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AND THE RECORDING OF
AMERICAN AND OTHER PATENTED INVENTIONS.

APRIL, 1835.

Address upon a proposed Rail-road from Wilmington to the Susquehanna, together with a Report of the Survey made by William Strickland, Esq., Architect and Engineer.

(WITH A MAP.)

The route through Wilmington, Elkton, North East, and Charlestown, to the Susquehanna river, has been, from the earliest settlement of the country, an established route in the great chain of communication running through Philadelphia and Baltimore. It is the shortest road between these two cities, and, until the establishment of the steamboat and rail-road line through Newcastle and Frenchtown, was the most expeditious, and, as such, was the regular route for the transportation of the United States Mail. In the winter season, when navigation ceases, it is still the line by which that mail travels. The peculiar advantages which this route possesses over all others, points it out as the natural thoroughfare over the peninsula, available at all seasons of the year, the shortest, and, when the proper artificial means are applied, the most expeditious. Convinced of these facts, the attention of intelligent individuals in Wilmington has for many years been directed to the subject of a rail-road communication along this route, as one which would at once unite great public convenience and utility, with a profitable investment of capital. An act of incorporation was obtained from the legislature of Delaware, in the year 1832, authorising a company, with a competent capital, to construct a rail-road from Wilmington to the line of the state of

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Maryland, in the direction of the Susquehanna; and in the same year, a similar act was granted by the legislature of Maryland, providing for a continuation of the road through that state; and, by provisions in their respective charters, the two companies are authorized, after their capital shall be subscribed, to unite their stocks, and form one company. The capital authorized to be created in each state, is \$400,000. The charters in both states are perpetual. Circumstances which it is unnecessary to detail, have delayed the serious prosecution of this undertaking until within a few weeks past. In the beginning of January, a committee, appointed by a town meeting of the citizens of Wilmington, employed William Strickland, Esq., of Philadelphia, to make a survey of the route from Wilmington to the bay of North East, who, having performed that duty, has submitted a report, which realizes all our anticipations of the facility and moderate expense with which an easy and excellent rail-road, shorter than the post road, may be constructed. Of this survey, as it is intended that Mr. Strickland's report shall accompany this, all the circumstances are so fully explained in it, that the committee will here simply refer to it, and pass on to a brief explanation of the advantages of this undertaking, and the inducements it presents as a profitable investment of capital.

The peculiar advantages belonging to a rail-road by this route, are: First—Its shortness. Second—Its capacity for constant use at all seasons of the year. Third—Its connection with the river Susquehanna. Fourth—The character of the country through which it passes.

And 1st—*Its shortness.*—The whole distance from Philadelphia, through Wilmington and Elkton, to Charlestown, at the head of the bay of North East, is one mile less than the distance to Frenchtown, by the way of the river Delaware and Newcastle. From Charlestown it is but five miles to the Susquehanna ferry, opposite to Havre-de-Grace, and thence thirty-six miles to Baltimore. As a mixed steamboat and rail-road route, the distance from Philadelphia, through Wilmington, to Charlestown, is but three miles greater than the distance through Newcastle to Frenchtown; and the distance from Frenchtown to Baltimore is fifty-six miles, while from Charlestown to Baltimore it is but fifty miles, making a difference of six miles in favour of this route, in the whole distance. Thus much for the actual distance. In point of time, the advantages of this route consist in nearly ten miles more of rail-road travel, of an excellent landing at Charlestown, and an open navigation, entering at once into the bay, without obstructions of any kind. In point of shortness, then, both of distance and time, the committee express a confident opinion that there is no route between the two cities which will compare with this.

2d—*Its capacity for constant use in all seasons of the year.*—Although the present survey has stopped at the bay of North East, the acts of incorporation contemplate an extension of the road to the Susquehanna, and the company, when organized, will undoubtedly deem it their interest to carry into effect the intention of the law.

The termination of the road, according to the present survey, at Charlestown, will be but five miles from the Susquehanna ferry, opposite to Havre-de-Grace, and is in the direct line to it. It has been ascertained that the extension of the rail-road to that point is practicable and easy. In view of these facts, it is obvious that, during the obstruction of the navigation in the winter season, this route must of necessity be the thoroughfare across the peninsula, available in all weather, and from that circumstance, securing the transportation of the mail, and the carriage of passengers. As connected with this view of the subject, it may be proper to add, that there is a law of Maryland authorizing the construction of a rail-road from Baltimore to Havre-de-Grace, which has been already surveyed, and that there is at this time an excellent turnpike road from Baltimore to Bush, about eleven miles from Havre and Port Deposit.

3d—*Its connection with the river Susquehanna.*—The probability, indeed, we may say, the ultimate certainty, of such a connection, has been adverted to in the preceding paragraph. Such a connection, by opening an avenue for the transportation of the vast produce of the Susquehanna on this road, presents advantages too obvious to render any illustration necessary.

4th—*The character of the country through which it passes.*—The route is laid through a populous and well cultivated district, and one which is probably not surpassed by any other of the same extent in the union, in the number of mill seats abundantly supplied with water. A great deal of this mill power is now applied to various and valuable manufactures of cotton, wool, iron, and flour, and the introduction of so ready an access to a market as the rail-road will present, cannot fail to bring into requisition and use, a great amount of manufacturing power, that is now unemployed.

Wilmington itself is situated in the midst of a great manufacturing district, embracing almost every species of valuable manufactures in our country. The vast manufactures of the Brandywine, in powder, flour, cotton, wool, and paper, will furnish a large amount of transportation for the road. Two large and valuable steamboats are owned in the place, and have for several years carried on a profitable business, in passages and freights. They would at once constitute a good beginning of a steamboat line, being already engaged in a regular and profitable business.

These advantages the committee present as peculiar to this route, of which it cannot be dispossessed or deprived by any competition. Adverting to others of a general character, in which a fair competition is to be encountered, they cannot see the slightest reason to doubt its ability to sustain itself. As an important connecting link in the great chain of artificial communications, passing from New York, through New Jersey and Pennsylvania, and through Maryland to the river Ohio, it cannot but obtain a fair proportion of the immense and increasing mass of travellers who are constantly passing north and south, on these great thoroughfares. The number of passengers over the Newcastle and Frenchtown rail-road, within the last year, is said to have been 100,000; and the rate of increase is

estimated at ten or twelve per cent. annually. The rapid increase of population in our country, combined with the rapidly increasing facilities of communication, give abundant assurance that this increase will steadily progress. From what has been previously stated in this address, we deem it fair to say, that the Wilmington and Susquehanna Rail-road may justly claim a moiety of this vast amount of business—a proportion which, with the exclusive sources of business and profit already adverted to, will, it is believed, amply repay the investment.

The committee conclude by referring to the report of Mr. Strickland, which is appended, for details relative to the practicability, length, and expense of constructing the road, and for other particulars connected therewith.

Wilmington, Feb. 17, 1835.

JAMES CANBY,	} Committee.
JOHN WALES,	
W. B. BROBSON,	
DAVID C. WILSON,	
H. WHITELEY,	
JAMES SEWALL,	
T. S. THOMAS,	

Philadelphia, Feb. 11, 1835.

SIR,—I have the honour to transmit to you my report and estimate of the cost of constructing a rail-road from the city of Wilmington to the bay of North East.

These documents are accompanied with a map and section, exhibiting the route and grade of the road, together with the principal streams, common roads, and towns, which lie in, and are adjacent to, the track.

There are twelve printed copies of the report, one for each member of the Committee of Survey; no more will be printed, unless so ordered by you; and when the lithographic map is finished, it is intended that it should accompany the report, as a means of more comprehensive illustration.

In the specification and estimate, you will perceive that I have comprehended all the items necessary to make a perfect and substantial road, including store-houses, wharves, and fencing in of the whole line; in short, every thing, except locomotives and car machinery.

As soon as the navigation opens, it is my intention to send to the Committee of Survey a specimen of the kind of edge* rail which is

* This rail was invented some years ago, by Samuel V. Merrick, Esq., of Philadelphia, and was favourably reported on by the Committee on Inventions, of the Franklin Institute. The first rails of this form were rolled in England, from drawings made by him. The annexed cut exhibits a transverse section of the rail; it evidently combines greater stability and strength, with less weight of



material, than any other edge-rail yet devised.

COM. PUB.

embraced in the estimate. It is of the most simple character, combining substance and strength, where these properties are most requisite. I hope the committee will not make a choice of wooden string pieces, merely on account of the difference in the cost, which is of no importance, compared with the permanence and lasting properties of the *iron edge rail*; particularly so, when we consider that the road is to be so great a thoroughfare for light and rapid transit, as well as for heavy trains of burthen cars.

The estimate is made with great care, and will cover every thing in a substantial and workmanlike manner; such as it ought to be, both for economy, as well as permanency and duration; at least, it is such as I will not hesitate to contract for and completely finish in all its parts.

With great respect, &c.

WILLIAM STRICKLAND.

To JOSHUA GILPIN, Esq.,
Chairman of Comm. of Superintendence,
Kentmere, Brandywine, Delaware.

REPORT.

Wilmington and Susquehanna Rail-road.

TO THE COMMITTEE OF SURVEY.

GENTLEMEN,—Your instructions of the eighth of January last, requiring the survey of a route for a rail-road between the city of Wilmington and the bay of North East, have been complied with, and I have now the honour to report to you a map of the country, containing the course and sectional grade for a rail-road between these two points.

Having had the advantage of an early acquaintance with the topography of this district of country, between the bays of the Delaware and Chesapeake, it was not in the least difficult for me, in the commencement of the exploration, to determine the general course, that would at once combine straightness with the least irregularity of surface; with a single view, therefore, to these characteristics of a good route for a rail-road, I have succeeded, I think, in tracing a line combining the lowest grade with the shortest direction.

It has been suggested that a more direct and eligible route might be obtained for a rail-road on the southern banks of the Christiana creek, by crossing this stream at Wilmington, and pursuing a course to the south of Iron hill, to a point near Elk landing, and from thence to North East, by the valley of Mill creek.

There is not, perhaps, in any other district of the union, an equal area of country embracing so many mill seats, with a bountiful supply of water, as that portion of Newcastle county which is contained within the quadrant circle of the twelve miles radius. Agricultural products, and manufactures of various kinds, abound on the tributaries which flow in upon the northern banks of the Christiana; and the

route for a rail-road, as laid down on this side of the stream, passes through a populous country, where mill power is applied to a great extent, and where the means of communication with a market like the route under view, will always command a great accession of freight and passengers. But few of these advantages exist on the southern side of the creek, and a single glance at the accompanying map will show that nothing, in point of distance, can be gained by this proposed route.

First Division.—On leaving Wilmington, it is necessary, in order to avoid the marshes on the northern side of the creek, to pursue a line of great curvature along the margin of the fast land, to a point below Moody's. At Moody's, there is no difficulty in making a choice between a level bottom and upland, where the line is laid in nearly a straight direction to Newport and Stanton. The surface of the country back of these town is entirely too high and undulating to pass out from the valley of the Christiana. Stanton lies nearly in the straight line from Wilmington to Elkton, and Newport is a little south of this line. A surface of ground of great uniformity, and upon a dead level, is obtained by the way of Latimer's woods, and the foot of Indian hill, through the town of Newport, Wardell's, and *Bread and Cheese* Island, to the Red Clay, at Stanton. This division of the route is five and a half miles in length, and can be laid at a small expense.

Second Division.—At the crossing of the Red Clay, near Bailey's mill, the banks of the opposite shores of this stream approach within 150 feet of each other, where a bridge of 75 feet span can be easily and cheaply constructed. From Stanton, Ogle-town is to the south of the same straight line to Elkton, and the route traced, passes through the bottom land of White Clay creek, on the north side of the stream; it crosses Mill creek near the barn of Dr. Reynolds, and proceeding through Francis and James Denny's land, it passes the White Clay at Morrison's, near Price's mill, from whence it continues in nearly a direct course, rising at a grade of about twenty feet to the mile, to the north bank of Ogle's run, near the bark mill, which is but a short distance from Ogle-town, on the road to Newark. This division of the route is four and a half miles in length, three of which is nearly level, and exceedingly easy of execution. Mill creek will require a bridge of seventy-five feet span, with embanked approaches of moderate length, and about twenty-five feet in height. The White Clay bridge must consist of five spans, of seventy-five feet each, with short embanked approaches of twenty feet in height.

Third Division.—On leaving the bark mill near Ogle-town, the same direct line heretofore mentioned as our guide to Elkton, passes between Iron and Chestnut hills, near Tyson's mill and ford; these hills are directly in the route to Elkton, and are connected together by a link or ridge of land, entirely too high for the passage of the rail-road. To pass round Iron hill to the southward, would require a great degree of aberration and curvature from the direct course, and, consequently, an increase of distance; the nearest approach,

then, to the straight line from the bark mill, onward, is by the northern foot of Chesnut hill, to the ravine of Persimmon run, at its junction with the head of the Christiana creek, below the forks. This division of the route is three and a half miles in length, upon an ascending and easy grade of about twenty feet to the mile. It will require but small bridges to pass Ogle's run, and the Christiana creek.

Fourth Division.—Pursuing the ravine of the Persimmon, which skirts the northern slope of Chesnut hill, the route crosses at the tangent point, or commencement of the circular line between the states of Delaware and Maryland, and rises by an easy grade to the level of the table land near the road leading from Newark to Elkton. It passes the summit about half a mile to the eastward of the old canal feeder, and gradually descends, at the grade of twenty-five feet to the mile, into the valley of Cow run, near the foot of Bell hill, at Ricketts', and crosses the Big Elk below Gilpin's ford, in nearly a straight course towards the Little Elk. Here the line leaves the town of Elkton about three quarters of a mile to the southward, where a branch line may be made to curve into the town upon a dead level. The fourth division extends to the Little Elk at Crawford's mill, and is six miles in length; it passes the summit about midway between the Persimmon and Elk, and upon very even and favourable ground. The passage of this stream will require a bridge of five spans, each seventy-five feet in length, with an embanked approach on the eastern side of the creek, of 800 feet, by twenty feet in height. The Elk is wild and impetuous; it runs through extensive flats, which are subject to overflow, and great care must be taken to promote a free passage for the water. The Little Elk is also of the same character, but a much smaller stream. Two spans of seventy feet, with short embankments, eighteen feet in height, will be sufficient at this pass. The ground upon which the line is laid, between these streams, is exceedingly favourable, and forms a level esplanade for the whole distance to the north and west of the town of Elkton.

Fifth Division.—After crossing the Little Elk on the south of the post road, the line curves towards Mill creek valley, and there it is laid in nearly a straight line through the barrens of this stream, for the distance of three miles, upon a rising grade of thirty feet to the mile. The ground to the right and left of this portion of the line, as far up the valley as M'Vay's, is very rough and undulating, and gives us no choice but to pursue the course of the stream. The numerous small runs of water which come in from the ridges on both sides of the line, must be led off by wide ditches and drains. M'Vay's is situated at the foot of the eastern slope of Bacon hill, where the ridge, or highest point of land, divides the waters of the North East river and the Little Elk. At this place, the valley of Mill creek continues in nearly a straight course, and rises rapidly to the summit of Bacon hill. From a distant view of this hill, it would seem to

afford a low pass in a direct line to the town of North East; but from a trial line of level, it proved to be entirely impracticable, being nearly 170 feet above the tide, and but two miles distant from the contemplated western termination of the road, on the river, at Simper's point. However desirable an object it might be to keep up, for this short distance, the existing straight and uniform direction of the route from Wilmington to the river at North East, I regret that it could not be effected but by resorting to a long deep cut, or tunnel, and the necessity of inclined planes on the western descent to the river. A resort to fixed machinery of any kind, on a public line of road, is highly objectionable, as it creates a never-failing source of expense, delay, and danger.

By curving the route to the northward, at a point in the line below M'Vay's, Bacon hill may be avoided altogether, and a pass through a sandy ridge can be had, by an average amount of cutting to the depth of twenty-two feet, for a distance of about 1800 feet in length. After passing this ridge, which is found to be about thirty feet lower than that at Bacon hill, a reversed curve of large radius will lead the line into a straight course toward the town of Charlestown, by crossing the North East river at a point between the forge and the town. This inclination to the northward will be highly favourable to the ultimate continuance of the route toward the ferry on the Susquehanna, opposite Havre-de-Grace. Simper's point is one mile below the town of North East, and is situated at the head of the navigation of the bay; the river between this point and the town, is made up of shoal water, and extensive mud flats.

Charlestown is equally as eligible a point for the termination of the rail-road, and is but two miles distant from the crossing of the North East river, on the road to the ferry at the Susquehanna. If the rail-road terminates at Simper's point, it must curve to the southward, and pass through the town of North East, at the distance of one and a half miles from the line direct to Charlestown; and if the termination be at Charlestown, the whole distance will be increased about three quarters of a mile. Both these positions are highly favourable for steamboat navigation, and for the construction of wharves, store-houses, &c. &c. This division is six and a quarter miles in length.

Upon a review of the whole line, it is highly satisfactory to find that it is laid nearly in a straight course, and that the several divisions which have been described, amount in distance to twenty-five and three quarter miles, counting from Market street, in the city of Wilmington, to Simper's point, at the head of the bay of North East. It is shorter than the post road, deducting the unavoidable increase of distance at the points of commencement and termination. One-third of the distance is level, and will require but little expense in execution. In the gradual approach to the table land, or summit, between the White Clay and the Elk, the grade is from fifteen to twenty-five feet in the mile, with but little cutting and embanking.

In passing the ridge between the Little Elk and North East, the ascending and descending grade is from twenty-five to thirty-five feet in the mile. The cutting at this ridge will be but forty-two feet, at its greatest point of elevation, while the shortness of the distance through it, together with the loose character of the soil, will render the excavation easy to execute, and at a moderate expense.

The soil, throughout the whole route, is uniformly composed of light loam, and a mixture of sand and gravel. Stratifications of white and red clay crop out on the summits of the ridges and table land. But few points of rock are touched by the line, and these occur only at Moody's, the crossing of the White Clay at Morrison's, and at the base of Chesnut hill. Detached boulders of horn-blende, hematitic ironstone, chalcedony, and jasper, lie scattered on the surface, and intermixed with the soil. Sand and clay form the whole surface of the country, from Elkton to the bay at Simper's point.

The principal bridges and embankments at the Red Clay, White Clay, and the two Elks, will constitute items of considerable cost in execution; these are unavoidable, and the expenditure ought to be liberally applied toward their substantial construction; particularly so, under the consideration of the smallness of the amount of labour in grading, fixing rails, and forming all other parts of the road, which you will perceive, upon reference to the detailed estimate accompanying this report, does not average more than \$19,000 per mile, for the whole distance from Wilmington to North East. The cost of the bridges, both large and small, including the culverts and drains, wharfing, and the fencing in of the whole route, amounts to \$169,485, making a total of \$507,623, to which is added three per cent., for contingent expenses and supervision.

In this estimate, an edge rail, similar to that used on the Liverpool and Manchester road, is contemplated, which is to be laid on white oak sleepers, and fixed in line, with half chairs on the inner and outer sides of the rails, omitting entirely the stone blocks and wooden string pieces, plated with flat bars of iron.

The whole distance from Philadelphia, by a rail-road route, passing through Wilmington and Elkton, to Charlestown, at the head of the bay of North East, is one mile less than the distance to Frenchtown, by the way of the river Delaware and Newcastle. At Charlestown, it is but six miles to the ferry on the Susquehanna, and five miles from thence to Port Deposit, by the river route; and whether *this route* be regarded as the great mail line, affording a speedy transit alike for passengers and goods to Baltimore, and for the conveyance of the products of the Susquehanna from Port Deposit, it is evidently the shortest and most direct that can be practically and efficiently established.

In conclusion, I must be permitted to express great satisfaction in the verification and close agreement of my present levels, with those which were made twelve years ago, in the survey of the northern route for the Chesapeake and Delaware Canal, a great part of which

route, you will perceive by the map, is now reported to you, as the most favourable ground for the contemplated rail-road.

Respectfully submitted, &c.

WILLIAM STRICKLAND,
Architect and Engineer.

Philadelphia, Feb. 10, 1835.

To Messrs. JOSHUA GILPIN,
THOMAS GILPIN,
JOHN CHEW THOMAS,
JAMES CANBY,
JAMES SEWELL,
DAVID C. WILSON,
WILLIAM CHANDLER,
HENRY D. MILLER,
GEORGE CRAIG,
JOHN EVANS,

} *Committee of Survey.*

NOTES OF AN OBSERVER.

Remarks on Professor Olmsted's Theory of the Meteoric Phenomenon of November 12th, 1833, denominated Shooting Stars, with some Queries towards forming a just Theory. By JAMES P. ESPY.

(Concluded from p. 160.)

In connexion with this subject, I am glad to take the present opportunity of recording, and communicating to the public, the following most remarkable occurrence, communicated to me by Mr. Sears C. Walker, of Philadelphia.

Philadelphia, Dec. 8th, 1834.

DEAR SIR,—I send you enclosed the statements of Mr. Riggs, and Mr. Black, concerning the falling bodies seen on the evening of the 7th, and morning of the 8th, of August, 1833.

I should not have mentioned the occurrence of this phenomenon, but for the extraordinary interest on such subjects, excited by the meteors of November subsequent.

The weather during the day was precisely like that on the 12th of November, viz: rainy in the morning, and clearing up gradually from noon to sunset, but not entirely clear, with wind from westward till eight or nine o'clock in the evening. Going into an eastern room, at half-past eleven, to observe the immersion of *m Ceti*, I observed a great number of falling bodies in the field of view in the telescope; they cast a slight shade on the moon's disk, in falling, but were only partially opaque. Their appearance reminded me of that of phosphorus, slightly heated, so as to be visible, at night, when near. I thought that they were embers, or like the white ashes from burning pine, when blown suddenly, and listened to know if there was not a