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John Redman Coxe, Robert Peterson, Caleb Newbold, Jr., and William Duncan of the City of Philadelphia, and Emor Bradley of the county of Chester be, and they are hereby, constituted the President and Directors of the company incorporated by said act, to continue in office until the second Tuesday in December next ensuing, Anno Domini one thousand eight hundred and twenty-four.

This Supplement failed to receive favorable consideration and the act authorizing the surveys for a continuous canal from Philadelphia westward was favorably reported from Committee eighteen days later.

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SPECIFICATION or description of anew and useful
improvement in the mode of constructing railroads.
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The improvement consists in forming the ways of hard stones laid longitudinally for the wheels of the carriages to run on. These ways are composed of granite or any other hard stone of such length, width, and thickness as may be most advantageous. In the roads I have already constructed on this plan, I have made use of stones of granite each about four feet long, fourteen inches wide, and from four to five inches thick. The inner and upper faces are hewn, and the ends are squared. These stones are placed longitudinally on the ground in two rows, the inner faces of which are about three feet, ten inches apart, and their upper faces fourteen inches wide on a level with the surface of the road on which the horses travel. This road could be formed in such a manner, and of such materials as to be firm and dry at all seasons, but not so hard as to injure the horses' feet. In clay and loamy soil it is necessary to dig trenches

Handwritten in red ink:
This road could be formed in such a manner, and of such materials as to be firm and dry at all seasons, but not so hard as to injure the horses' feet. In clay and loamy soil it is necessary to dig trenches

about eighteen inches deep, and to fill them with sand or gravel on which the stones are bedded. A ditch should be formed on each side about two feet deep, and holes perforated from the bottom of the trenches to the bottom of the ditches. For preventing the wheels from running off the ways, it may be necessary to place on each side on the outward edge thereof, a continued line of joice from three to four inches.

The construction of these improved railroads is so simple as to require no further explanation.

John Stevens.

Hoboken, September 7, 1824.

To the Honorable the Mayor of the City of New York.

The Memorial of John Stevens, respectfully sheweth,

That your Memorialist hath lately taken out a patent "for a new and useful improvement in the mode of constructing railroads", the principal object of which is the substitution of granite or other hard stone in the place of what are technically termed *Tram-plates* of cast-iron for the wheels of carriages to run on. Were double rows of such stones for passing each way, laid down in every street throughout the city, great advantages would result. The constant rattling of carriages over rough pavements would be entirely done away; and we should be conveyed from place to place almost without any perceptible motion. These are minor objects when the vast saving that would accrue from the adoption of such an improvement are taken into consideration. Upwards of two thousand cartmen are daily employed in the transport of countless and very multifarious articles through the streets of

this great commercial city. Supposing, then, that the earnings of each man and horse be no more than a dollar a day, it would amount to more than \$600,000 per annum. Supposing next that the actual capital in horses, carts, &c., belonging to these cartmen amounted to \$750,000, on this aggregate sum of \$750,000 should we estimate the saving produced by the adoption of this improvement, at only ten per cent, it would amount to \$75,000 per annum. This sum would probably be more than sufficient for the extension of it through every street in the City. No account is here made of the saving in wear and tear of hackney coaches, pleasure carriages, &c., which would be very considerable. As this view of the subject renders the adoption of this improvement highly important, your Memorialist craves leave to call the attention of your Honorable Body towards it.

John Stevens.

New York, December 27, 1824.

CHAPTER XXI.

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Letter to Richard Peters, Jr., Esq.

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Hoboken, December 28, 1824.

Dear sir:-

I have just now received yours of the 24th. written on the circular of your Committee. I will now explain to you what was my meaning when I signified to you that my subscription to your association would be conditional. You already know that last March, a year ago, an Act passed your Legislature "to incorporate a company to erect a railroad from Philadelphia to Columbia in Lancaster County." Unfortunately a majority of the gentlemen who were named as Directors were so lukewarm in the business that they neglected "to perform certain duties required of them in said Act, in consequence of which no choice of Directors took place on the second Tuesday in December, 1824. I herewith enclose a Supplement to said Act for appointing a new set of Directors to continue in office until

the second Tuesday in December. These gentlemen have all expressed their willingness to serve. The charter is extremely favorable to the stockholders, securing to them three per cent quarterly, provided the net proceeds shall be sufficient. I now, my dear sir, come to the conditions above alluded to, which are as follows:-

Imprimis,. Whenever said Supplement becomes a law, I hereby promise to pay instantly into the Treasury of your society, \$100. And further, that should the object of said charter be carried into effect, out of any surplus that may remain after the quarterly payment of three per cent has been made to the stockholders, I hereby agree to pay into said Treasury, \$100. Lastly.--On an assurance that the Company will be disposed to exert their influence in procuring the passage of said Supplement, I further promise to explain to you the mode I propose to pursue in forming said railroad, and, as I confidently expect, remove in toto the difficulties which appear to you so formidable.

Letter from Mr. Stevens to Richard Peters, Jr.,
of Philadelphia.
.....

Hoboken, January 14, 1825.

Dear sir:-

I have this day transmitted to you by the
N. L. directed to the care of Captain Pawtson to be
left in the office till called for, a number of publi-
cations on the subject of railroads issued from the
press at different periods--commencing with a pamphlet
printed in 1812 with the title of "Documents tending
to prove the superior advantages of railroads and
steam carriages over canal navigation."

I also send a map, of the contemplated route
of the railroad from Philadelphia to Columbia, made by
Charles Loss, accompanied with his report. The map
and report I wish you to preserve. A pencil mark des-
ignates with tolerable accuracy the contemplated route.

Mr. Loss and myself spent twelve or fourteen
days in July, 1823, in exploring said route--and in
September following I again went to Columbia. In our

~~* But on exploring the ground between the West
Chester road and the ridge I discovered my error.~~

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Letter to His Excellency, De Witt Clinton, from
John Stevens.

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Hoboken, January 19, 1825.

Dear sir:-

I know that the following project would, by almost every man in the State, be considered as wild and chimerical. But I trust you will see it in a more favorable light. Without further preface or apology, I proceed to give you a sketch.

Railroads are, in their nature, more particularly adapted to the conveyance of passengers. By the agency of steam, the velocity with which passengers may be carried is a problem yet to be solved. I can see no reason why the velocity of a steam-carriage may not equal twenty, twenty-five or thirty miles an hour. All that is necessary is a level road, and a proper application of the power. As respects the application of steam power simply--a "Steam-carriage,

road and a due application of steam power. The shores of the Hudson afford a theatre for the display of the former as complete as can be desired; and permit me to say, I feel the utmost confidence in being able to effect the latter.

The next question is whether such a project would quit cost? But if passengers can be conveyed in this way, at least as cheap, and in less than half the time, we may fairly calculate that steam-carriages would rival successfully steam boats.

It may again be objected, that the expense of erecting a railroad one hundred and fifty miles long, will prove too enormously great; that the receipts would not, after deducting expenses, pay legal interest on the capital invested. I will freely admit that this would indeed be very problematical were a double railroad, on the plan now in use in England, to be adopted. Mr. Dewey, Superintendent of both (roads and transportation) has communicated to me the latest improvements in the construction of railroads in that country. So executed, a double railroad would

I may truly say, has infinitely the advantage over a Steam Boat. The one operates in a dense medium, the resistance of which increases with the squares of its velocity, whereas the other passes through a medium nine hundred times more rare.

The application of steam power for effecting this object, has not, however, been yet accomplished--at least but in a very limited degree. But from this circumstance alone we are by no means authorized to pronounce it impracticable. It is but little more than a dozen years since steam boat navigation from New York to Albany was considered as impracticable and visionary.

The object then I wish to accomplish is to take passengers from New York to Albany in carriages impelled by steam, instead of boats so impelled. Do not be startled at the novelty of the project. If a canal is on the point of being completed from Albany to Lake Erie, why may not a railroad be formed from Albany to New York less than half the distance? I have already said that all that is required is a level

cost in this country, at least \$25,000 per mile, and require a capital of \$3,750,000 for the whole distance.

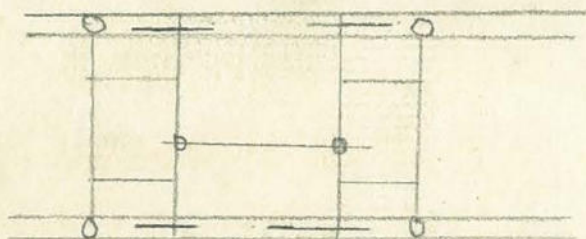
I will now trouble you with no further details, but leave you to form an estimate of the immense magnitude of the contemplated object. Although I failed, perhaps upon just principles some dozen years ago, to convince you that railroads with steam-carriages were preferable to canal navigation, yet in the present instance I trust I shall be more fortunate. That you will unhesitatingly give a decided preference to steam-carriages on railways when contrasted with steamboat navigation, more especially for the conveyance of passengers. Should you think the project as at all feasible, I shall, whenever called upon, finish the details for carrying it into effect.

Memorandum made on Monday the 28th February, 1825.
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In the afternoon of last Saturday week I made some experiments for propelling a carriage on railways, but did not succeed to my satisfaction, owing to the great friction of the wheels against the sides.

On the following Monday I sent the carriage down to Van Velsen's shop and directed him to insert rollers into each end of two bars, one to be placed in front of the fore wheels, and the other behind the hind wheels, extending beyond their track on each side, so as to roll against the upright pieces placed on the outer sides of the ways. This improvement, as far as I know, is original; and in conversation with John this morning in the nursery, he mentioned that Robert proposed that the wheels of the carriages intended to run on the "Mont Russe", should have grooves for iron bars set edgeways to run in--but that Edwin had proposed to put wheels on the ends of the axle-trees to take off friction against the sides of the ways. I

then told John what I had on Monday last directed Van Velsen to do, and made a sketch of my plan with a pencil in the blank leaf of book thus:-

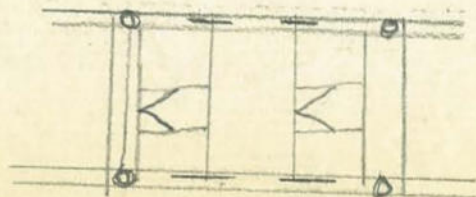


Letter to Richard Peters, Jr., Esq.

Hoboken, March 10, 1825.

Dear sir:-

I have received the Committee's instructions to Mr. Strickland, dated February 17, 1825; also "Abstract of Review", &c., dated February 25. I can very well conceive that on a perfectly straight road what is called "an edge ruttrack" would have much advantage over a concave or a flat track with a flange. But what peculiar circumstances can produce the extraordinary difference, stated in said Abstract, in favor of the former, I am quite at a loss to form any conjectures. When the track is curved, the friction on all of them must be very considerable. To obviate this very serious objection, in a model lately executed of the full size, extending about 200 feet, I have placed lateral rollers thus:-



which operate as guides effectually, preventing the rims of the wheels from coming in contact with the flange. And from the trials I have made, I am fully convinced that this improvement will give to a carriage on railways a decidedly great superiority in draught over any other mode of construction now in use. As I consider this improvement of such primary importance, I wish Mr. Strickland to be silent respecting it on the other side of the Atlantic. In your favor of the 8th. January last, you are pleased to say "You may be assured, sir, of the efforts of the Committee to obtain the passage of the bill, and it is not feared that these efforts will be 'unsuccessful'". It appears to me of the utmost importance that this supplement should be passed, as, even if the company propose the adoption of any plan until Mr. Strickland returns, yet a season would be saved, for, in the mean time, the route may be ascertained, and the ground reduced as nearly as possible to a level. I presume the session of your Legislature, according to usual practice will close soon.

My sons are about to erect what in Paris is called Mont Russe. They have already erected a road of 40 feet long--on which by adopting the above principle of lateral rollers, the friction is so astonishingly diminished that a carriage will ascend nearly to the elevation it started from. You will find a very important description of those in use at Petersburg in Sir. Robert K. Porter's travels through Russia. Although those are formed with blocks of ice, yet for want of sufficient impetus to ascend a second mont, the sportsmen and women are obliged to walk back to where they started from. Whereas, by means of the above improvement, the traveler may continue to ride as long as they please.

I am, dear sir,

Your Obedient Servant,

John Stevens.

From a letter to Gerard Ralston, dated July 20,
1825.
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In the third edition of your friend's pamphlet, I, for the first time, noticed a passage in pages 25 and 26 where he describes his contrivance for removing the lateral friction of the periphery of the wheels of carriages on railroads against the flanges. In a letter addressed to R. Peters, Jr., Esq., dated the 10th. of March last, I have given a description of my mode of effecting this very important object. Until a few days ago I had not received the least intimation of your friend's projects, but whenever merit may be claimed on this score, I certainly am entitled to a claim of originality, if not of priority.

I have this moment seen in the papers that the convention have organized, after agreeing to the report of the Committee, which seems to have cautiously avoided any particular recommendation of a canal but generally of an internal complete communication.

As the Legislature does not meet before December, there is time enough to make a strong impression on the public mind in favor of railways. In your friend's pamphlet dated March 15th., in page 9, he says, "For seven and twenty years many unsuccessful attempts were made to improve the cumbrous vehicles", and then subjoins, "Very recently these efforts have been crowned with the most complete success in Great Britain." Strange that these grand improvements have nowhere been particularly noticed by him in any of his publications. The last accounts I have seen, give a detail of various experiments made by a special committee with Mr. Rlenkinsop's engine, which has undergone no alteration or improvement from its first construction ten or a dozen years ago. This engine with the carriage, weighs no less than nine tons.

Letter to Gerard Ralston, who was Corresponding
 Secretary of the Pennsylvania Society for the
 promotion of Internal Improvements.

Hoboken, August 12, 1825.

Sir:-

I have received the third and fourth edition of your printed pamphlet, and have been much gratified in the perusal. The luminous expose he makes on this very interesting subject, and the decided superiority thus evinced by railways over every other mode of conveyance, will, I presume, have a preponderating influence with the Convention. I am very anxious to learn the result of its deliberation.

On the perusal of your friend's strictures at the beginning of page 28, I am apprehensive to allude to an incorrect mode of expression used in my letter of June. I have there said, "That any small increase of the power which would drive the carriage two miles an hour, would be capable of compelling it

ten or twenty miles an hour." I meant to have said at the rate of ten or twenty miles an hour. But even with this correction it would by no means give an accurate enunciation of the fact. The real fact is that to effect an increased velocity, a proportionate increase of power must take place. That is,--to drive a carriage at the rate of ten miles an hour would require an exertion of five times as much power as would impel it at the rate of two miles an hour. In the increase, however, it would require an hour for the carriage to pass over two miles of space--in the other only twelve minutes.

It is apparent then, that in both cases the aggregate quantum of power expended would be equal. To illustrate this by a familiar example, let us suppose a steam engine at one time to make ten strokes of the piston in a minute, at another, twenty; it is obvious, then, that to double the velocity requires an expenditure of twice the quantity of steam or power. But as the passing over a given space would in such case be performed in half the time, the quantity

of steam or power expended would be equalized. The application of the principles above stated leads to results hitherto far from being duly appreciated.

If, instead of progressing, as on a canal, at a speed of two, three, or, at the utmost, four miles an hour, it should be practicable to acquire a velocity of twenty miles an hour by means of a locomotive machine impelled by steam on a railroad,--how great the advantages would be I need not now stop to enumerate. But the decision of your friend in favor of horse power in preference to steam power, for propelling carriages on railways is truly surprising. His whole calculation is founded on an egregious error in estimating the capital requisite for their respective erection. He estimates the cost of rails and way for horse power at much less than railways for steam power-- whereas the fact is just the reverse. The railways simply for steam power can be completed for less than railways and road for the use of horse power. For the latter the formation of a

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good road in the first instance is indispensable, and afterwards a continual annual expense for repairs will be required. In the former these items of expense are saved altogether. The construction and reparation of the railways would be precisely the same in both cases; but when railways are carried through the various coal districts--and "in abundance of coal Pennsylvania is not exceeded by any country on the face of the globe"--the expense of steam power will be infinitely less than of horse power. The latter, too, is limited in speed, which cannot advantageously exceed three or four miles an hour; whereas the velocity of the former is in truth limited. This circumstance is not merely a great accommodation to the merchant and to the traveler, but is also at the same time a great saving in expense. For although an equal quantity of coal will be consumed, whether the carriage goes twenty miles an hour or in twenty hours, yet in the saving of time every expense is proportionably lessened.

The following two extracts are from a pamphlet of sixty-eight pages entitled "Facts and Arguments in favor of adopting Railways in preference to Canals, in the State of Pennsylvania; to which are added a few Remarks on the subject of Internal Improvements." (Fourth Edition, Philadelphia, August 1, 1825.)

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"An improvement in economically effecting this object, (i.e., lessening the noise made by vehicles in city streets, and making the drawing of them easy) has actually been put in practice in Linlithgow and other towns in the same district in Scotland. It consists in placing stones of ten inches cube in the usual direction of the wheel tracks. The expense is only six shillings a yard, or 528l. per mile, for two courses composing one set. Our ingenious countryman, Mr. Stevens, of New Jersey, has constructed a railway of granite for about half this expense. This experiment, which was tried on a road of small extent, was completely successful."

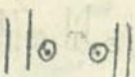
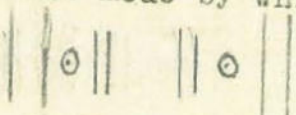
("A model of a railway several hundred feet in length, has been made by Mr. Stevens,--the gentleman who recently obtained permission to construct a railway from Columbia to Philadelphia.)"

To Gerard Rolston, Esq.
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Hoboken, December 2, 1825.

Dear sir:-

You will no doubt be surprised, from the import of my last letter to you, that you have not ere this heard further from me respecting the experiment I was about to make with my steam carriage. But a series of misfortunes and disappointments have occurred, which have hitherto prevented the accomplishment of my object. The frost we had some time ago, congealed the water left carelessly in the connecting pipes, and fractures were the natural consequence. I then attempted to repair the leaks with soft solder, but the high temperature of the steam soon melted it. I have now disconnected the fractured pipes and sent them to the coppersmith either to repair them, or to replace them with new ones, and in a few days shall, I hope, be ready. From observation and reflection I am now, however, convinced that I have committed a

very essential error in the disposition of my lateral wheels which are intended to act as guides to the movements of the wheels on the ways. At present the disposition is thus  The guide wheel works against the interior surfaces of the ways. You will readily see that any deviation of the ways from a rettilineal course,--say, for instance, to the left hand--must cause the lateral wheels on the right hand to come in contact with the ways upon the right hand. The effect of the friction thus produced, will be to retard the motion of the carriage wheels on their side, when, in fact, it is necessary they should be accelerated, being compelled to describe a larger arch of a circle than the wheels on the left side. Had I not attempted to make the carriage go round in a circle, the obvious defect might not have prevented itself to my view. The mode by which I purpose remedying this is thus  You will readily perceive that instead of the guide wheels revolving on each side against the interior surfaces of the ways,

they are made here to come in contact with guides placed nearer to the middle so as to admit of the lateral wheels revolving against the exterior surfaces of the guides. On turning then, as before, to the left, the guide wheel on the left hand will come in contact with the guide, and by its friction against the same, retard the carriage wheel on that hand, which produces the same effect as if the carriage wheel on the right hand had actually been accelerated. However simple this may appear, it completely obviates a difficulty otherwise, in my apprehension, insuperable.

To facilitate the ascent of locomotive carriages on railways is a desideration of great importance. . Three modes have occurred to me. First, for surmounting small elevations I would avail myself of the retardation of the velocity acquired in passing over a definite length of a horizontal plane.

Second. For surmounting greater elevations the means now used on board of steam boats for hauling small boats along side, may be resorted to.

Third. And lastly, for surmounting elevations of one, two, three, or more hundred feet, I have devised a plan for the explaining of which a model will be required, which when finished I hope to have the pleasure of showing you.

I am, dear sir,

With much esteem and regard,

Your Obedinet Servant,

John Stevens.

Have you lately received anything of consequence from Mr. Strickland?

Letter to Gerard Ralston, Esq.

Hoboken, Janusry 14, 1826.

Dear sir:-

My last letter to you per mail was dated the second of December--a letter which I hope you have received, as it contained matters, in my estimation at least, of some importance. Soon after the date of that letter, my second daughter was taken ill, and, to the great affliction of myself and family, died on Friday the sixth instant. These cirsunstances, added to the season of the year, have suspended my further operations.

In your letter you say, "Must there not be a double railway for passengers?" And Mr. S. in his answer says, "A railroad for the transportation of goods, merchandize and lumber of all kinds, ought to be a double line of edge-rail." But if two double lines of edge-rails should be required, the expense would prove too enormously great to yield a prospect of anything like an adequate revenue derivable on and

from the capital expended. On the principles pursued in the charter, a single line--that is, two parallel roads constructed of wood, shod with plate iron--can be made to answer, very conveniently, every purpose. The particular manner in which this can be done need not now be detailed. Here, then, we should effect a most astonishing saving both in the number of rails, and in the cost of their materials; and the Company would be released from all apprehension of difficulty in procuring what iron may be wanted. I have invariably calculated the expense of a single railroad at a sum not exceeding \$5,000 per mile; whereas four, executed on Mr. Stevens plan, would cost nearly ten times that sum. The next Legislature would be enabled from the progress made by the Company, to form a correct estimate of the expense and the feasibility of the plan pursued, and to proceed, should they find it advisable, understandingly and without delay to extend the route of the railroad through Harrisburg to Pittsburg.

In the Evening Post I lately met with an ex-

tract from the State Gazette containing an "Extract of a letter addressed to William Strickland, Esq." and his answer thereto. The difficulty of connecting the waters of the Ohio with those of the Delaware by means of a canal, is admitted on all hands, and has induced, very wisely, your Governor to recommend to the Legislature, "Deliberately to weigh and examine the results of the experiments now making in England upon a great scale, as to the relative and comparative expense and advantages of canals and railways, before they finally determine upon any mode which heretofore may not, under all circumstances, be found to embrace the best interests of the country."

I have besides what I have lately done in making experiments on a large scale, at different times expended much time and money in exploring personally, with the aid of an expert surveyor, a route of a railroad between Philadelphia and Columbia, on the Susquehanna--a survey or map of which is, I presume, in your possession. At the eastern bank of the Conestago is, I believe, the only place where an in-

clined plane, requiring a stationary engine or some other mechanical contrivance, will be found necessary. At the time the Act passed, granting the Charter, the project of a railroad of such length was generally scouted as visionary. But principally owing to the laudable exertions your Society have made, the public mind has been so much enlightened on this subject as to open a fair prospect of its being seriously undertaken during the ensuing year. In order then, to save probably a whole year, would it not be expedient to procure the passage of the short supplement which has previously been before the Legislature? The Act itself was under consideration during the greater part of the session, and its various provisions underwent so thorough an investigation as to preclude any necessity for introducing amendments--which, indeed, if attempted, would likely prove fatal to the Charter itself.

I hope shortly to be able to resume my efforts in perfecting the objects I have so nearly brought to a close. I purpose setting about immedi-

ately the completion of my model of a plan for ascending and descending declined planes, without the necessity of recurring to stationary steam engines.

Should your Society deem it expedient to give their aid and countenance to an application to the Legislature for the passage of said supplement, I should apprehend no difficulty would occur; and could the Legislature be induced to subscribe for a moderate number of shares, such an impulse would be given as would insure the ultimate success of the object--more especially should Mr. Strickland, as no doubt he will, bring out with him all the recent improvements on railroads.

An answer to this will be esteemed a particular favor by, dear sir,

Your Obedient Servant,

John Stevens.

Gerard Ralston, Esq.,

Secretary.

You will find a copy of the Sup. on the next page.

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Letter to Gerard Galston from John Stevens says
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~~dated~~ Hoboken, January 17, 1826,

Dear sir:-

I lately addressed a letter to you per mail dated the -----inst. This will be handed you by Mr. Frances Stockton, who will take charge of the report, &c., should my son James not call for it. The small portion of road near this place laid with flags has answered so perfectly well, that we have been induced to form the road for half a mile on this side its junction with the road to Jersey City or Pawles Hook in a similar manner. I mention this to call your attention to a suggestion made in a former letter, which was to this effect:- To carry railways calculated for steam carriages through the streets of a city would be extremely inconvenient: I would purpose therefore, that the steam carriages should stop somewhere on the east side of the Schuylkill Bridge, and that the carriages for conveying goods and passengers be drawn by

Review

horses over flagged ways into all parts of the City ; and should the line be extended on towards Bristol, &c., the railways for steam carriages should form a junction with the Bristol route at Kensington. Such an arrangement would be very convenient, as coal, &c. could be carried immediately to every person's door with but the trouble and expense of shifting, &c.

Should, through the exertions of your Company, the Charter be revived, there cannot now be a particle of doubt respecting the practicability, feasibility and complete success of the undertaking. Should even my projected improvements all come to nothing (do not construe this as the language of despair--so far from it, I feel every day more and more sanguine in respect to my improvements), enough has already been done in England to place this grand improvement beyond all possibility of failure. Read the following extract of a letter from Darlington, *England* October 31, 1825.

"The locomotive engine is now at work on this line, and I am rejoiced to say she excites the aston-

ishment and admiration of the country; she performs her work well, and carries from the coal pit to Stockton, a distance of twenty-five miles, with a greater burthen than was calculated. We have now been at work over a month." The Darlington railroad passes over elevations far surpassing any to be met with on the railroad routes from Philadelphia to Columbia. I feel anxious that the incalculable benefits to be derived from the introduction of railways in our country should be the result of your meritorious efforts. The completion of the Erie Canal unquestionably does imperishable honor to the State of New York. But the establishment of railroads will form an entire new era in Political Economy.

We cannot not now form the faintest conjectures respecting its ultimate results. And what renders these prospects so charming, and truly valuable is that it is now satisfactorily ascertained that the picture it holds out to our view is not visionary, but a true representation of what must very soon be brought into actual existance. No section of the

Union will be so greatly benefited by this improvement as your Commonwealth. The cheap conveyance to a market of your excellent iron and coal, which you possess in such abundance, will be the means of bringing into existence manufacturing establishments everywhere with the products of which your Commercial Capital will for a long while supply the wants of the new empires rising up into existence in the Southern Hemisphere of our extensive continent. Thus will it carry agriculture, manufacturers, and commerce to an extent hitherto unknown, and which will probably continue forever unrivaled. Independently of being the most of the vast extent of commercial intercourse in our territories, Philadelphia must soon become the principal Commercial Depot of the Western country. I say no more, but to entreat you to be up and doing.

Letter to Gerard Rolston.

Hoboken, January 28, 1826.

My Dear Sir:-

I am fully aware of the justness and truth of your observation--that an efficient agent should feel some personal interest in the business of his principal to make him act with zeal and energy.

You must be aware that the net profits arising on the undertaking must depend on the amount of the capital expended and the cheapness of the mode of conducting the business of transporting goods and passengers.

First then, as to the capital. The difference of expense of forming one or two lines of railways will be nearly one hundred per cent. But can the business be conducted satisfactorily on a single line?

Next as to cheapness of transport. With a view to this object, the special and peculiar provisions contained in the Charter are founded. The emol-

uments of all other establishments of a similar nature are based on the receipts of a specified toll. But it is on the immense profits to be derived from the exclusive transport of goods, and conveyance of passengers, that we are to look for our emolument. The Act establishes the rate of fare on this transport of "goods, wares, and merchandize", merely. On the conveyance of passengers the Charter is silent and from the comparative cheapness and speed of this mode of conveyance, we should not only engross the whole, but the number of travelers would thereby be increased beyond all calculation. Look at the increased intercourse between Philadelphia and New York during the last season, when the fare was reduced to \$2--2 1/2. The transport of goods, &c., is, by the Charter, rated at seven cents westward per ton per mile, and eastward at, of transportation, three and a half cents; now the actual expense exclusive of twelve per cent capital paid to stockholders and repairs, will not, I am confident, amount on a ton to one cent per mile.

But can the business be conducted satisfact-

orily on a single line? Were indeed the road open to all, this would not be effected with any tolerable convenience. But where the whole transportation will be conducted by the Company under the control of the superintendent, it will be readily seen that we take into consideration that such arrangements and regulations can be made and adopted as to prevent all interruptions and detentions. The several lines of carriages can be made to start at certain hours precisely. The rate of traveling can always be regulated so as to arrive at certain places at certain times. For instance, suites of carriages start one from Philadelphia and another from Columbia at the same time--they will, of course, meet half way. And should it be necessary to have a number of lines, by starting at a given time, and traveling at a given gait, they will always be sure to meet each other at a given time and place. Besides, intermediate turnouts can be made at convenient distances so as, in case of accidents, which indeed can rarely happen, no interruptions and detentions can take place. But you will say that goods, &c.,

and passengers will not be carried with equal speed. Admitted. But as this mode of conveyance is capable of being regulated with the utmost precision, it can be ascertained to a minute when a given suite of carriages with passengers will arrive at a given place. At this time a slow line with goods, &c. must take its station on a turnout-- and should it even be detained there a half an hour (which in practice can rarely or never happen) it is of little or no importance. Suppose, for instance, the usual speed of the slow lines to be five miles an hour, it would take sixteen hours to perform the whole journey. But should the period of arrival be occasionally protracted to twenty hours, it would be of little or no importance. The illustration I now give will, I expect, afford you a competent idea how the business may be conveniently conducted with a single line.

Upon the whole, then, by having only one line and that too constructed on a plan vastly more economical than any yet in use--in consequence too of the

superior cheapness of the mode of transportation and also of the immense amount of transport, the projected improvement cannot fail of being extremely lucrative--after paying all expenses as well as twelve per cent on the capital to the stockholders, the residuum must amount to something very handsome. This residuum, by the charter, the Superintendent is authorized to retain to himself.

I come now to the proposition I wish to make you in consideration of attendance at Harrisburg so long as may be necessary during the remainder of the present session of the Legislature, and of your services in procuring the passage of the supplement to the charter, I now promise and agree to relinquish to you whatever allowance the Directors may agree to give to the Superintendent, provided you perform the duties required of him by the Act. And moreover, I also promise and agree to assign over to you twenty per cent of the amount of the residuum above aluded to, whatever it may be. And in order to assure the zealous cooperation of Mr. Peters I now further promise and

agree to assign over to him ten per cent of said residuum.

I need not go into any minutia of details to satisfy you that the residuum cannot but be very considerable, should a single railroad prove sufficient. In consequence thereof, and of the cheap mode of construction, should the capital not exceed \$400,000; and further, should important improvements be made in the construction of the railways, steam engine, and carriage--all three circumstances combining, will enable you to form a pretty correct estimate respecting the magnitude of the residuum. But there can be no question that should the railroad from Philadelphia to Columbia be completed, it will soon be extended not only to Pittsburg, but be ramified in all directions. The field is unbounded, and to a young man like yourself holds out a positive assurance of an immense harvest at no distant period.

You have not acknowledged the receipt of a letter dated the second December last in which was a description of an improvement in the position of the

lateral wheels. In your enumeration of expected opponents you mentioned "The Pottsville and Danville Railway, Susquehanna and Delaware Railway to commence at Wilkesbarre and to terminate at Water Gap on the Delaware." Let me ask if charters have been obtained for these objects, and when? And upon what plan they are to be constructed. I would wish to get a printed copy of these bills.

I have already informed you (in my letter of the second of October last) that Doctor Mitchell, another gentleman and myself took our seats on the carriage, and without any assistance, the carriage was started by the force of the engine, and conveyed us to the further extremities of the ways, about three hundred feet. These ways had a curve precisely like those I have erected. Owing, however, to a variety of unfortunate circumstances which I cannot now detail, I have as yet made only a few partial experiments, but these, with what was done in the shop, have satisfied me of final success. With respect to the operation of the engine no doubt can now remain--

and the reduction of its weight from eight or nine tons to a single one is surely of primary importance. Should you, however, still be devoid of faith as to my improvements, yet the complete success of the Darlington railroad will surely prove completely satisfactory.

Get but the Supplement through, and the accomplishment of these our magnificent objects must inevitably follow.

A letter from Mr. Peters dated July last, contained the following effusions:-

"I confidently hope the application which we will make for the revival of your law at the next session, will, after the knowledge on the subject of railroads now, and which will before December be in possession of the public, assure the success of the application. The conduct of the Legislature of Pennsylvania in relation to your law was disgraceful."

Mr. Connelly has a certified copy of the Act, which no doubt he will let you have.

I just now read in the Globe and Emerald of

this day's date an article headed "Pennsylvania Canal."

"The Committee appointed by the Pennsylvania Legislature for the purpose of considering a resolution relative to the commencement of the Pennsylvania Canal have furnished their report. The report is decidedly favorable to the undertaking; it says that the constitution of the contemplated canal uniting the Delaware with the Ohio and Lake Erie, will effect an app- x x x x and the states of the West. The entire length of the canal will not exceed fifty miles, and will not cost more than \$6, 000 per mile." Is the statement correct? I have to acknowledge the receipt of the "First Annual Report" accompanied with several other printed documents--among the rest "Andi alteram partem" in answer to Hamilton, or, as I suspect your Corresponding Secretary--viz, Your First Vice-President. Be this as it may, should "Andi" continue his publications be so kind as to transmit them to me per mail. Mr. Peters and yourself must set your faces against all attempts at amendments. Should any

one of the provisions of the law as permitted, become a subject of discussion, its enemies would assuredly obtain a complete triumph. If, after mature deliberation, the Legislature was induced three years ago to pass a law for incorporating a railroad company, the present Legislature x x x x when the success of the undertaking is no longer x x x (What follows is impossible to decipher on account of dry rot, the letter concluding as follows:-)

Will not the United States Gazette give us all the proceedings in the Legislature respecting railroads and canals?

Document No. 352, read in the House of Representatives of Pennsylvania, February 4th., 1826, was--

"An Act to incorporate the Columbia, Lancaster and Philadelphia Railroad Company.

To Stephen Van Rensselaer, Esq.

Hoboken, February 21, 1826.

Dear sir:-

I perceive by the proceedings of the Legislature, that you have applied for the incorporation of a company for erecting a railroad from Schnectady to Albany. This, if properly constructed, cannot fail to prove extremely lucrative. I enclose a description of the Hutton Railroad, which is published in the U. S. G. of yesterday's date. The plan exhibits one of the most unfavorable locations that could almost any where occur. Still you see the thing has been most successfully carried into effect under these very unpromising circumstances. This publication at once puts an end to all cavalling about the practicability of this grand improvement.

I enclose also a printed copy of my letter to Governor Clinton, written last winter, and his answer; also proposals for erecting a railroad from N. Y. to Albany--which you will perceive was considered as visionary and unpracticable--with some other short

publications, all which I will thank you to preserve.

I now come to the subject I wish to communicate. Last winter I was premature in my project--and if postponed to the next winter I shall be entirely too late. It may now possibly be carried through the Legislature. Three years ago I obtained a charter for a railroad from Philadelphia to Columbia, on the Susquehanna, but it was suffered to expire from want of faith in the project. If not too late you have now an opportunity of immortalizing your name, by bringing before the Legislature the project of a railroad from New York to Albany. The Act passed by the Pennsylvania Legislature will serve to frame the proposed bill by. Have the goodness to answer this by the next mail.

J. S.

To his Excellency, De Witt Clinton, Esq.
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Hoboken, February 22, 1826.

Sir:-

The letter addressed to Stephen Van Rensselaer, Esq., on the other side, was written last evening. It has since occurred to me that now this grand improvement has been fairly tested in England, and no doubt can now remain as to its practicability, the State might without hesitation carry it into effect. I think it a duty the members of the Legislature owe to their constituents to take the matter up immediately--they should not suffer the ensuing season to be lost. It will soon, if properly executed, produce an immense revenue to the State, and redound much to the honor of the members of the Government who have had any agency in the business, if it should be instantly put under way. I have written to Mr. Brasher on the subject, and requested him to call on your Excellency, who will have the goodness to show him the plan of the Hutton railroad and my letter.

J. S.