Being mobile, they had a ready second-hand market. Being animals, they required attention seven days a week, whether or not they were working; they could fall ill; they had a working life that varied considerably and unpredictably, and, finally, being sentient creatures, some were stubborn or vicious and some could be mistreated in a way which upsets us today and upset many Victorians at the time.

Major horse owners

Major horse owners bought almost all their horses first-hand, usually at five years old. When their horses became lame or lost their strength, they were sold, generally at auction, and passed on to a second owner. For 1875 we have a list of major horse owners which shows what kinds of business owned large numbers. It comes from the minutes of the London General Omnibus Company (LGOC). Other data for this company come from its six-monthly reports to shareholders (Table 1).

Table I Some major London horse owners, 1875

| | | |
|---------------------------------|-------|--|
| London General Omnibus Co. | 8,000 | Omnibus co. |
| Pickford & Co. | 900 | General carriers and railway agents |
| Thomas Tilling | 750 | Jobmaster, carrier, contractor, buses |
| Great Northern Railway | 720 | Railway |
| Chaplin & Horne | 600 | General railway carriers |
| S. & E. Leney, Paddington | 500 | Contractor (to GWR) |
| Great Eastern Railway | 500 | Railway |
| London & SW Railway | 450 | Railway |
| McNamara | 400 | Railway agents, contractor to GPO |
| Carter Paterson Co., Goswell Rd | 300 | Carriers and railway agents |
| Cadogan Livery Stables | 300 | Livery stables |
| Tom [L?]ane, Ebury St, Pimlico | 250 | ? |
| South Eastern Railway Co. | 240 | Railway |
| T. Morrison Fairclough | 230 | Licensed carman |
| Truman Hanbury Buxton & Co. | 200 | Brewers |
| Newman & Co. | 200 | Jobmaster |
| Samuel Crews | 170 | Omnibus proprietor |
| Barclay Perkins & Co. | 150 | Brewers |
| C. Glover | 150 | Wheelwrights, carriage builders, contractors |
| Frederick Wiggins | 150 | Horse dealer |
| Watney & Co. | 142 | Brewers |
| Joseph Taylor Younghusband | 135 | Carrier |
| J. Cousins & J Cockram | 120 | Smiths and farriers |
| Thos Fardell | 120 | Licensed carman |
| C. & J. Manning | 120 | Cab proprietor |
| Whitbread & Co. | 116 | Brewers |
| William King | 100 | Cab proprietor |
| George Goodchild | 100 | Jobmaster |

Source Public Record Office, Kew, RAIL 1114/34-6.

Carriage horses

Carriage horses ranged from the splendid to the merely ordinary, but were generally superior to cab horses. Some people kept their own, some hired horses and vehicles from jobmasters – the Victorian equivalent of Hertz or Avis. Anthony Trollope relates in *Barchester Towers* how Dr Grantly, who was rich:

kept a separate pair of horses for the exclusive use of his wife since the day of his marriage; whereas Mrs Proudie had hitherto been jobbed about the streets of London at so much a month during the season; and at other times had managed to walk, or hire a smart fly from the livery stables.²

According to Mayhew in 1850, the *Post Office Directory* showed 154 jobmasters located in London, fifty-one also being cab proprietors and twenty-eight also owning omnibuses. ‘The number of job-horses kept for chance work in the metropolis may be estimated at about 1,000, in addition to the cab and omnibus horses, many of which frequently go out in flies.’ Most horse pairs drawing splendid carriages belonged to jobmasters, as very few noblemen brought their carriage horses into London.³

Omnibus and tram horses

When George Shillibeer initiated a London omnibus service in 1829, three horses were used, as in Paris, but after some years most London omnibuses were drawn by two horses. By 1901 almost the only three-horse buses remaining were the red 'Favourites' from Highgate and Islington to the City. The LGOC had studs of ten or eleven horses, eleven for omnibuses that did four full trips plus a short one in a day. A full trip averaged three and a half hours, so without the extra short trip the day's work employed eight horses, giving each pair in turn a day's rest. An extra short trip meant an extra horse and a different system of relief.⁴ The horses did sixteen miles a day; while London Road Car horses did fourteen.⁵ These horses had to be strong, but they did not have to be handsome. They were similar to the horses used for light carts and tradesmen's carts. They formed a major proportion of omnibus company assets, and were treated accordingly.

The same kind of horse was used for trams as for omnibuses. North Metropolitan Tramways, started in 1871, hired its horsepower from the LGOC until mid-1878, at 6³/₄d per mile run. Each car on duty generally ran seventy miles a day, requiring an active stud of eleven horses, one spare and five pairs on duty, each pair doing fourteen or fifteen miles during three and a half to four hours, the contract providing that each pair of horses worked at least fourteen but not more than sixteen miles a day.⁶ London Tramways was also supplied with horses until the middle of 1873 by the LGOC, except for two lines, but by the second half-year of 1876 owned an average of 1,031 horses.⁷ By 1890 North Metropolitan Tramways had 3,346 horses, London Tramways had 3,211 horses and London Street Tramways, the third largest, had 1,127.⁸

Cab horses

Some cabs worked with one horse, especially those driven by owner-drivers, and some had three horses, but two horses, changing once in the day, was usual. Each horse might be out for six to seven hours, in which case the driver would work twice as long as that, sometimes up to eighteen hours per day, sometimes less than twelve hours a day.⁹ One proprietor explained that he let on the two-horse system to younger men, who worked longer hours than the older men.¹⁰

The trade was always one of small proprietors. Among 3,168 proprietors with 10,806 cab licences in 1893, the seventeen largest had only 14 per cent of the total, in fleets ranging from fifty-two to 281. They may have bought good horses, but that does not necessarily mean that the horses were well looked after. Some cabs were drawn by dreadful old 'hacks'. The earnings of the driver depended partly on the state of his cab and horse, for a good cab got a better tip. 'Anyone choosing a cab looks even more particularly at the horse than at anything else, and finds, as a rule, that good cattle and good cabs go together.'¹¹

Cart and van horses

Cart horses were used in many trades—railways, breweries, distillers, millers, vestries, carriers and coal merchants being among the most prominent. These heavier horses used were largely Clydesdales and Shires. Lighter horses were used for parcels work by the Post Office, shops (Whiteley's had seventy), the railways and carriers. But the bulk of such horses were used by a whole multitude of businesses. Many of their drivers probably described themselves in their census returns as milkmen or bakers, so the numbers recorded in the censuses as 'carmen' and carters provide no useful clues.

Many of these horses were jobbed, even down to the butcher's cart and pony,¹² and much of the work was done by contractors. Pickford's and Chaplin & Horne, who were the two big 'wharfingers' and railway carriers, worked as agents for a number of railways, especially until the mid-1870s.

Street cleansing and watering, and dust removal (so-called because ashes were the major part of Victorian domestic rubbish), were the responsibility of the City Corporation and of the parish vestries. Their horses were among the finest cart horses in London, but were outshone by the brewers, whose horses took the most prizes at the London carthorse parades. The brewers owned a large number of horses. Barclay Perkins, for example, had 154 in 1837 and 148 in 1883.¹³

Working life

The treatment of the brewers' horses, however, was exceptional. Since many drivers and stablemen were uninformed, and even human labourers were overworked and dismissed once they were 'worn out', it is not surprising that maltreatment of horses was common. A horse was regarded by many as no different from any inanimate piece of capital equipment, at least early during Victoria's reign, and was treated accordingly. Horses, like people, are prone to accidents and infectious diseases, so owners had to allow for both deaths and absenteeism among their stud; the larger owners ran hospitals for their horses. A foreman in charge of 1,000 omnibus horses, on a tour of inspection ordered 'a pint and a half of ale for one horse, mustard for another, a blister for another, poultices for two or three, and "*a drop of whisky for the roan at the far end*".¹⁴

Horses were usually purchased by users at the age of around five. Some horses were kept until they died or had to be destroyed; others were kept for a shorter period, being 'cast', i.e. sold off, usually at auction, because they were unsuitable. Their working life for their first users in the case of brewers, vestries and railways, who looked after their horses well, averaged between five and eight years, though in 1890 five of the horses of St Mary Abbot's, Kensington, had done twelve or thirteen years of service for the vestry. In contrast, LGOC horses lasted only four and a half to five years in service on average, and tram horses lasted only four years: 'what kills the omnibus cattle is the continued pulling up and starting on the London stones, while the railway horses' work is steady pulling'.¹⁵

The reason why the tram horses were worked out sooner than omnibus horses was ‘the greater effort required to start a tramway car . . . together with the greater frequency of the stoppages’.¹⁶ Furthermore ‘so much greater is his effort that it costs a shilling a week more to feed him’.¹⁷ Service life was a business decision:

Experience, or rather a combination of circumstances, has led coach proprietors to the same result; but they have reasoned a step further, and found it more profitable to double the quantity of labour here assigned for the day’s work of a horse, and to wear the horse out in three or four years. The difference between the interest that will return the excess of capital expended in the [more frequent replacement] purchase of fresh horses, and the annual expense of keeping a greater number of them [to do the same total amount of work] is too great to allow the proprietor of three or 400 coach horses to hesitate about 130 of them in a year being sacrificed. It is a melancholy reflection to recollect, that there is at all times in this country several thousand of horses wearing down under excess of labour.¹⁸

Steam competition

Before the introduction of steam locomotion, thousands of waggons, mostly drawn by six or eight horses, entered or left London each week.¹⁹ The total number of horses in the country as a whole used in coaching was over 150,000—about one horse per mile of route. Coachmen, guards, storekeepers, ostlers, clerks at booking offices, porters, assistants, etc., were upwards of 30,000. The number of stage and mail coaches was not over 4,000, some 700 of them being mails. William Chaplin was the largest owner, occupying five yards and having 1,300 horses at work in coaches. B. W. Horne and Edward Sherman were the two next largest proprietors, with about 700 each.²⁰ However, as early as the year ending January 1845 ‘short’ stage coaches had been abandoned and the railways had driven all the long ones from the road except about fifty, but there were at least 1,400 omnibuses.²¹ Charles Collins, a coach proprietor on the London and Blackheath road, had been increasing the number of his coaches until 1834, when the introduction of steam vessels diminished their number, which by 1837 had fallen by half:

they run in the summer season, a time when we calculate on making our profit. The steam vessels certainly took away nearly all our profit . . . since that time the railway has so much diminished the number of passengers by our coaches, that it is impossible for all those that are now working to be kept on.²²

Before these changes, coach and waggon traffic in and out of London, passing through the turnpikes which surrounded it, must have been very considerable, but then the character of such traffic changed. According to the chairman of the Metropolitan Road Commissioners, who looked at the matter in terms of turnpike revenue, in 1856:

Half the horses in London never see a turnpike gate. Take the brewers in the London traffic, and other tradesmen; there are hardly any, I believe, go out of London; a very limited number of brewers' carts go out of London; the same as to coals and as to the job horses. The principal horses that come through the tolls are for what is called the long traffic. I believe [it] may be divided into pretty nearly four heads in London. The first and largest is the omnibuses; then there are the vans from the railroads, and other commercial traffic, which now form a very large item, say £12,000 a year; next the agricultural. I suppose what with hay, straw, market gardenings, and other things which come to London, they pay £12,000 a year. Then perhaps the smallest division is what is called pleasure traffic: gentlemen's carriages, riding on horseback, and other things, which is very little towards the east end of town.²³

Some proprietors managed to cope with the technological revolution and prospered. By 1846 Chaplin and Horne had joined forces; they became major carriers for the railways, Horne became chairman of the London & South Western Railway, an MP and Sheriff of London and Middlesex. Pickford & Co. also adapted. An advertisement in the *Times* of 14 June 1837 ran:

Forty horses working Pickford & Co.'s London, Manchester and Liverpool Van. To be sold by auction in consequence of the intended opening of the Railway from Liverpool to Birmingham.

The fall in the growth in the number of horses, however, lasted for only a few years. The number of horses with vans returned for assessed taxes by Pickford's had resumed its 1837 level by 1845 and grew rapidly thereafter.²⁴

Steam traffic was not only competitive, it was also complementary, for the growth of London and its railway traffic entailed a parallel growth in passenger movements and in the collection and delivery of goods within the metropolis. Hence the rapidly growing railway traffic increased rather than diminished the number of horses in London. In 1841 James MacAdam wrote:

Much additional thoroughfare and wear have continued to take place upon the upper portion of the Metropolis Roads during the past years, arising from the great increase in the number of public carriages, rendered necessary for the conveyance of the public to and from the several railway stations, and by the extension of buildings in almost every direction along the lines of the several Roads. A large addition has therefore taken place in the number of horses kept in London.²⁵

Less obviously, according to Mayhew, 'the job trade, I am assured, has increased fivefold since the general establishment of railways', probably because people coming to town for the season now came by rail and left their horses behind.²⁶

In 1866 an observer of the national scene wrote:

It might reasonably be supposed that the new means of communication would have supplanted and destroyed the old. Singular to relate, no diminution has taken place either in the road or canal traffic. As fast as coaches were run off the main roads, they were put on the side roads, or reappeared in the shape of omnibuses. At the present moment there is probably a larger mileage of road passenger traffic than in 1834. The railway traffic is new and additional traffic.²⁷

In the competition between steam and horse, taxation penalised the latter for a number of years. In a pamphlet J. E. Bradfield, who acted as secretary to a London omnibus proprietors' association, produced estimates for 1853 to support its criticism of the mileage duty (Table 2). In 1855 Gladstone responded to the continuing charges that this discriminatory taxation was responsible for the depressed condition of the omnibus trade thus:

But the chief part of that increased pressure [on the stagecoach proprietors] is, in my opinion, due to causes unconnected with the duty. It is owing partly to the high price of forage. It is owing to the increased price of horses. It is owing to the increased competition of railways and of steamers on rivers. With regard to the metropolis, I may also add, a disadvantageous effect has been produced on omnibuses by the increased number of cabs in consequence of the measure of two years ago, by which the radius within which hackney cabs can ply for hire was extended, from four to five miles of the General Post Office, to the whole metropolitan district, which is about fifteen miles. The result has been, that whereas in 1848 the number of hackney cabs in London was 2,849, in 1854 that number had risen to 3,270.²⁸

Table 2 Taxation and the competition between steam and horsepower

| | <i>£ per annum</i> |
|---|--------------------|
| Some 1,200 omnibuses in daily use, cost on average £120 [12] | 12,000 |
| Ten horses for each omnibus, each costing £20 [5] | 48,000 |
| Harness for each costing £20 [2] | 12,000 |
| Stable utensils etc., at least £5 [3] | 2,000 |
| Repairs of omnibuses, each. p.a.. £52 | 62,000 |
| Consumption of corn per horse per week 8s 9d | 358,800 |
| Consumption of hay per week, fourteen trusses per stud | 26,400 |
| Consumption of straw per week, ten trusses per stud | 2,400 |
| Rent of stabling, £20 for each omnibus p.a. | 26,400 |
| Shoeing 12,000 horses p.a. | 32,200 |
| 6,000 conductors, drivers, stablemen, time-keepers, clerks, smiths etc. 28s | 436,800 |
| Mileage duty | 130,000 |
| Licences [some £4,500] and tolls | 45,000 |
| Total | 1,194,000 |
| Mileage duty as percentage of total costs | 11% |

Note Capital costs have been converted into annual costs simply by dividing them by the author's guesses, in square brackets, about appropriate annuity factors.

Source J. E. Bradfield, *Observations on the Injustice, Inequalities and Anomalies of the present System of Taxation of Stage Coaches in England, Scotland and Wales* (1855).

The mileage duty was reduced to $1d$ in 1855, to $\frac{1}{4}d$ in 1866 and finally repealed from January 1870. While tramways and river steamers similarly paid no duty, the railway passenger duty continued (though it did not apply to third-class fares) with the result that complaints by the railways now superseded the earlier complaints by the omnibus proprietors. A select committee reported in 1876 that:

The evidence shows that the railways in all large towns, and especially in and around the metropolis, are subject to very severe competition with omnibuses and tramways, and that the effect of the remissions of taxation from time to time given to stage carriages, has been such that while, in 1865, upon one railway which may be taken as a fair specimen of metropolitan railways generally, the Government taxation amounts to 2.84 per cent. of the gross receipts, and in the case of the London General Omnibus Company to 8.71 per cent.; in 1873 the like payment by the London General Omnibus Company was only 1.53 per cent while with the railway company it had risen to 11.46 per cent.²⁹

The total number of omnibuses licensed changed very little over the whole period 1847–64, apart from a temporary jump in the year of the Great Exhibition (1851), and the net growth from 1864 to 1870 (data for intervening years are missing) was from 1,176 to 1,258. These figures, along with the numbers of trams and cabs licensed, are shown in Figure 1.

Thus the number of omnibus horses cannot have increased very much before the second half of the 1860s, but must then have grown fairly steadily until, in the early twentieth century, the competition of the internal combustion engine began to be felt. The number owned by the London General Omnibus Company, which had about 5,800 horses by the end of 1856, its first year of operation, had risen to 16,714 in 1901.³⁰ Yet only ten years later it ran its last horse bus.

The number of horses owned by Tilling also rose impressively (Table 3). This firm ran omnibuses and cabs (from 1864), having sixty by 1900. It hired out carriage horses and from 1880 on horsing contracts for the fire brigade and the Regent's Park Canal company. It also ran livery stables, and provided

Table 3 Horses owned by Thomas Tilling

| <i>Year</i> | <i>No. of horses</i> |
|-------------|----------------------|
| 1860 | 126 |
| 1870 | 427 |
| 1880 | 1,055 |
| 1890 | 2,022 |
| 1893 | 2,631 |
| 1894 | 2,778 |
| 1895 | 3,069 |
| 1896 | 3,386 |
| 1903 | 6,203 |

Source Tilling, *Kings of the Highway* (1957), year-end figures.

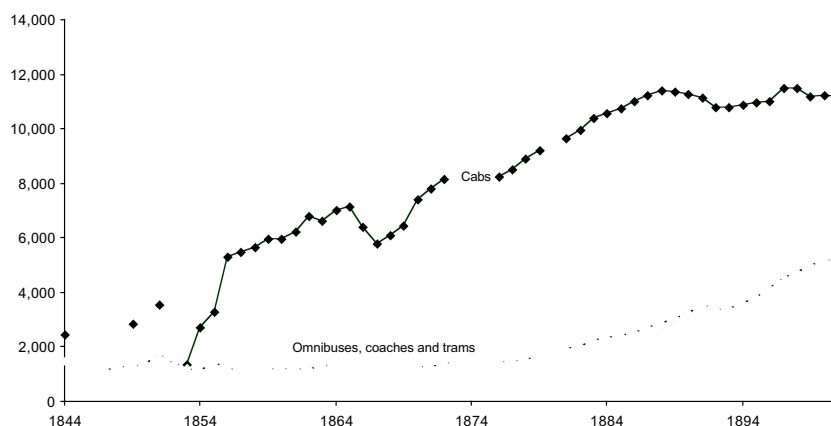


Figure 1 Number of cab, bus, coach and tram licences issued, 1844–1901.

Sources 1844: hackney and stage carriages from *Chambers's Edinburgh Journal* (1845), pp. 409–10. The stage carriages were all but some fifty omnibuses, and all but c. 200 of the hackney carriages were cabs. (Barker/Robbins suggest in a footnote that 1,472 in 1844 seems far too high.) 1849–50: 2,846 cabriolets and 1,350 omnibuses from Mayhew, citing a return obtained by Mr Charles Cochrane from the Stamp and Tax Office, Somerset House. September 1851: 3,548 carriages from *Returns relating to Hackney Carriages, Metropolitan District* (P.P., 1852, XLII). 1847–57: stage carriages and omnibuses licensed from return from the Inland Revenue in a pamphlet, *General Wyndham's, MP, Motion as to Cavalry and Artillery Horses and the Stage Carriage Trade* (1855), and in *Stage Carriages, etc.* (P.P., 1859, XIV). The figures exclude supplementary stage carriage licences, which in 1847–54 were 885, 1,155, 863, 825, 1,579, 1,104, 649 and 559. Mileage duty received in the metropolis also peaked in 1851 and 1852. 1859–64: stage carriages and omnibuses licensed from *Stage Carriages, etc.* (P.P., 1865, XXXI). 1853–72: hackney carriage licences from Select Committee of the House of Lords on Horses (P.P., 1873, XIV). 1884–93: hackney carriage and driver licence data from Committee of Inquiry on the Cab Trade (P.P., 1895, XXXIII). 1870–73 and 1876 on: hackney and stage carriage licences from the reports of the Commissioner of the Metropolitan Police.

horses for the Metropolitan Board of Works, the police, Peak Fren's and two breweries.³¹

How many horses?

Although the total number of horses in London undoubtedly grew, the statistics are meagre and elusive. None of the direct estimates presented below is wholly dependable or comparable with the others. The idea of supplementing them with indirect estimates constructed by using data on hay consumption may seem attractive but founders upon the fact that throughout most of the nineteenth century there were also many *cows* in London—13,000 in 1850, for example.³² Mayhew used his estimates of the number of horses and other animals to estimate the amount of dung dropped in the streets, so the latter cannot serve to estimate the number of horses.

The first estimate, which includes the whole of Middlesex, much of it still rural, is provided by Table 4, submitted in 1825 by the chairman of the Board of Taxes. Agricultural horses had been freed from tax in 1821.

Table 4 Number of horses in the City, Westminster and Middlesex, 1825

| | <i>Taxed horses, including butchers' and draught horses</i> | <i>Horses used in stage coaches</i> | <i>Post horses</i> | <i>Hackney coach horses</i> | <i>Dealers' horses</i> | <i>Other exempt horses</i> | <i>Total</i> |
|---------------------------|---|---|------------------------|-------------------------------------|----------------------------|------------------------------------|--------------|
| London and Westminster | 10,125 | 150 | 116 | 128 | 401 | 24 | 10,944 |
| Middlesex | 18,249 | 547 | 543 | 436 | 328 | 268 | 20,371 |
| Southwark | 1,150 | | 18 | 98 | | 7 | 1,273 |
| Total | 29,524 | 697 | 677 | 662 | 729 | 299 | 32,588 |

Source Select Committee on Turnpike Trusts, *P.P.* (1825) V.

Mayhew provided an estimate for 1849–50 in the section of his work entitled *The Streets of London*, where he quoted a return obtained by Mr Charles Cochrane from the Stamp and Tax Office which gave the number of horses in the metropolis as 21,214 and noted that the assumption of four horses per omnibus was too low, ‘as many proprietors employ ten horses to each “bus,” and none less than six’, the horses working in shifts. Hence ‘we may fairly assume that there are at the least 25,000 horses at work every day in the streets of London. Besides the horses above mentioned, it is estimated that the number daily coming to the metropolis from the surrounding parts is 3,000.’ Changing four horses per omnibus to eight, his table with a total of 21,214 becomes Table 5. This estimate is probably on the low side, though Mayhew said nothing about the omission of army and jobmasters’ horses, which were exempt, as were the horses of dealers and those of the royal family. In addition, of course, there were the horses on which tax was evaded and horses taxed at their owner’s residence outside the metropolis. Evasion must have been fairly significant. When, in 1869–70, the collection and assessment of the assessed taxes (which included the taxes on carriages and on horses) were taken away from persons who were not civil servants, the Commissioners of Inland Revenue in their thirteenth annual report expressed relief at the reduction in evasion and corruption which was expected to result.

Table 5 Mayhew’s estimate, 1849-50, excluding Middlesex

| | |
|--|--------|
| Private carriage, job and cart horses, London | 3,683 |
| Private carriage, job and cart horses, Westminster | 6,339 |
| 2,846 licensed cabs, with two horses | 5,692 |
| 1,350 licensed omnibuses, with eight horses | 10,800 |
| Total No. of horses in the Metropolis | 26,514 |

Source Mayhew, *London Labour . . . II Streets of London* (1851–62), p. 185.

A calculation similar to Mayhew's, again limited to horses covered by taxes (or licences), is presented in Table 6, covering 1854–64. The number of riding, carriage and trade horses for 1854 relates to Middlesex as well as to London and Westminster but still excludes Southwark. Thereafter it is for the metropolis. Ponies, not mentioned by Mayhew, are explicitly included.

Table 6 Number of taxed horses in London, 1854–64

| Year | 2 × No. of hackney carriage licences | 11 × No. of stage carriage licences | Riding and carriage horses | Trade horses | Ponies | Total |
|------|---|--|----------------------------------|-----------------|--------|--------|
| 1854 | 5,412 | 12,760 | ← | 35,751 | → | 53,923 |
| 1855 | 6,592 | 15,906 | | | | |
| 1856 | 10,584 | 13,112 | | | | |
| 1857 | 10,948 | 12,507 | | | | |
| 1858 | 11,292 | | 17,019 | 20,759 | 2,808 | |
| 1859 | 11,920 | 13,002 | 17,597 | 20,757 | 3,206 | 66,482 |
| 1860 | 11,954 | 12,980 | 17,480 | 21,822 | 3,274 | 67,510 |
| 1861 | 12,430 | 13,123 | 17,904 | 22,738 | 3,374 | 69,569 |
| 1862 | 13,564 | 12,881 | 17,634 | 24,788 | 3,120 | 71,987 |
| 1863 | 13,294 | 14,982 | 18,132 | 25,768 | 3,316 | 75,492 |
| 1864 | 14,074 | 12,936 | 19,027 | 26,831 | 3,710 | 76,578 |

Source Return of the Number of Stage Carriages, etc., 1859 and 1865, Select Committee of the House of Lords on Horses, *P.P.* (1873) XIV, Return of the Number of Horses and Carriages paying Tax for each County in England for 1854.

As regards stage carriage and omnibus horses, the proprietors stated in 1855 'that within the last four years the number of Horses used in the Metropolitan districts have decreased from 12,000 to 9,000', so the number of horses per omnibus stud was probably below eleven in the earlier years of the table.³³ As for cabs, 'Generally, two horses were used to work a cab, but in practice it was necessary to provide for replacements in case of sickness or injury. A ratio of between two and a half and two and a third horses per cab was generally applied.'³⁴ On the other hand, there were some cabs run on the one-horse system and others working only a fraction of each week, drawn by horses from another trade, and some cabs were always unfit for use, so the average number is here taken as two.³⁵

In 1870 a writer on the maintenance of urban roads reported that the Inland Revenue had 'obligingly furnished us with figures, giving the number of horses and of taxed vehicles, within a radius of four and a half miles from Charing Cross, and hence covering the greater part of the metropolitan area. There are thus 71,903 horses in all . . . within this space.'³⁶ It is not certain, however, that this included bus and cab horses.

The figures for taxes on horses for other years than those given above are available only for England and Wales as a whole; in any case, the horse duty was abolished in 1874. Thus taxation data were unavailable to W. J. Gordon, who presented estimates for 1893 (Table 7) in his enjoyable book *The Horse*

Table 7 Number of horses in London, Gordon's 1893 estimate

| | | | | |
|----------------------------------|----------|---|--------|---|
| Buses | 22,000 | <i>including:</i> | | 2,210 licensed buses × 10 |
| | | LGOC | 10,000 | |
| | | London Road Car | 3,000 | |
| Trams | 10,000 | | | Just under |
| | | North Metropolitan | 3,500 | Nearly |
| | | London Tramways | 3,250 | About 150 less |
| | | London Street | | |
| | | Tramways | 1,200 | About |
| | | South London | 800 | About |
| | | 9 smaller co's | | |
| Cabs | 15,000 | | | 9,000 workable cabs, two-thirds with two horses |
| Railways | 6,000 | | | Horses for waggons, goods, parcels, shunting and some buses |
| | | Great Western | 1,100 | |
| | | Midland | 1,350 | |
| | | Great Northern | 1,300 | |
| | | Brighton | 225 | |
| | | South Eastern | 275 | |
| | | North Western | 650 | |
| Carriers | 19,000 | | | |
| | | Pickford's | 4,000 | |
| | | Carter Paterson | 2,000 | |
| Post Office | 600 | | | Horsed by McNamara |
| Vestries | 1,500 | | | Somewhat less than half are hired |
| Brewers | 3,000 | | | |
| Queen | 100 | | | |
| Carriages | 40,000 | | | Approx. Many owned by jobmasters |
| Fire brigades | | | 110 | Supplied by jobmasters |
| Coal | 3,000 | | | |
| | | Leading merchants | 1,500 | |
| Undertakers | 700 | | | All black, mainly stallions |
| Cavalry | 550 | | | |
| Police | 375 | | | The number of mounted police |
| Riding horses | Very few | | | |
| Other firms, ponies and hackneys | 28,175 | | | [? obtained by difference ?] |
| Total first-hand horses | 150,000 | 'confirm the usual estimate that half the London horses are at least second-hand' | | All horses = 300,000 |

Source W. J. Gordon, *The Horse World of London* (1893).

World of London. Unfortunately the derivation of the grand total ('All horses'), as explained in the bottom row, does not instil great confidence!

The costs of horsepower

The price paid for a horse, less the price obtained when it was cast or sold dead, spread over its service life to obtain the annual equivalent, plus the similarly

annuitised cost of stables and the rates on them, constituted its annual capital cost. (For firms horsing their own vehicles, the cost of the yard would be a joint cost and cannot be divided between horses and vehicles.) Current costs consisted of provender, i.e. fodder and bedding, the pay of the workers who looked after the horses, and shoeing. (On average London horses required a shoe every week, and in winter there was the additional cost of roughing the shoes to stop the horses slipping on icy surfaces.) All these costs were included in Bradfield's 1853 estimates for omnibuses presented above. For the current costs of brewery dray horses Truman Hanbury & Buxton's accounts permit calculation of their composition over the period 1837–64 (Table 8).

Table 8 Costs of brewery dray horses, 1837–64 (%)

| | |
|------------------------------|-------|
| Provender net of manure sale | 73–79 |
| Grooming and attendance | 9–13 |
| Harness | 4–7 |
| Smith and farrier | 5–7 |
| Sundry | 0.4–2 |

Source Truman Hanbury & Buxton rest expenses volumes, London Metropolitan Archives, Acc. 73. 37–47.

Fodder accounted for the major part of provender costs. A horse could live on hay and grass alone, but eating time and bulk both had to be reduced for a working horse. Many horses were fed with chaff, i.e. hay cut with straw. It saved hay, both because of the admixture of straw and because the waste from hay being dropped and trodden into the litter was avoided. Also, chaff took less time to eat, so horses settled down to rest sooner. Peas, beans or carrots also formed part of the diet, plus corn, i.e. oats or maize. Maize was regarded by some as an acceptable substitute for oats only for horses doing moderate and regular work, as it 'makes flesh and fat but not muscle'; moreover the fact that it makes horses smell strongly caused maize to be avoided in private stables.³⁷ The first part, at least, of this statement was an opinion rather than an established fact, but much of established wisdom on the care of horses was based on trial and error; controlled experiments and measurements were almost unknown in the horse world. Certainly a vet writing in 1882 referred to 'tables of calculation founded upon experiment' from which 'it has been ascertained that the greatest advantage in the employment of horse-power is obtained when the hours of labour are increased and the pace correspondingly diminished' but, like most authors on the subject of horses, he provided no reference.³⁸

The factors determining the quantity and variety of fodder were age, physical condition, the time of year and the quality of the food. In addition, size and the amount of work done were the major determinants. Thus, as Gordon put it, 'a corn-chandler will forage your horse at threepence an inch of height per week' and, while there was no expressed equivalent of miles per gallon, horses that worked all day were given more food than horses that were resting.³⁹

Taking the example of bus and tram horses, quantities and costs are shown in Table 9. Maize, first purchased by the LGOC in 1862, had largely replaced oats by 1876, though their relative shares varied through time in response to changes in their relative prices. Maize was also substituted for beans when they rose in price (though not for the horses in infirmaries).⁴⁰ Sawdust or peat was sometimes used instead of straw as bedding. Such price-induced substitutions made total provender cost fluctuate less than the prices of its components, though substitution was less marked in the case of brewers' splendid horses, which always had to have the best (Table 9).

Table 9 Six-monthly quantities and cost per horse, 1857 and 1876

| | LGOC | | | | London Tramways | |
|------------------------|----------|------------|----------|------------|-----------------|------------|
| | 1857 | | 1876 | | 1876 | |
| | Quantity | Cost (£) | Quantity | Cost (£) | Quantity | Cost (£) |
| Maize (qrs) | | | 6.11 | 8.61 | 6.61 | 9.05 |
| Oats (qrs) | 10.06 | 12.90 | 0.18 | 0.21 | 0.35 | 0.43 |
| Beans (qrs) | 0.23 | 0.54 | 0.11 | 0.28 | 0.03 | 0.08 |
| Bran (qrs) | ? | 0.10 | 0.40 | 0.22 | 0.93 | 0.26 |
| Hay and clover (loads) | 0.89 | 3.57 | 0.55 | 3.46 | 0.62 | 3.96 |
| Straw (loads) | 0.75 | 0.96 | 1.07 | 2.48 | 0.83 | 1.97 |
| Sawdust (sacks) | | | | | 6.60 | ? |
| Sum | | 18.07 | | 15.25 | | 15.75 |
| i.e. | | £0.69/week | | £0.59/week | | £0.61/week |

Source LGOC biannual reports, PRO, RAIL 1114/33.

Figure 2 shows the generally downward trend in provender cost from the 1860s onward; note the difference between provender costs for brewery (Truman Hamburg & Buxton) and bus (North Metropolitan) horses. Fluctuations around this trend reflected harvest variations, such as the extraordinarily poor hay harvests in 1892 and 1893.

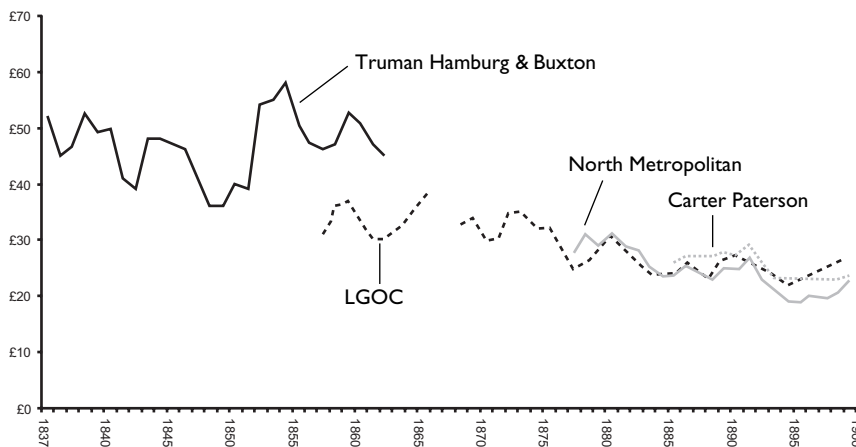


Figure 2 Cost of provender per horse, 1837–1900

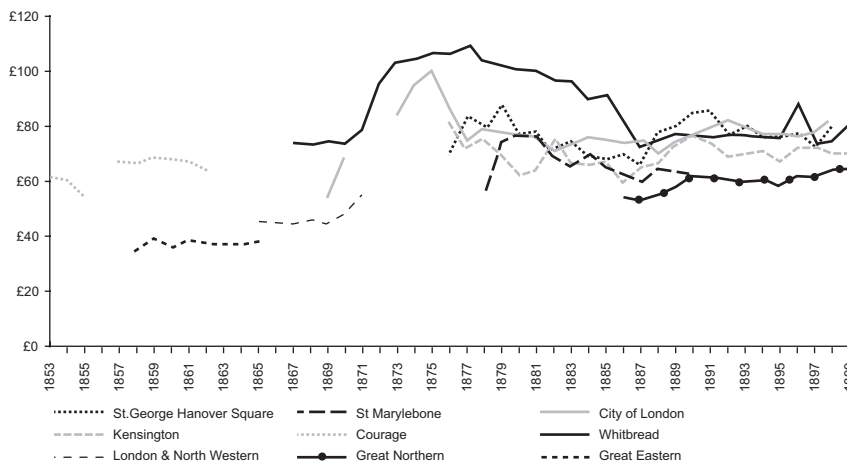
Horse prices

Horse prices are difficult to obtain and to analyse because horses are so heterogeneous. Most of the factors determining the price that a particular horse will fetch are neither quantifiable nor even very clearly defined; experts were better at recognising quality than at describing it. Certainly, buyers who knew their business needed to spend quite a bit of time inspecting possible purchases. As a purchaser for the army put it, ‘Purchasing horses is laborious work, and by the time that twenty-five or thirty have been examined, passed, and registered, the officers employed will have exhausted much power, both of eye and brain.’⁴¹

Size and age, which are quantifiable, were obviously important for any general class of horse. The effect of age is indicated by the average prices paid by Whitbread & Co. over the years 1881–1900, as calculated from a large sample of the purchases recorded in their horse book. These were £75 for four-year-olds (few in number), £79 for five-year-olds, £76 for six-year-olds and £70 for seven-year-olds.⁴² Lower prices were paid for mares.

Nearly all the available records of individual horse purchases, however, are limited to the prices paid, without any description of the animals. The use of mean prices thus entails the hope that nearly all the purchases were of the same type of horse, and it is difficult to know how far such was the case. Thus in 1855, while the Engineer’s Department of the North Eastern Railway bought six horses at a uniform price of £50 8s, nineteen horses were bought for the Traffic Department at prices ranging from £25 to £80, an average price of £38 16s.⁴³ In such cases the use of median prices may serve to cut out horses that were different, such as the odd horse bought for a gig to draw a foreman from one stable to another.

The prices paid by commercial purchasers varied a good deal. Figures 3 and 4 display information although they exclude the facts that Barclay



52 **Figure 3** Heavy horse prices, 1853–1900

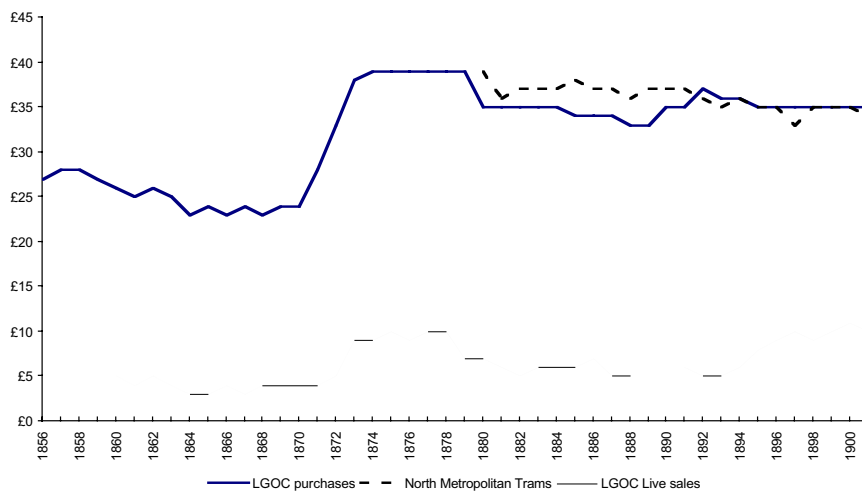


Figure 4 Omnibus and tram horse prices, 1856–1901

Perkins paid fifty guineas for its dray horses in 1837 and 1838, similar to what Courage & Co. paid in the mid-1850s,⁴⁴ and the book value of Truman Hanbury & Buxton's horses lay around £35 in the years 1837–43, falling to an average of £23 in the years 1849–52.⁴⁵ Since the number of horses owned was not falling, this decline probably reflects a reduction in the prices that the firm paid for its horses, although its precise timing could be ascertained only if the depreciation method used were known.

Whitbread prices are averages; thus 1874 is for dray horses only, van horses bought that year costing £72 13s. The proportion of van horses in later years is not known, but variations in it may account for some of the changes in the average price. In 1897 four of the first twenty horses bought cost over £100, while none of the first twenty bought in the years before and following cost that much; perhaps these were extra-splendid animals.⁴⁶ Courage prices are median values; the firm had some thirty horses in the 1850s. The church vestries all appear to have bought the same kind of horses. Data for cab horses are not available, but their prices seem to have behaved in much the same way as the prices of heavy and omnibus horses. According to May, cab horses cost around £20 during the three decades after 1832, and rose in the 1870s. 'Thereafter the price seems to have levelled off, with £37 10s quoted as an average price in 1883, and £34 in 1894.'⁴⁷

The various series can be combined into two indices. Taking an unweighted (i.e. equally weighted) geometric average of such price relatives as exist for each successive pair of years, chaining them and setting the index base of 100 as the average value of the index for the whole period, 1860–80, generates the picture shown in Figure 5.

The indices shown in Figure 5 exclude the royal purchases. The royal household paid remarkably constant prices over most of Queen Victoria's reign.⁴⁸ In 1873 Colonel George A. Maude, who bought all the horses for the

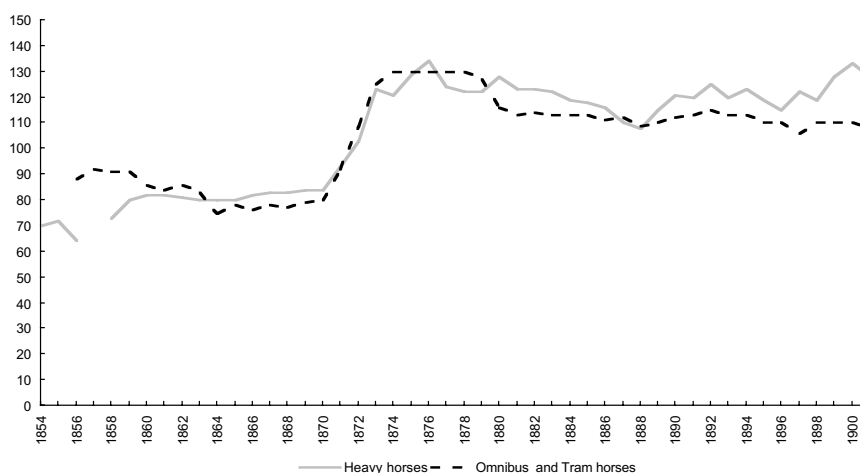


Figure 5 Indices of horse prices, 1854–1901 (average for the whole period = 100). For heavy horses the 1874 price relatives compare prices with 1871 instead of 1873, in order to have two observations. Their geometric mean is applied to the index for 1871 to compute the 1874 index

Queen's service, testified that 'Lately we have been buying them a year younger; we have been buying them at three years old for the last twelve months, which amounts, in fact, to an increase of price, but we do not give actually more money for them.'⁴⁹ Hence the strong upward price movement of the 1870s appears to have been universal, after all.

The prices of worn-out omnibus horses, also excluded from the indices, followed a very similar path. The prices obtained by the LGOC rose from £4–£5 in the years 1868–72 to £9–£10 in 1874–78. Even dead horses rose in price during the 1870s; the LGOC got over £2 for its carcasses from 1872 to 1880 but less than £2 in the 1860s and afterwards, and rentals, as well as purchase prices, rose sharply.⁵⁰

The graphs probably understate the effective cost of horses in the 1890s, at least for the omnibus and tram companies, which were buying imported horses and found that it entailed extra costs. In 1897 Daniel Duff, General Manager of the London Road Car Company, explained that although horses from America cost from £26 to £36, 'because the voyage seems to upset them [they] cost a further £10 before they can be considered fit for the heavy work of our streets'.⁵¹ Similarly, R. T. Kingham, Secretary of the LGOC, reported that 'We buy Canadian horses at an average price of about £30. The voyage undoubtedly affects them, and it usually requires an expenditure of £8 to £10 before the animal is fit for the company's work.'

Horse prices in the 1870s

The first point to note about the rapid rise in horse prices from 1870 to 1876, as evidenced by these London data, is that part of it reflected a general rise

in prices. In many cases the peak year was 1873, rather than 1876. Certainly Feinstein's revised cost of living index fell after 1873, after rising by 8 per cent from 1870,⁵² although Wood's index of average money wages continued to rise until 1876, when it exceeded its 1870 value by 14 per cent.⁵³ Even by 1873, however, horse prices had increased by as much as 50 per cent since 1870, and they continued to rise to 160 per cent of their 1870 level by 1876. Therefore we can say that factors specific to the horse market were at work.

Confirmation of the extreme rapidity of the rise in horse prices in the early 1870s is provided by many of the witnesses who appeared before the House of Lords Select Committee on Horses in 1873. Indeed, it was the alarming rise in prices which stimulated the appointment of the committee. Edward Greene, MP, told the committee that 'Pickford type' horses had been priced at between £35 and £40 twelve months earlier but now, in March 1873, they were between £45 and £65, while cart horses at the spring fair had risen by £20 from £45.

The committee was able to articulate an explanation for the rise in horse prices. Noting that there were no data on total horse stock, it asked many witnesses whether there were fewer or more horses than before, and discovered that there were no fewer (except for breeding mares) but that nevertheless there was a scarcity. It regarded the following as the causes of the deficient supply:

- (1) The exportation of mares to foreign countries;
- (2) The increased profits on sheep and cattle, which, being more certain and more rapidly realised, are doubly attractive to the farmer, as compared with those obtained by breeding horses;
- (3) The increased demand consequent upon a multiplication of population and wealth which, together with a decline of breeding in many parts of the country, produces a relative if not an absolute scarcity.

There were also minor causes, such as the consolidation of smallholdings into large farms, and the export of horses during the Franco-Prussian War (1870).⁵⁴

A typical well informed witness before the committee was Joshua East, dealer, contractor and jobmaster. He told the committee that he couldn't get four-year-olds, as dealers bought them all for sale to gentlemen. Foreign dealers bought four and five-year-olds, mainly mares. Agents for foreigners would 'give a sovereign a horse to you for finding out about the mares'. The present shortage was because breeding was less profitable than it was: beef and mutton paid better than before and foreigners had bought all the best mares. He used to buy all his horses in Yorkshire; but now had to buy largely from Ireland, whereas hitherto the only Irish horses were those brought over by Irish dealers. He had tried buying German horses, since the Germans had bought many fine English mares, but German horses were extremely unsatisfactory in his view, though many of the harnessed horses seen in London were German. He used to send enormous number of horses to Paris, but no longer did so.

Edward Greene, brewer and MP, who also gave evidence, said that not many cart horses were exported and that beef and mutton prices were much less important for them, as farmers regularly bred cart horses. The present high price of cart horses must therefore have resulted from a rise in demand. It would cause farmers to breed as many as possible, and since cart horses acquired a market value at two years, so the situation would correct itself. As many of the better mares had been shipped abroad, however, the breeding of good cart horses would take time.

There was evidently no simple causal relationship at work, and we cannot be sure that the breeding of heavy and omnibus horses suitable for the London market, or their prices, did not move differently from that of horses in general. As noted earlier, Ireland supplied only a few heavy or omnibus horses, providing carriage horses, riding horses and hunters, and it was no doubt these horses which most exercised the minds of the Lords committee.

So far as the demand side is concerned, analysis is hindered by the incomplete data on purchases of harness horses for town work and the lack of any independent measure of the competing demand of agriculture for horses. But the number of omnibus licences did start to grow in the 1870s. Whereas it had scarcely changed in the preceding six years, the LGOC's stock of horses rose by 21 per cent from the end of 1870 to the end of 1876, mainly because it was providing now horses for trams. Also, there was a remarkable growth in building construction activity which must have caused a parallel growth in contractors' demand for horses. British capital formation in buildings and works measured at constant prices rose every year from 1870 to 1876, the increase over this period being 52 per cent.⁵⁵ Furthermore, railway freight traffic grew by 25 per cent from 1871 until 1877, while track mileage grew by only 11 per cent, so the displacement of horse traffic by rail must have been outweighed by the expansion of railway carriers' collection and delivery work.⁵⁶

Horse prices in the 1890s

A major feature of the 1890s revealed by the indices in Figure 5 is the reduction in the prices of omnibus horses relative to the prices of heavy horses from 1893 onward. The cause was a rightward shift in the supply curve of carriage and omnibus horses from North America.

First, there was a fall in freight costs, both within North America and across the Atlantic. A dealer said that freight of a horse from New York to Liverpool was £12 in 1890 and in 1897 was £3 10s—'and in a better ship'.⁵⁷ The operators had reacted to the new opportunities. Second, there was a fall in the American demand for horses. The average value of farm horses fell from \$61.20 in 1893 to \$31.51 in 1897, i.e. by 48.5 per cent, more than for sheep, pigs and cattle, a fact that 'may be attributed to the rapid extension of the use of electricity on street-car lines and otherwise during the period considered'.⁵⁸

The result of this supply shift was that, while:

in the year 1893 Great Britain took 13,707 American horses, in 1894 the same purchaser received from the United States 22,866 horses, and in 1895 34,072. But during the first nine months of the year 1896 there had been shipped from the United States to England 34,642 head of horses. Shipments by Canada have increased during the same time in about the same proportion, while shipments from the Continent of Europe have fallen off materially; so that it may now safely be claimed that the United Kingdom looks to America for all the horse supply which she once purchased principally from Germany . . . American horses are now in steady demand for omnibus, street-railroad, and cab services, and for the use of traders who keep drays, vans and carts for the collection and delivery of goods. English breeders are turning their attention chiefly to hacks, hunters and heavy draft horses.⁵⁹

In Britain, witnesses before the 1897 committee that enquired into the horse breeding industry in Ireland described the resort to North American horses. Mr Hetherington, a dealer, said that American competition became acute around 1893. Their middle-class horse bred from imported Clydesdales out of American mares was, he said, better and cheaper than anything produced in Britain.⁶⁰ Mr Reekie, manager to Withers & Co., the leading jobmasters, asserted that the English farmer had practically given up breeding carriage horses and explained that good American carriage horses would fetch £90 to £110; they had paid this since they began dealing in American horses in 1894.⁶¹ The General Manager of the London Road Car Company said, 'We are obliged to depend on America for our supply, as we can not any longer get English, Scottish or Irish horses in sufficient numbers at a possible price . . . We began buying about five years ago.'

Conclusion

The nineteenth-century data presented above are not as good as one could wish, especially as regards the number of horses.⁶² The differences in coverage between the estimates presented, both in their geographical coverage and as regards the types of horse included, together with the element of guesswork involved in them, unfortunately do not allow a summary other than in the broadest terms. The number of horses appears to have reached around 11,000 in the early part of the century in London and Westminster, more than double that by mid-century, over 70,000 for London as a whole by the mid-1860s and at least 200,000 by its end of the century.

The capital investment involved was large. Horses made up 55 per cent of the value of the LGOC's fixed assets in 1894, and, since the stock had to be renewed every five or six years, horse purchases constituted a large proportion of its capital expenditure.⁶³ The data presented on the prices paid for this element of gross transport capital formation show that there was a marked upward shift in the 1870s. However, this cost increase exerted no discernible

upward pressure on bus and tram fares or on carriers' charges, because of the continuing downward trend in the very much larger item of provender costs.⁶⁴ There were fluctuations round this trend due to good and bad harvests, but the variability of provender costs was kept below that of the prices of oats, maize, beans, straw and hay by substituting what had become relatively cheaper for what had become relatively more expensive.

Notes

- 1 On the subject of manure see my paper 'Goods and bads', *World Economics* 1, 4 (2000), pp. 1–13
- 2 Anthony Trollope, *Barchester Towers* (London, 1857).
- 3 H. Mayhew, *London Labour and the London Poor* (London, 1851–62), letter LXXIII, Thursday 10 October 1850.
- 4 W. J. Gordon, *The Horse World of London* (London, 1893), p. 12.
- 5 Walter Wellman, *Special Report on the Market for American Horses in Foreign Countries*, Fifty-fifth Congress, Third Session, Senate Documents (1897).
- 6 D. K. Clark, *Tramways: their Construction and Working* (London, 1878), pp. 214–16.
- 7 Clark, *Tramways*.
- 8 Gordon, *The Horse World of London*.
- 9 Charles Booth, *Life and Labour of the People in London* (1903), Second Series, 1886–1893, III *Industry*, on cab owners and drivers.
- 10 W. E. Cooper, Select Committee of the House of Lords on Horses, *P.P.* (1873), XIV.
- 11 Booth, *Life and Labour* III on Cab-owners and drivers.
- 12 Gordon, *The Horse World of London*, p. 116
- 13 Greater London Record Office Acc. 2305/1/Barclay Perkins Rest Books.
- 14 Gordon, *The Horse World of London*, p. 18.
- 15 *Live Stock Journal and Fanciers' Gazette*, 16 March 1877, pp. 205–6.
- 16 Clark, *Tramways*, p. 262.
- 17 Gordon, *The Horse World of London*.
- 18 T. Tredgold, *A Practical Treatise on Rail-roads and Carriages* (London, 1825 edn), p. 73.
- 19 Dorian Gerhold, *Road Transport before the Railways* (London, 1993), p. 1.
- 20 J. E. Bradfield, *The Public Carriages of Great Britain* (London, 1855), p. 19–20.
- 21 *Chambers's Edinburgh Journal*, 14 June 1845.
- 22 Evidence to Select Committee on Internal Communication Taxation, *P.P.* (1837), XX.
- 23 Select Committee on Metropolis Roads, *P.P.* (1856), XIV, q. 1653, Earl of Lonsdale, Chairman of the Metropolis Road Commissioners.
- 24 PRO, RAIL 1133/147, Number of horses with vans returned for assessed taxes by Pickford's, p. 73.
- 25 Fifteenth Report of the Commissioners for Metropolitan Roads North of the Thames, *P.P.* (1841) (1) XII, 249.
- 26 Mayhew, *London Labour*, letter LXXIII, Thursday 10 October 1850.
- 27 R. D. Baxter, 'Railway extension and its results', *Journal of the Statistical Society* 29 (1866), p. 562.
- 28 Hansard (Commons), 26 June 1855, cols. 212–13.
- 29 Select Committee on Railway Passenger Duty, *P.P.* (1876), XIII, p. vi.
- 30 According to Wellman, *Special Report*.
- 31 Thomas Tilling, *Kings of the Highway* (London, 1957), pp. 40, 45.
- 32 J. R. McCulloch, *London in 1850–1851* (London, 1851), p. 56.
- 33 'Memorial of the Stage Carriage Proprietors to the Chancellor of the Exchequer', 1855, in a pamphlet published by the Stage Carriage Committee entitled *General Wyndham's MP Motion as to Cavalry and Artillery Horses*.
- 34 T. May, 'The Administration and Organisation of the London Cab Trade from the late Eighteenth Century to the First World War', Ph.D. thesis, University of London (1991), chapter 5.
- 35 Gordon, *The Horse World of London*.
- 36 F. A. Paget, *Report on the Economy of Road Maintenance and Horse Draught through Steam Rolling, with Special Reference to the Metropolis* (London, 1870), p. 49.

- 37 *Live Stock Journal and Fanciers' Gazette*, 23 February 1877, p. 145.
- 38 R. S. Reynolds, *An Essay on the Breeding and Management of Draught Horses* (London, 1882), p. 91.
- 39 Gordon, *The Horse World of London*, p. 50.
- 40 PRO, RAIL 1114/33, LGOC report for the first half of 1875.
- 41 F. G. Ravenhill, 'Remarks respecting Horses and Horse Breeding in Canada' and 'Address to Horse Breeders', delivered in Islington (1887), in *Report of the Minister of Agriculture for the Dominion of Canada 1886*, appendix 53.
- 42 Courtesy of the Whitbread Archive (Archivist, Nicholas Redman).
- 43 PRO, RAIL 527 2186.
- 44 London Metropolitan Archives, Acc. 2305/1/1300, Stable Account, 1827–April 1839.
- 45 London Metropolitan Archives, Acc. 73.37–47, Truman Hanbury & Buxton Rest Expenses volumes.
- 46 Data by courtesy of the Whitbread Archive (Archivist, Nicholas Redman): 1874–91 from General Ledger, 1887–1900 from Horse Book entries (which agree to within £2 for the overlap) using only the first twenty purchases in the years 1891–98 and the first forty-five in 1899 and 1900.
- 47 May, 'The London Cab Trade', chapter 5.
- 48 This information is used by gracious permission of HM the Queen. The data 1837–53 are from RA MOH HB1, the Royal Horse Book, and the data for 1853–95 from RA MOH AR1–4, Annual Reports. Many horses were bought from Mr Dyson of Waltham Cross for 130 guineas.
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- 50 PRO, RAIL 250/239, GWR Horse Establishment Committee minutes, 29 January 1884.
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- 54 Select Committee of the House of Lords on Horses, *P.P.* (1873), XIV, report.
- 55 C. Feinstein, *Studies in Capital Formation in the United Kingdom, 1750–1920* (Oxford, 1988), appendix table X.
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- 58 *Year Book of the US Department of Agriculture, 1897* (Washington DC, 1897), p. 264.
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- 61 Wellman, *Special Report*.
- 62 Later on they improved! Having found horse acquisition a major problem during the Boer War, the War Office got round to having a horse census taken in 1917 and repeated it in 1924 and 1934 so as to be well prepared for the next war. (F. M. L. Thompson, 'Nineteenth-century horse sense', *Economic History Review*, second series, 29 (1976), pp. 60–81.
- 63 Computed from a manuscript note in the LGOC accounts for the first half of 1894.
- 64 The LGOC's receipts per bus per week rose less than the number of passengers carried per bus from 1870 to 1875.

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