ALC/D/099.1-4

NORTHAMPTON MERCURY December 17th 1831

RAILROADS AND STEAM CARRIAGES

To the Editor of The Northampton Mercury-Sir,

As everything relating to rail roads, or the application of steam, or any other elementary power, to the conveyance of goods or passengers is, at the present moment, of considerable importance to the public. I have taken the liberty to send you some extracts from the report of a select committee on steam carriages, ordered by the House of Commons to be printed on the 18th October, 1831, and just now published. Whoever reads this report, which is drawn up with considerable ability and talent, must be convinced of the practicability, and speedy application of steam to the propelling of carriages on the turnpike roads, as they now exist, without requiring one shilling to be expended, either in altering their line of direction or improving their surface. This important fact, which is fully established by the evidences of the different witnesses examined before the committee, should be very generally made known to the public, as it may save many individuals and families from ruin, who might otherwise be induced from the plausible, and wild assertions of the interested projectors of rail road schemes, to embark their property in such undertakings, which, if they were not before, are now clearly shown to be a most hazardous speculation.

The dullest, and most obtuse understanding must be convinced that where several millions are required to be expended in the purchase of lands, and executing all the works required, for the completion of an extensive iron railway, many years will elapse before they can be completed, or a return of capital expected, and that, during that period, considerable improvements will, unquestionably, be made in the construction of steam carriages applicable to turnpike roads.

The consequence of which will be, that passengers will be carried over the present lines of communication with nearly the same speed that they can be carried on rail roads, and with this additional advantage

that they will pass *through the* towns on the intermediate parts of the main line, as they do at present, by stage coaches, where inns are already established, and where the connections, and business of the greatest number of travellers may possibly be situated; this, alone, will induce a greater traffic, than over a railway which cannot possess these advantages for ages, as they can seldom be carried within several miles of the intermediate towns, on the general line.

The number of passengers, therefore, that might otherwise be fairly reckoned on as likely to travel by a rail road, will be very materially reduced, if steam carriages travel on the present existing lines of turnpike roads; consequently, the income that might be expected to be derived from passengers over a proposed rail way, will be considerably diminished, if not wholly destroyed. It is not, indeed, at all improbable that the original subscribers may lose the whole amount of their shares as was the case in the building of the Waterloo (bridge, and the proposed tunnel under the Thames), for the proprietors of steam carriages running on the turnpike roads will not be encumbered with one shilling of debt, or interest for money expended in the construction of the roads, consequently they will be enabled to carry passengers cheaper than the rail way companies, who will have to pay the enormous interest of several millions expected in the making of the roads. To meet the low fares of the proprietors of steam carriages on the turnpike roads, they will be reduced to the choice of two evils, either to lower their fares to meet that of their opponents, or to travel without passengers, either of which cases will be equally destructive of the property invested in rail way undertakings. As to any idea of a profit arising from carrying heavy goods by a rail way, that is completely set at rest, by the fact that the Manchester and Liverpool rail way company are not able to carry a ton of goods except at considerable loss; it is, therefore needless to waste time in any speculations on that head. All the profit that can be expected to arise from the traffic over a rail way must arise from the transit of passengers alone. Any cause, therefore, that will diminish the number of passengers travelling over a railway, will tend to increase the risk of rail road speculations, and none will have a greater effect than the running of steam carriages on the common turnpike roads.

The possibility - I might almost say the certainty - of such an event taking place is clearly established by the evidence given before the Committee of the House of Commons on this subject.

The report does not give the names or the members composing the committee, but from the circumstances of D.O.Jephson, Esq, being the chairman and Davies Gilbert, Esq. (the later President of the Royal Society,) and Colonel Torrens, forming part of it, there can be no doubt that it consisted of some, if not all the scientific men, and those most capable of judging of such matters, that were to be found in the House of Commons. The opinions of such men should, therefore, have great weight with the public.

The witnesses examined by the committee were-Mr. Goldsworthy Gurney, Mr. Walter Hancock, John Farey, Esq. Mr. Richard Trevithick, Davies Gilbert, Esq. M.P. Mr. Nathaniel Ogle. Mr. Alexander Gordon, Mr. Joseph Gibbs, Thomas Telford, Esq. Mr. William Alltolt Summers, Mr. James Stone Mr James Mc.Adam, Mr John Macneill, Colonel Torrens, M.P.

I will, in the first place, give extracts from the report of the committee, and the important conclusions they arrived at, and afterwards, extracts of such parts of the evidences of the different witnesses, as may appear to be of interest or importance to the public.

I am Sir, your obedient Servant,

J.M.N.

Northampton Mercury December 14th. 1831

EXTRACTS FROM THE REPORT OF THE COMMITTEE

The committee proceeded in the first instance.

.....carriages on common roads, by means of steam or mechanical power, had been carried into practical operation; and, whether the result of the experiments already made had been sufficiently favourable to justify their recommending to the House, that protection should be extended to this mode of conveyance, should the tolls imposed on steam carriages, by local Acts of Parliament, be found prohibitory or excessive"

"In the progress of their inquiry they have extended their examinations to the following points, on which the chief objections to this application of steam have been founded:-viz. The insecurity of carriages so propelled, from the chance of explosion of the boiler, and the annoyance caused by travellers, on public roads, by the peculiar noise of the machinery, and by the escape of smoke and waste steam, which were supposed to be inseparable accompaniments."

"It being also in charge to the committee 'to report upon the proportion of tolls which should be imposed upon steam carriages,' they have examined several very scientific engineers, by whose observations on the causes of the ordinary wear of roads, they have been greatly assisted."

"The committee were directed also 'to report on the probable utility which the public may derive from the use of steam carriages.' On this point, they examined a member of the committee, well known for his intelligence and research on subjects connected with the interest of society, and they feel that they cannot fulfil this part of their instructions better than by merely referring the House to the evidence of Colonel Torrens."

"These inquiries have led the committee to believe that the substitution of inanimate for animal power, in draught on common roads, is one of the most important improvements in the means of internal communication ever introduced. Its practicability they consider to have been fully established; its general adoption will take place more or less rapidly, in proportion as the attention of scientific men shall be drawn by public encouragement to further improvement."

"It appears from the evidence, that the first extensive trial of steam, as an agent in draught on common road, was that by Mr. Gurney, in 1839, who travelled from London to Bath and back, in his steam carriage. He states, that although a part of the machinery which brings both the propelling wheels into action, when the full power of the engine is required, was broken at the onset, yet that on his return he performed the last eighty-four miles, from Melksham to Cranford bridge, in ten hours, including stoppages. Mr. Gurney has given to the committee very full details of the form and power of his engine, which will be found in the evidence.

"The committee have also examined Messrs. Summers & Ogle, Mr. Hancock, and Mr. Stone, whose steam carriages have been in daily use for some months past on common roads. It is very satisfactory to find, that although the boilers of the several engines described, vary most materially in form, yet that each has been found fully to answer the expectation of its inventor. So well, in fact, have their experiments succeeded, that in each case where the proprietors have ceased to use them, it has only been for the purpose of constructing more perfect carriages, in order to engage more extensively in the business."

"When we consider that these trials have been made under the most unfavourable circumstances, - at great expense, - in total uncertainty, - without any of those guides which experience has given to other branches of engineering; - that those engaged in making them are persons looking solely to their own interests, and not theorists attempting the perfection of ingenious models;-when we find them convinced, after long experience, that they are introducing such a mode of conveyance as shall tempt the public, by its superior advantages, from the use of the admirable lines of coaches which have been generally established - it surely cannot be contended that the introduction of steam engines on common roads is, as yet, an uncertain experiment, unworthy of legislative attention."

"Besides the carriages already described, Mr. Gurney has been informed, that from 'twenty to forty others are being built by different persons, all of which have been occasioned by his decided journey in 18 2 9.'"

"The Committee have great pleasure in drawing the attention of the House to the evidence of Mr. Farey. His opinions are the more valuable, from uniting, in so great a degree, scientific knowledge to a practical acquaintance with the subject under consideration. He states, that he has 'no doubt whatever but that a steadily perseverance in such trials will lead to the general adoption of steam carriages;' and again, 'that what has been done proves to his satisfaction the practicability of impelling stage coaches (by steam) on good common roads, in tolerably level parts of the country, without horses, at a speed of eight or ten miles per hour.'"

"Much, of course, must remain to be done in improving their efficiency; yet Mr Gurney states, that he has kept up steadily the rate of twelve miles per hour; that 'the extreme rate at which he has run is between twenty and thirty miles per hour.'"

"Mr Hancock reckons, that with his carriage he could keep up a speed of ten miles per hour, without injury to the machine."

"Mr Ogle states, that his experimental carriage went from London to Southampton, in some places, at a velocity of from thirty-two to thirty-five miles per hour."

"That they have ascended a hill rising one in six, at sixteen and a half miles per hour, and four miles of the London road, at the rate of twenty-four miles and a half per hour, loaded with people."

"That his engine is capable of carrying three tons weight, in addition to its own."

Mr. Summers adds, that "they have travelled in the carriage at the rate of fifteen miles per hour, with nineteen persons on the carriage, up a hill one in twelve."

"That he has continued for four hours and a half to travel at the rate of thirty miles per hour."

"That he has found no difficulty of travelling over the worst and most hilly roads."

Mr. James Stone states, that "thirty-six persons have been carried on one steam-carriage."

"That the engine drew five times its own weight nearly, at the rate of from five to six miles per hour, partly up an inclination."

(To be continued.)

(From a Correspondent.)

***London and Birmingham Railway.*- A meeting was held at Leighton Buzzard, of Monday last, for the purpose of ascertaining the sentiments of the owners and occupiers of land affected by the intended railway, and its passage through the county of Bedford a corner of which it crosses. This, however was not effected, as a number of persons owning and occupying gardens, and other small properties, in the immediate neighbourhood of Leighton Buzzard, formed a majority of the meeting, and prevailed upon passing a resolution of assent, unsupported by the principal landowners affected by it in that county. This circumstance is not likely to have any ultimate effect on the measure, as it will appear by the statement in next week's paper how very large a majority of them are decidedly adverse to the project.**

ALC/D/099.2

NORTHAMPTON MERCURY **December 24th 1831**

RAIL ROADS AND STEAM-CARRIAGES.

(RESUMED FROM OUR LAST).

The several witnesses have estimated the probable saving of expense to the public, from the substitution of steam power for that of horses, as from one-half to two-thirds. Mr. Farey gives, as his opinion. "That steam coaches will

very soon, after their first establishment, be run for one-third of the cost of the present stage coaches."

Perhaps one of the principal advantages resulting from the use of steam, will be, that it may be employed as cheaply at a quick as at a slow rate; "this is one of the advantages over horse labour, which become more and more expensive as the speed is increased. There is every reason to expect, that in the end the rate of travelling by steam will be much quicker than the utmost speed of travelling by horses; in short, the safety to travellers will become the limit to speed." In horse draught the opposite result will take place; "in all cases, horses lose power of draught in a much greater proportion than they gain speed, and hence the work they do becomes more expensive as they go quicker." On this and other points referred to in the report, the committee have great pleasure in drawing the attention of the House to the valuable evidence of Mr. Davies Gilbert.

Without increase of cost, then, we shall obtain power which will insure a rapidity of internal communication far beyond the utmost speed of horses in draught; and although the performance of these carriages may not have hitherto attained this point, when once it has been established, that at equal speed we can use steam more cheaply in draught, than horses, we may fairly anticipate that every day's increased experience in the management of the engines, will induce greater skill, greater confidence, and greater speed.

The cheapness of the conveyance will probably be for some time a secondary consideration. If at present it can be used as cheaply as horse power, the competition with the former modes of conveyance will first take place as to speed. When once the superiority of steam carriages shall have been fully established, competition will induce economy in the cost of working them. The evidence, however, of Mr. Macneill, showing the greater efficiency with diminished expenditure of fuel by Locomotive Engines on Railways, convinces the committee, that experience will soon teach a better construction of the engines, and a less costly mode of generating the requisite supply of steam.

Nor are the advantages of steam power confined to the greater velocity attained, or to its greater cheapness than horse draught. In

the latter, danger is increased, in as large a proportion as expense by greater speed. In steam power, on the contrary, "there is no danger of being run away with, and that of being overturned is greatly diminished. It is difficult to control four such horses as can draw a heavy carriage ten miles per hour, in case they are frightened, or choose to run away; and for quick travelling they must be kept in that state of courage, that they are always inclined for running away, particularly down hills, and at sharp turns of the road. In steam, however, there is little corresponding danger, being perfectly controllable, and capable of exerting its power in reverse in going down hills." Every witness examined has given the fullest and most satisfactory evidence of the perfect control which the conductor has over the movement of the carriage. With the slightest exertion it can be stopped or turned, under circumstances where horses would be totally unmanageable.

The committee have throughout their examinations been most anxious to ascertain whether the apprehension, very commonly entertained, that an extensive use of these carriages on roads would be the cause of frequent accidents and continued annoyance to the public, were well founded.

The danger arising from the use of steam carriages, was stated to be two-fold; - that to which passengers are exposed form the explosion of the boiler, and the breaking of the machinery, and the effect produced on horses, by the noise and appearance of the engine.

Steam has been applied as a power in draught in two ways; in the one, both passengers and engines placed on the same carriage; in the other, the engine carriage is merely used tc draw the carriage in which the load is conveyed. In either case, the probability of danger from explosion has been rendered infinitely small, from the judicious construction of boilers which has been adopted.

These boilers expose a very considerable surface to the fire, and steam is generated with the greatest rapidity. Froir their peculiar form, the requisite supply of steam depends on its continued and rapid formation, no large and dangerous quantity can at any time be collected. Should the safety valve be stopped, and the supply of steam be kept up in greater abundance than the engines require, explosion may take place, but the danger would

be comparatively trifling, from the small quantity of steam which could act on any one portion of the boilers. As an engine invented by Mr. Trevithick, has not been as yet applied tc carriages, the committee can do no more than draw the attention of the House to the ingenuity of its contrivance. - Should it in practice be found to answer his expectation, it will remove entirely all danger from explosion. In each of the carriages described to the committee, the boilers have been proved to a considerably greater pressure than they can ever have to sustain.

Mr. Farey considers that the danger of explosion is less than the danger attendant on the use of horses in draught; that the danger in these boilers is less than in those employed on the railway, although there even the instances of explosion have been very rare. The danger arising to passengers from the breaking of the machinery, need scarcely be taken into consideration. It is a mere question of delay, and can scarcely exceed in frequency the casualties which may occur with horses.

It has been frequently urged against these carriages, that, wherever they shall be introduced, they must effectually prevent all other travelling on the road; as no horse will bear quietly the noise and smoke of the engine.

The committee believe that these statements are unfounded. Whatever noise may be complained of, arises from the present defective construction of the machinery, and will be corrected as the makers of such carriages gain great experience. Admitting even that the present engines do work with some noise, the effect on horses has been greatly exaggerated. All the witnesses accustomed to travel in these carriages, even on the crowded roads adjacent to the metropolis, have stated, that horses are very seldom frightened in passing. Mr. Farey and Mr Macneill have given even more favourable evidence in respect to the little annoyance they create.

No smoke need arise from such engines. Coke is usually burnt in locomotive engines, on railways, to obviate this annoyance; and those steam carriages which have been hitherto established also burn it. Their liability to be indicated as nuisances will sufficiently check their using any offensive fuel.

There is no reason to fear that water steam will cause much annoyance. In Mr. Hancock's engine it passes into the fire, and in other locomotive engines it is used in aid of the power, by creating a quicker draught, and more rapid combustion of the fuel. In Mr. Trevithick's engine it will be returned into the boiler.

The committee, not having received evidence that gas has been practically employed in propelling carriages on commor roads, have not considered it expedient to inquire as to the progress made by several very scientific persons who are engaged in making experiments on gases, with the view of procuring a still cheaper and more efficient power than steam.

The committee having satisfied themselves that steam has been successfully adopted as a substitute for horse power or roads, proceeded to examine whether tolls have been imposed or carriages, thus propelled, so excessive as to require legislative interference, and also to consider the rate of tolls by which steam carriages should be brought to contribute in fair proportion, with other carriages, to the maintenance of the roads on which they may be used.

Mr. Gurney has given the following specimens of the oppressive rates of tolls adopted in several of these acts:- Or the Liverpool and Prescot road, Mr. Gurney's carriage would be charged £2.8s. while a loaded stage coach would pay only 4s. Or the Bathgate road the same carriage would be charged £1.7.Id. while a coach drawn by four horses would pay 5s. On the Ashburnham and Totnes road, Mr. Gurney would have to pay £2, while a coach drawn by four horses would be charges only 3s. Or the Teignmouth and Dawlish roads the proportion is 12s to 2s.

Such exorbitant tolls on steam carriages can only be justified on the following grounds. First, because the number of passengers conveyed on, or by, a steam carriage, will be so great as to diminish (at least to the extent of the difference of the rate of toll) the total number of carriages used on the road; or, secondly, because steam carriages induce additional expense ir the repairs of the road.

The committee see no reason to suppose that, for the present, the substitution of steam carriages, conveying a greater number of persons than common coaches, will take place to an^ very material extent; and

as to the second cause of increased charge, the trustees, in framing their tolls, have probably not minutely calculated the amount of injury to roads likely to arise from them.

The committee are of opinion that the only ground on which a fair claim to toll can be made on any public road, is to raise a fund, which, with the strictest economy, shall be just sufficient, first, to repay the expense of its original formation; secondly, to maintain it in good and sufficient repair.

..... is not far distant when, in framing a scheme of toll for steam carriages, their general adoption, and the great number of passengers which will be conveyed on a small number of vehicles, will render it necessary not only to consider the amount of injury actually done to the road, but also the amount of debt which may have been incurred for its formation or maintenance; yet at present they feel justified by the limited number of such carriages, and by the great difficulties they will have to encounter, in recommending to the House, that in adopting a system of toll, the proportion of "wear and tear" of roads by steam, as compared with other carriages, should alone be taken into consideration.

Unless an experiment were instituted on two roads, the one reserved solely for the use of steam coaches, the other for carriages drawn by horses, for the purpose of ascertaining accurately the relative wear of each, it would be quite impossible to fix with certainty the proportion of tolls to which, on the same road, each class of vehicles should be liable. To approximate, however, as nearly as possible to the standard of relative wear, the committee have compared the weights of steam carriages with those of loaded vans and stage coaches. They have tried to ascertain the causes of the wear of road; also the proportion of injury done by the feet of horses, and the wheels of coaches; how far that injury is increased by increased velocity, and also in what degree the wear of roads by loaded carriages may be decreased by any particular form of wheel.

The committee would direct the attention of the House especially to the evidence of Mr. Macneill, whose observations on this branch of the subject, being

founded on a long course of very accurate experiments, are peculiarly interesting and useful. He estimates that the feet of horses drawing a fast coach, are more injurious to the road than the wheels, in the proportion of three to one nearly; that this proportion will increase with the velocity; that by increasing the breadth of the tires of the wheels, the injury done to roads by great weights may be counteracted. He considers that on a good road, one ton may be safely carried on each inch of width of tire of the wheels.

Mr. McAdam and Mr. Telford have given corresponding evidence as to the greater wear caused by horses' feet than by wheels of carriages.

Each of the above witnesses agrees, that, adding the weight of the horses to that of the coach, and comparing the injury done to a road by a steam carriage of a weight equal to that of the coach and horses (the wheels being of a proper width of tire), the deterioration of the road will be much less by the steam carriage than by the coach and horses.

The weight of the steam carriages at present in use varies from 53 to 80 cwt. ; but it must be recollected that they are mere models; they were made with attention to strength only, to bear the uncertain strain to which they would be exposed in the course of experiments, and a very considerable diminution of weight may be anticipated.

The weight drawn, at the rate of ten miles per hour, by Mr. Gurney's engine, has not, on any extent of road, exceeded the weight of the drawing carriage; nor is it likely, with the difficulties to be encountered on the present lines of road, from their quality and the numerous ascents, that the weight drawn will be in excess of the strength of the road. The immense quantity of spare power required to surmount the different degrees of resistance likely to occur, would render the engine too unmanageable. This will appear evident from the force of traction required to draw a wagon over the Holyhead and Shrewsbury road, which varied from 4 0 to upwards of 3 00 lbs.

In considering the effect on roads, we must not overlook one peculiarity, in which they have a great advantage over other carriages. In coaches drawn by horses, the power being without the machine to be moved, it becomes an object of the greatest importance to give as much

effect as possible to the power, by diminishing the resistance, arising from the friction of the wheels upon the surface of road. For this purpose, the proprietors of coaches and wagons have adopted every possible contrivance, so to reduce the tires of their wheels, that a very small portion of them may press on the road; in some coaches they are made circular in their cross section, so that the entire weight of the carriage presses on a mere point; should the materials be soft, such wheels cut their way into the road like a sharp instrument. The owners of wagons too have adopted a similar plan. Mr Macneill states that the actual bearing part of the tire of apparently broad-wheel wagons, is reduced to three inches, by the contrivance of one band of the tire projecting beyond the others.

With steam, on the contrary, a certain amount of adhesion to the roads is required to give effect to the action of the machinery, or the wheels would slip round, and make no progress. It appears of little importance therefore, so far as relates to the engine, whether the requisite amount of friction be spread over a broad surface of tire, or be concentrated to a small point; but as the wheels, by being too narrow, would have a tendency to bury themselves in every soft or newly made road, and thus raise a perpetual resistance to their own progress, it actually becomes an advantage to adopt that form, which is least injurious to the road. The proprietors who have been examined on this point, seem to be quite indifferent as to the breadth of tire they may be required to use.

(To be continued)

ALC/D/099.3

RAIL ROADS AND STEAM-CARRIAGES.1831

(RESUMED FROM OUR LAST)

Some trustees have placed the toll upon the number of wheels. The Committee would object to this mode of charge, if only, because it interferes between the rival modes of steam travelling, and gives a bounty in favour of that, in which the engine is placed on the same carriage with the passengers. The opposite plan of separating the engine from the carriage is that which probably the public will prefer, until the safety of the mode of conveyance shall have been fully ascertained.

There is still a more serious objection to this mode of charge, it tends to discourage the use of separate carriages; although it must be evident, that if a certain weight be carried, it will be much less injurious to the road when divided over eight wheels, that when carried on four only. On this point the committee must again refer to Mr. Macneill's evidence. They cannot therefore recommend the House to adopt a scale of toll which shall increase in inverse proportion to the injury done to the road. It will be seen in Mr McAdam's evidence that the Toll on steam carriages imposed by the Metropolitan Roads Act, is liable to this objection.

The committee feel that however strong their conviction may be of the comparatively small injury, which properly constructed steam carriages will do to the road, yet this conviction is founded more on theory, and perhaps what may be considered as interested evidence, than practical experience; they would therefore recommend, that the House should not make, at present, any permanent regulations in favour of steam. The experience which will be gained in a very few years, will enable the legislature to form a more correct judgement of the effect of steam carriages on roads than can be now made. They therefore recommend that the **tolls** imposed on steam carriages by local acts, where they shall be unfavourable to steam, shall be suspended during **three years**; and that, in lieu, thereof, the trustees shall be permitted to charge toll according to the rate to which the committee have agreed.

The House will have perceived, in the former part of this report, that there are two modes of applying steam in lieu of horses in draught; one, where the engine and passengers are on the same carriage, the other where the engine is placed on separate wheels, and is merely used to propel or draw the carriage. Although the difference of weight may be in favour of the former mode, yet as on the latter it is divided over eight wheels,

instead of four, its small excess cannot justify a larger toll being imposed, as it will be found much less injurious to the roads. The committee therefore recommend, that in charging toll, the engine carriage and carriage drawn shall be be considered as one.

As it is the opinion of all the engineers examined, that the use of narrow wheels has been the great cause of the wear of roads, and that cylindrical wheels, of a certain width of tire, are not only the least injurious, but that, in some states of the road, they may be even beneficial, the committee recommend, that the wheels of the engine carriage should be required to be cylindrical, and of not less than 3 1/3 inches of tire. No proprietor of steam carriages has expressed the slightest fear of any inconvenience or loss from the use of such wheels. Beyond this, the committee would not recommend interference with the breadth of tire they shall find most convenient in proportion to the weight carried.

The committee have divided steam carriages (intended for passengers) into two classes, to be subject to different rates of toll. The first, where the carriage is not plying for hire, or where, if plying for hire, it shall not be calculated for, of carry at any time, more than six passengers; the original cost of such machines, and the expense or working them will sufficiently protect the roads from any great number of merely experimental carriages; and for the same reason they will not be of a weight or size likely to be injurious. A steam carriage only calculated to convey six passengers will be solely used where great speed is required, and will be so light as to cause very little wear of the road, probably much less than many carriages drawn by the number of horses which the committee recommend as the standard of charge for this class. The toll, therefore proposed to be placed on this class of steam carriages is that, which (on the several roads where they may be used) is charged on a carriage drawn by two horses.

In the second class they have placed all other steam carriages, except those travelling at slow rates, for goods only; carriages of this class should pay the same toll as may be charged on a coach drawn by four horses. This may at first appear unjust from the supposed power of steam to draw almost unlimited weight. The committee have already enumerated the difficulties hitherto encountered in attempting to propel very heavy

loads on turnpike roads. They are such as to discourage the expectation, that within any short period of time, the system will have been so perfected as to give rise to inconvenience from this source; should any hereafter be found, it will then be sufficient to remedy the defect. Until a due proportion of the parts of the machinery shall have been ascertained, the makers of these carriages will vary but cautiously, from the models at present in use; their object will be, for some time, the perfecting of them, rather than the uncertain experiment of increasing their size.

The committee do not anticipate, that, for a considerable period, steam will be used as propelling power on common roads for heavy waggons. It appears to have been the general opinion of the witnesses, that in proportion as the velocity of travelling by steam on common roads is diminished, the advantages of steam over horse power are lost. The efficiency of horses in draught is rapidly diminished as their speed is increased; while, on the contrary, the weight, which could be carried or propelled, at any great velocity, by steam, could not be more cheaply conveyed, were the speed decreased to that of the slowest waggon.

As speed, therefore, is the cause of greatly increased expense where horses are used, while with steam it is comparatively unimportant, it is probable that the latter will be chiefly resorted to when rapidity of conveyance is required. Mr. Gurney considers, that under four miles per hour, horses can be used in draught more economically than steam. Should it, however, be deemed profitable to convey heavy goods by steam carriages, the committee recommend that there should be as little interference as possible with the number of carts employed; as the effect of the surface of roads would be infinitely more injurious if heavy loads were placed on a single cart, than if the same weight were divided over several. The committee recommend, that where carriages, containing heavy goods alone, are propelled by steam, the weight of the load should be charged, without reference to the number of carts on which it may be carried.

As a horse is able to draw 2 0 to 4 0 cwt. on common roads, they propose that each 20 cwt of load conveyed in or drawn by, a steam carriage, should be chargeable at the same rate of toll as one horse drawing a cart.

A charge on weight is not so objectionable where goods are conveyed at a slow rate, as when speed is alone required.

In conclusion, the committee submit the following summary of the evidence, given by the several witnesses, as to the progress made in the application of steam to the purpose of draught on common roads.

Sufficient evidence has been adduced to convince your committee.

1.-That carriages can be propelled by steam on common roads at an average rate of ten miles per hour.

2.-That at this rate they have conveyed upward of fourteen passengers.

3.-That their weight, including engine, fuel, water and attendants may be under three tons.

4.-That they can ascend and descend hills of considerable inclination with facility and safety.

5.-That they are perfectly safe for passengers.

6.-That they are not (or need not be, if properly constructed) nuisances to the public.

7.-That they will become a speedy and cheaper conveyance than carriages drawn by horses.

8.-That, as they admit of greater breath of tire than other carriages, and as the roads are not acted on so injuriously as by the feet of the horses in common draught, such carriages will cause less wear of roads, than coaches drawn by horses.

9.-That rates of toll have been imposed on steam carriages, which would prohibit their being used on several lines of road, were such charges permitted to remain unaltered.

(To be continued)

AT ***A MEETING of the PROPRIETORS and OCCUPIERS of LANDS in the COUNTY of NORTHAMPTON, through which the projected LONDON and BIRMINGHAM RAILWAY is intended to pass, holden at the*** White Horse Inn, ***at*** Towcester, ***on the 3 0th Day of December, 183 0 (pursuant to public Advertisement), for the Purpose of considering the Subject; and adopting, such Measures as may be expedient on the Occasion, (Sir WILLIAM WAKE, Bart, in the Chair),*** Resolved unanimously, ***That it is the Opinion of this Meeting that the said Railway will do great Injury to the Properties through which it is to pass.***

1st. By destroying the Privacy and Unity of the Farms, and cutting off Parts thereof from the Homesteads.

2dly. By dividing into separate, ill-shaped Fragments, Closes which are now- convenient in their Form, Size, and Quality.

3dly. By occasioning deep Cuttings across the Slopes of the Hills, and thereby intercepting the Supply of Water to the Wells and Grounds below them.

4thly. By occasioning large Embankments across the low Lands, and thereby intercepting the natural Drainage of the Parts above them.

5thly. By requiring in numerous Cases so great a Width for Slopes, in Addition to that of the Railway itself, as to render any Communication between the Lands separated by it extremely difficult and inconvenient.

2d. That it is the Opinion of this Meeting that it will occasion great Inconvenience to the Public, from the interruption of the Parochial and other Highways; and that where it crosses them on the same Level it will endanger the Lives of the Passengers.

3d. That there is already Conveyance for Travellers between London and Birmingham by numerous Coaches every Day, at the Rate of ten Miles an Hour, and Water Carriage for heavy Goods, to a greater Extent than has ever been required.

4th. That no Necessity has been shown for accelerated Communication beyond what can be supplied by Means at present in Existence, and such Improvements as are constantly taking place thereon.

5th. That this Meeting are not aware of any Advantages likely to be produced by the said Railway sufficient to countervail the certain Evils that will be inflicted by it.

6th. That the Scheme is not promoted (with very few Exceptions) by Persons interested as Land-owners in the District of Country through which it is proposed to be carried, but by Persons combined together in Pursuit of private gain, and who are themselves exempt from the Evils they would inflict on others. That the Absence of the Support of the Landowners is an undeniable Proof that the Speculation is uncalled for by the Wants or Wishes of the Country.

7th. that the Persons whose Property and Comforts are to be sacrificed to these Ojects, are some of them Noblemen and Gentlemen, upon whose Places of Residence large Capitals have been expended in Decoration and Convenience, which Capital will be nearly annihilated; and others of them are respectable Yeomen, who dread the injury that will be done to their respective Properties, and feel severely the Hardship imposed upon them, either of sustaining the Evil, or being burdened with the Expense of Resistance.

8th. That this Meeting are far from wishing that any undue Attention should be paid to their individual Interest, but that they feel it a Duty to themselves and the Community to protest against such a violation of private Rights, unless a public Benefit of correspondent Magnitude and established Certainty would be obtained by the Sacrifice.

9th. That this Meeting is strongly impressed with the fact that Endeavour has been made to obtain the Assent of the Landowners to this Measure, by exhibiting a Plan which affords no Information as to the Evils which this Meeting apprehends as detailed in their first Resolution.

10th. That from the best Information within their reach, it appears that the Expense will be far greater than the Public are led to expect, and that there is no Probability of any adequate Remuneration to the Person who may be induced to embark their Capital thereon.

ALC/D/099.4

RAILROADS AND STEAM CARRIAGES.

(Resumed from our last).

EXTRACTS FROM THE EVIDENCE OF THE WITNESSES.-Mr. Gurney, stated that his carriage went up Highgate-hill, and to Edgeware, also to Stanmore, up Stanmore-hill, and Brockley Hill, and against all these hills the wheels never slipped. That he travelled to Bath, and over all the hills between Cranford Bridge and Bath, and returned with only one wheel attached to

the axle; that he went from Melksham to Cranford Bridge in ten hours, a distance of eighty-four miles, including stoppages. That his carriage weighed two tons, and that those now building will not weigh more than 3 5 cwt. with the same power of engines. That one carriage now building, intended to carry three people and light parcels, will not weigh 5 cwt. That he has travelled with a steam carriage five years, more or less, every week, and been very frequently in the public streets of London, and in the roads round London, and also in the private and public roads in the country, and has often seen horses shy, but never make a dead stand at the carriage. That he has blocked up the wheels of the carriage with square pieces of wood four inches in diameter, and started it when so blocked up. That his boilers are proved to 800lbs. on the square inch, and that, they are subjected to a pressure of only 70lbs. in the ordinary

rate of travelling, and in extreme cases to 13 01bs. That he has always found the most perfect command in guiding steam carriages, and that they can be stopped within a space of six or seven yards, if travelling at the rate of eight miles an hour. That the carriage on the Cheltenham road was stopped in consequence of the breaking of one of the cranks, occasioned by the extra difficulty of drawing the carriage over a hollow in the road, where new stones had been placed 18 inches deep; that the carriage had gone through it twice with twenty passengers, but the third time the axle was fractured; that the road was in an unusual state; that he saw the passengers of four-horse coach get down in the stones; that he was told all the two-horse coaches put down their passengers; that the mail was stopped; that there were two wagons and two coaches in the stones stopped at the same time, and that they were obliged to

exchange their horses to get through. He also states, that, on a pavement, the carriages require only one-fourth the power which the require on a gravel road; That he has no doubt whatever that steam carriages may be brought into operation on the turnpike roads as they now exist. That he has now a steam coach with safety on the public roads, with a velocity of 18, and sometimes 20 miles an hour, but recommends 12 miles an hour as the most preferable rate of travelling.

He estimates the relative expense betwixt horse and steam power for locomotion as follows;-

The first cost, wear and tear of the coach, drawn *by steam, or by horses, to be the same both cases.*

The expenses of men to manage is about the same also. In one case, there is a coachman and guard; in the other an engineer, and director. Government duty and turnpike tolls *must also be considered the same.*

It remains then to show the difference in the expense of POWER only; viz-between the expense of horses and the expense of steam.

First, in the outlay on 100 miles of ground. To work a coach well with horses, 100 miles up and 100 miles down, once a day, will require 100 horses. A horse a mile is the present calculation for doing the work. If these horses be taken at £20 or £30 per horse, or say £25, it will amount to £2,500. Three *steam carriages will do the same work, and the expense of these will be about £500 each, or £1,500 for the three. A saving will consequently be effected in the first outlay of £1,000 in capital.*

The wear and tear of horses may be estimated at about £5 each per annum on the 100 horses; viz. £500 per annum.

The wear and tear of the three steam towing carriages will not exceed £100 each per annum; £300 for the three; saving in wear and tear £2 00.

The expense of shoeing, keep, provision, attendance, harness, & c is per day somewhere about 3s. each, or £15 upon the 100 horses.

The expense of fuel for two carriages, one up and the other down, doing the same work, will be that of 100 bushels of coke at 6d. per bushel, say £2.10s.; or if we take Is. per mile *per horse power, it will be about the same. The expense of fuel for the steam carriage will be, on an average throughout England, about 3d. In some coal districts it will not exceed Id. per mile, while in other situations it will amount to 6d. The expense of stables, which is considerable, compared with sheds for coke and water, has not been taken in this estimate:-*

From these data, a carriage may be worked by steam *at one-fifth the expense of* horses.

In concluding his evidence Mr. Gurney states, that he firmly believes that the introduction of steam carriages on common roads, will do more than any other thing for this country; that having this impression, he left an honourable and lucrative profession, in which he was extensively engaged, in order to attend to this subject, because he was convinced of its importance and practicability; that imperfections still exist in the machinery, but, that the main points of difficulty have been removed by the experiments which he had made, and that all those now remaining are practical difficulties, which will be removed by further experience; and if there is no cause opposed by the Legislature, or any other source, he will be bold to say, that in five *years, steam carriages will be generally employed throughout England. That between*

twenty and forty different carriages are at present building or about to be built, by different persons.

Mr. Hancock states, that he has been running a steam carriage about twelve months on the turnpike roads. That his boilers are much lighter than any that are now in use; that he was worked up to a pressure of 4 001bs. on the square inch, but that on the average of roads, the pressure is only 701bs. That there are 100 square feet of the boiler exposed to the fire, and that on an average he consumes lcwt. of water and a quarter of a bushel of coke per mile. That the boiler is placed behind the carriage; that the engines are placed between the passengers and the boilers; that the forepart of the carriage is for the passengers. That he now carries ten passengers, but is making provision to carry 14. That his carriage weighs from three to three and a half tons, including fuel and water. That the chimney cannot be seen, and that there is no annoyance to passengers from smoke, wasted steam or noise of the engines, which is less than that of a common stage coach. That he could turn the carriage out of a street ten feet wide into another street also ten feet wide, and at right angles to the former, when travelling at the rate of six miles an hour. That he can stop the carriage in a space of twelve feet, when travelling at a speed of eight miles an hour, and, in extreme cases, it might be stopped in a space of four feet by backing the engines; that he has frequently been obliged to do so from children running across the road.

That his carriage is more than equivalent to a four-horse carriage, from the fact of its being able to do more work. That he has never found his wheels slip excepting once in the City-road, when there was frost, and the ground quite slippery; it was for an experiment to see if his carriage

could run up the Pentonville Hill with one wheel only acted on by the engine; he found some difficulty near the top, but if both wheels had been in action, there would have been none. That he thinks there are no hills upon which horses travel, but what his coach would propel itself up. That the fares he charges passengers are barely 2d. per mile. That he will be able to continue running at two-thirds the present fares charged by stage coaches; and the expenses of his coach, wages for engineer, steersman, fuel, oil, etc. will be from £3 to £4 per day, and the distance travelled in the day 100 miles in ten hours, allowing two hours for stoppages and eight hours for the work.

(TO BE CONTINUED.)